WHITE PAPER ON LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM IN JAPAN, 2013

Ministry of Land, Infrastructure, Transport and Tourism

Contents

Part II Trend in MLIT Policies

Column

※ Maps used in this white paper do not indicate exhaustive Japanese territory.

Preface

If we look back over the development of infrastructure, there are traces of such from an archaeological standpoint from the earliest times, but if they rely solely on the etymology of infrastructure, its origins can be traced back to Ancient Rome. The ancient Romans are referred to as 'the fathers of infrastructure' by modern men, and the word "infrastructure" itself is said to be derived from combining the latin word *infra*, used by ancient Romans to mean "below," or "underneath," and the latin word *structura*, which means "building," or "structure."

Though infrastructure created by the Romans included many things, such as temples, amphitheaters, and public baths, the Appian Way and the Aqua Appia—both planned and constructed by Appius Claudius Caeus (340 - 273BC)—became the model for the great Roman roads and aqueducts that have left their mark in posterity as the great infrastructures of Rome[Note].

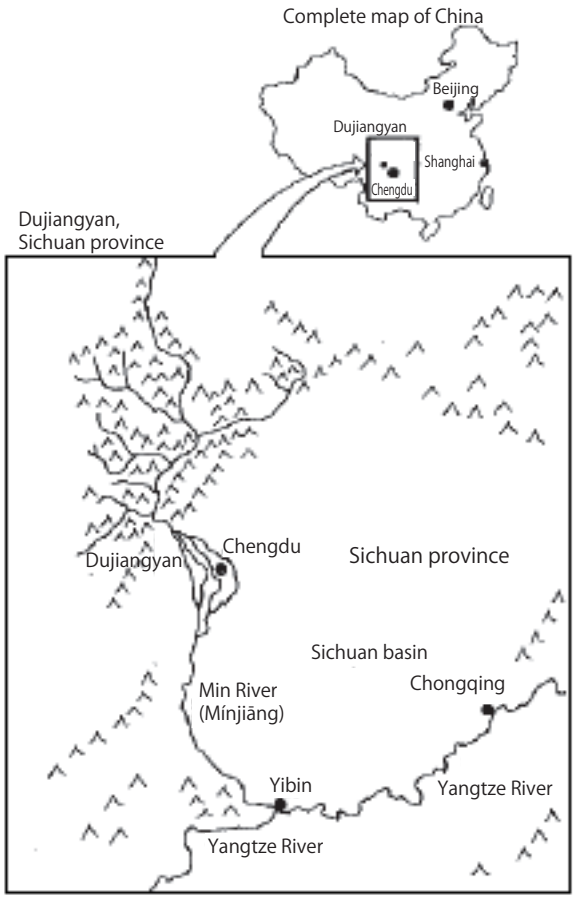
There is a story, which takes place in the 6th century—several hundred years after the construction of the Appian Way—about a senior statesman of the Eastern Roman Empire visiting Italy and marvelling at how the Roman roads has continued to function for such a long period of time, but this can be attributed to the Roman Empire investing in the proper maintenance and repair of their roads.

Meanwhile, if we look at the development of infrastructure in Ancient China, during the Warring States period (221 - 206BC), Li Bing, a military and civilian governor of Shu, constructed the Dujiangyan, a massive irrigation infrastructure on the Min River, which is a tributary of the Yangtze River, located about 60km northwest in an area known in modern times as Chengdu, in the Sichuan Province of China. The structure of Diujiangyan not only prevented damage from the flooding of the Min River, but also made it possible to divert the water into the Chengdu Plain. Since then, the Chengdu Plain has been called the 'Land of Tianfu,' and is one of the foremost agricultural areas of China. Astonishingly, the Diujiangyan continues to perform the function for which it was designed over 2,200 years ago, but this can be largely attributed to the fact that repair work was continuously carried out by successive river administrators for proper maintenance.

Figure 1 The Appian Way (Rome, Italy)

Source) The Japan Civil Engineering Consultants Association, General Incorporated Association

Figure 2 Location of Dujiangyan



Source) Joji Tanaka (2001) "Dujiangyan and its Founder, Li Bing: Memorandum of Irrigation Structures in Ancient China" Koyo Media

Note An even more ancient example of a road would be the Royal Persian Road, built by Darius I, king of the Persian Achaemenid Empire (r. 522 - 486BC).

If we reflect back on history in this way, we can see that great infrastructure in any country that has been constantly updated and properly maintained is able to carry out the same function for which it was designed over hundreds of years, and leave its mark on history.

Figure 3 Dujiangyan (Dujiangyan, Sichuan province, China)

Source) The Japan Civil Engineering Consultants Association, General Incorporated Association

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT), having estimated that Japan's social infrastructure that was developed after the high-growth period will age rapidly in the future, has designated 2013 as the "First Year of Maintenance," to demarcate the year for when serious efforts towards realizing a beginning of the age of maintenance of general social capital started. In this White Paper, we will discuss the maintenance and updating of social infrastructure in light of the current situation of aging infrastructure, and present the future direction of the MLIT [Note].

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Note In general, the term 'Infrastructure,' is assumed to refer to physical structures such as roads and sewage systems. For example, in the Japanese dictionary "Kojien" (6th edition), infrastructure is defined as, 'Facilities that are foundations for societal living and industry. Social capital that forms an industrial base, such as roads, railways, ports and harbors, as well as social capital relevant to supporting societal living, such as schools, hospitals, parks, and social welfare facilities. However, when the term used is 'Social Infrastructure,' various public services and general systems may be included in the discussion. For example, in the Cabinet Office 2013) "FY 2013 Economy and Finance Annual Report," 'Social Infrastructure' is a term that refers to, 'A wide range that includes roads, ports and harbors, water supply and sewage systems, electricity and gas, medical care, fire-fighting, policing, and government services.' So when the term 'Social Infrastructure' is used, the concept encompasses a very wide range. In this white paper however, the term 'Infrastructure' will mainly be used for social capital that are physical facilities, while the term 'Social Infrastructure' will be used to include public transportation services provided that are related to transportation infrastructures, as we discuss the maintenance, management and upgrading of such. Therefore, the term 'Social Infrastructure' will be used in this white paper, but when discussing infrastructure that refers only to physical facilities, the terms 'Infrastructure' or 'Social Capital' will be used.

Part I

Towards Maintenance, Management and Renewal of Future Social Infrastructures

- Social Infrastructures That Are Passed on from Aged to Age -

Chapter 1 Social Infrastructures To Date and Challenges Open for the Future

Section 1 History of Social Infrastructures and Their Roles

1 Development of Infrastructures Viewed in Chronological Order

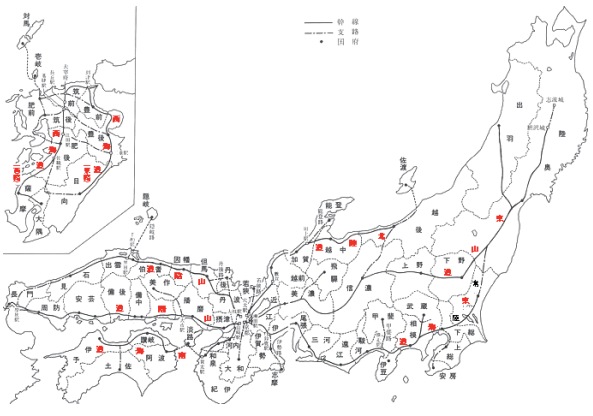
The history of infrastructure development is long in Japan as well. Here is a retrospective review of the history of infrastructure development in Japan, starting from the ancient times (to the late Heian Period), through the medieval times (from the Kamakura Period to before the formation of the Edo Shogunate Government), to the modern times (Edo Period), modern age (from the Meiji Period to prewar years) and present age (from postwar years to the present time), along with discussions of how the infrastructures developed have been maintained and managed.

(1) Ancient times - Budding infrastructures in Japan -

A documented account of infrastructures in the prehistoric days of Japan can be found in a Chinese book of history written in the third century, titled "Gishi-wajin-den." An envoy from the Chinese country of Wei visiting Tsushima and the northern part of Kyushu in those days described the roads there as being no better than "animal trails" and remarked that he could not see people walking ahead of him because of gross vegetation. With the subsequent opening of the Tumulus Period, tumuli came to be built everywhere. Huge dimensions of these architectural structures attest to the advanced level of the civil-engineering technology in those days. According to Japan's legendary history, the 16th generation Emperor Nintoku, the founder of the capital in Nanba, allegedly built Manda-no-tsusumi (Manda Levee) alongside Yodogawa River and a bridge across Ikaizu[Note 1] and opened a highway from the capital of Nanba to Tajihino-mura[Note 2].

In 645, a political reform known as "Taika Reform" began to accelerate the pace of formation of a nation of centralized governance based on "Ritsuryo" (system of code and ordinance), enforcing a system of complete state ownership of land and citizens and marking off local administrative districts. The Capitals of Fujiwara-kyo and Heijo-kyo, built in succession, were furnished with large networks of roadside ditch nets as drainage. In the river traffic-rich nation of Japan, there had been ports called "Tsu" or "Tomari" from the ancient times, but state-run ports called "Kunitsu" were newly developed from province to province from which to ship tributes to the government during the Ritsuryo period.

Figure 1-1-1 Schematic of the Seven Post Roads



Source) "Japanese History of Traffic," authored by Kota Kodama, Yoshikawa-kobunkan

Road development was commenced from a military viewpoint for unifying warring provinces. The prototype of roads had already been formed before Taika Reform (645), but roads entered a stage of full-scale development about during the reins of Emperor Tenchi and Tenmu (668-686), and seven trunk roads (Tokai-do, Tosan-do, Hokuriku-do, Sannin-do, Sanyo-do, Nankai-do and Saikai-do) were collectively called the "Seven Post Roads."

Regarding the maintenance and management of infrastructures in those days, the Building and Repairs Statutes of the Yoro Code compiled in 718 dictated that ports, bridges and roads in each district be repaired from mid-September to October and that, whenever an important road was broken to deny passage, it be fixed at all times. The statutes proceeded

Note 1 Presumably part of the districts of the Higashinari-ku and Ikuno-ku of the present-day City of Osaka.
Note 2 Presumably part of the Cities of Matsubara, Habikino, Sakai, etc. of the present-day Osaka Prefecture.

to require provincial governors and local magistrates to patrol embankments close to a big river and renovate them after the fall harvest if they needed repairs or do so whenever they were found wrecked.

Column Public Works Undertaken by Gyoki

In the ancient days of Japan, religious practioners played a dominant role in the development of the nation's infrastructures. In those days, the Japanese Buddhist priests who had sailed as an envoy to Tang Dynasty China not only acquired the latest doctrines of Buddhism in the continent but brought back the then state-of-the-art concepts and expertise of civil engineering as they came home to Japan. As an example, Dosho (629 to 700), who visited Tang Dynasty China in 653, is said to have learned the Ritagyo (altruistic practices) of Mahayana (Greater Vehicle) Buddhism from Genjosanzo (Xuanzang), purportedly a model of Sanzo Hoshi appearing in Hsi-yu-chi (Journey to the West). Ritagyo is the way of the Buddha who not only pursued his own state of enlightenment but is dedicated to self-annihilation for the benefit of others. Monks are said to have sought learning from their practices of civil-engineering works, which were in accord with their concepts as they provided labor to make for a better living environment in the interest of the public.

Figure 1-1-2 Seated Statue of Gyoki (duplicate)

Source) Picture courtesy of the Osaka Prefectural Sayamaike Museum.

Among them, Gyoki (668 to 749), a disciple of Dosho, is remembered as religious practioner who had left the most brilliant achievements among all. Initially, Gyoki was accepted as a wicked monk who kept people astray and his missionary work was suppressed by the imperial court[Note].

Figure 1-1-3 Infrastructures Developed by Gyoki

Kind	Number	Location
Ponds	15	Kawachi (1), Izumi (8), Settsu (6)
Ditches	6	Kawachi (1), Izumi (2), Settsu (3)
Dykes	4	Kawachi (1), Settsu (3)
Sluices (Note)	3	Kawachi (3)
Road	1	A road leading to Kawachi and Settsu
Bridges	6	Yamashiro (2), Settsu (4)
Funayasu (harbors)	2	Izumi (1), Settsu (1)
Fuseya	9	Yamashiro (2), Kawachi (2), Izumi (2), Settsu (3)

(Note) Watergates and tubes through which water is discharged from reservoirs or the like (sluiceways and sluice pipes)
Source) Developed by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) from a chronicle of Gyoki in "The Dictionary of Gyoki" authored by Kaoru Inoue.

Under an ancient system of centralized governance based on the Ritsuryo (law and code), when people were ordered to pay taxes, such as Yo (taxes in kind) and Cho (tributes) or provide labor, they had to travel to and from the capital by carrying their own supplies of food to fulfill their duties. Travelers would suffer from hunger and diseases and may fell dead along the way. For this reason, Gyoki built welfare facilities, called "Fuseya," to practice the Ritagyo, providing food and lodging to the travelers and thus save them. While propagating adherence to the Ritagyo, Gyoki led practiced his teachings by leading people to construct civil-engineering works with funding from local powerful families, digging irrigation reservoirs and ditches, opening roads, building bridges and more (Figure 1-1-3). These activities not only resulted in a growing number of people following Gyoki's teachings but also enriched the powerful families' land. In 723, the Sanze-isshin Law, or a law that endorses the ownership of reclaimed land for three generations, was enforced to revise the land system then based on public land ownership, to authorize those who had reclaimed land to owner for a certain period of time, encouraging voluntary reclamation. Such change to Japan's land system helped broaden

Note In Shoku Nihongi" (Chronicles of Japan, Continued) compiled in 717, Gyoki is mentioned as a Shaveling Gyoki" ("shaveling" meant to disgrace a monk).

Gyoki's sphere of activities, with his reputation rising higher. Gyoki's such social enterprises soon won recognition from the imperial court.

Figure 1-1-4 A scene from the upper volume "Gyoki Building a Bridge" of Gangoji Gokuraku-bo Engi Emaki (Handscroll of the Legends of Gokuraku-bo at Gango-ji Temple)

Source) Image courtesy of the Gangoji Institute for Research of Cultural Properties.

In the wake of a heightening chain of social anxieties, including an outbreak of smallpox, famine and political rivalry, Emperor Shomu issued an "Order to Construct a Statue of Birushana Buddha" in 743 as a token of his prayer for the nation's stability. Gyoki was chosen to drive the construction of the great image of Buddha in this project, because nobody else could have probably been equal to the task of undertaking such large-scale public works by raising a huge amount of money and getting an innumerable number of workers to work. Two years later, Gyoki was promoted to the position of Japan's first Daisojo (a Buddhist priest of the highest order) by Emperor Shomu to top the official priests' hierarchy. Gyoki passed away in 749, when he was recorded as Gyoki Bosatsu (Bodhisattva) in Shoku Nihongi" (Chronicles of Japan, Continued) cites him as Gyoki Bosatsu (Bodhisattva) for the sake of his achievements, blessing and so on. The diverse trails Gyoki had left behind have survived many centuries since to tell us of a typical example of a private initiative to develop social infrastructures in the ancient days of Japan.

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(2) Medieval times - Opening of the era of the warrior class and the development of infrastructures -

Through the medieval times in which a warrior government came into existence, a nation of decentralized governance that built on feudalism lasted as distinct from one of centralized governance based on Ritsuryo. Accordingly, the nation's infrastructures trended more towards regional development rather than uniform, nationwide deployment.

Figure 1-1-5 Shingen Zutsumi (Shingen Banks)

Source) Ministry of Land, Infrastructure, Transport and Tourism(MLIT)

The Kamakura shogunate government worked to turn the capital of Kamakura into a large fortress not found in the ancient times. It built Kirigishi (bluffs), Horikiri (water-filled moats) and Kiridoshi (paths cut through mountains), roads with guttering and rivers with revetments. Wakaejima Island built at the proposal of a Buddhist priest, O-amidabutsu, is well known as the oldest port left to date. As a road policy, Minamoto no Yoritomo enforced the Law of Post Roads in 1185 to lay the Tokai-do Road between Kamakura and Kyoto. Further, Kamakura Roads were developed for local warriors to rush to Kamakura in times of emergencies often expressed in the saying "Iza Kamakura." Further, officials known as "Hobugyonin" were appointed to manage lands and roads in the city of Kamakura, fix bridges and clean up roads.

As the period of warring states sets in, leading warring lords appeared. These lords embarked on programs to develop infrastructures in their own territories in an effort to boost their national power. A typical example is the repair works of the merging section of Kamanashi River and Midai River flowing Kofu Basin undertaken by Shingen Takeda. Generally

known as "Shingen Zutsumi (Shingen Banks)," the works encompassed a broad suite of flood control techniques, including embankment, water sharing, open levees and retardation. A Shinto shrine was built on the banks, where festivals were purportedly held to attract visitors to let them tread on and consolidate the banks (Figure 1-1-5).

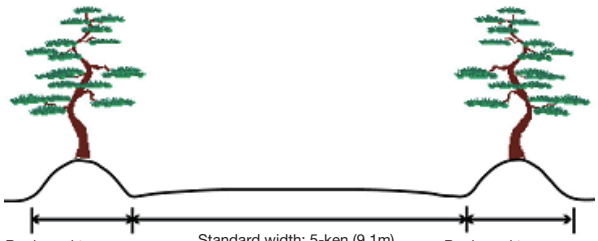
(3) Modern times - Development of infrastructures in times of peace -

In the Edo Period in which the Tokugawa shogunate regime was in firm position, a state of national tranquility lasted about 270 years to encourage the regional, as well as nationwide, development of infrastructures. The shogunate government of Edo was a centralized entity but had power to reshuffle, diminish or divide the feudal lords' territories at its discretion and imposed obligations on the feudal lords to provide the money and labor needed to help it build infrastructures on its own in the civil-engineering and construction works called "Otetsudai-bushin."

Go-Kaido Roads, or the five key roads, are typical of the highways developed during the Edo Period. The five land routes starting from Edo were kept under direct supervision from the Tokugawa shogunate government - Tokai-do Road, Nakasen-do Road, Nikko-dochu Road, Oshu-dochu Road and Koshu-dochu Road. Each of these roads had post stations set up at fixed intervals and each station was required to keep horses available at all times under a Tenma-sei, or transportation system. The Go-Kaido Roads were managed by Road Magistrates, who regulated post stations, repaired roads and bridges, preserved boulevard trees and milestones and more. Day-to-day maintenance and management tasks were undertaken by roadside post-station townsmen and villagers, while larger works were carried out by daimyo, or feudal lords, and daikan, or local governors. Because the roads were treaded not only by daimyo traveling to and from Edo to fulfill their duty for alternate year-attendance at the Tokugawa shogunate government but also by merchants and the general public, the roadside amenities were frequently maintained and fixed.

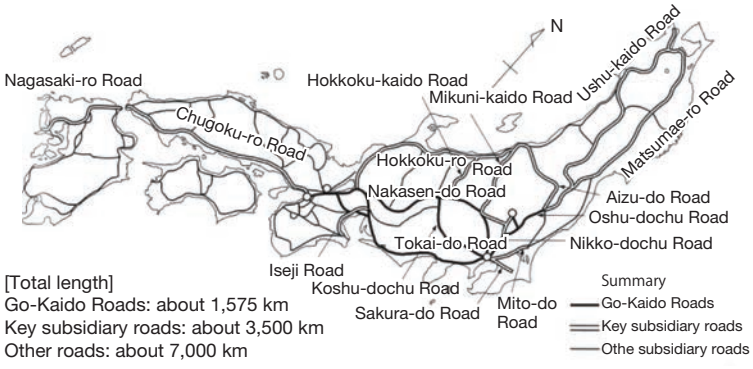
Flood control projects continued to grow in scale and technologies advanced. In the Kanto Plains, Kanto Region Magistrate Ina Bizennokami Tadatsugu and his descendents changed the course of Tone River then flowing into the present-day Tokyo Bay eastwards to flow into Choshi on the coast of Pacific Ocean in an effort to defend Edo from recurring flood damages in a 60-year major flood control project known as "Eastward Move of Tone River" (Figure 1-1-8). Flood control works conducted during the Edo Period were

Figure 1-1-6 Typical Cross-Sectional View of the Go-Kaido Roads



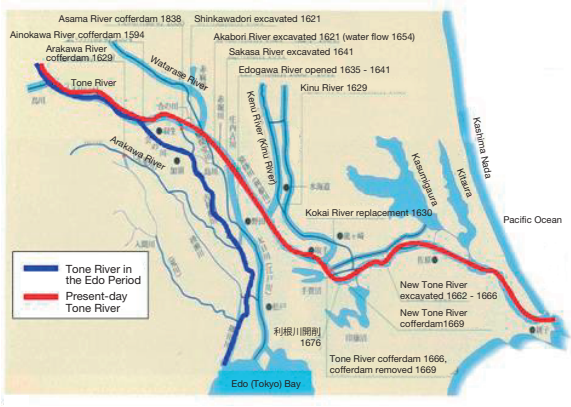
Source) MLIT

Figure 1-1-7 Schematics of Key Roads



Source) MLIT

Figure 1-1-8 Eastward Move of Tone River



Source) MLIT

supervised by the shogunate government, with their expenditures being shared among the shogunate government, clans, villages and so on in the ratios predetermined according to the scale of the works, such as governmental, public, lord and private works.

As for sewage systems, stone-built sewer ditches, called "Taiko (or Sewari) Gesui," allegedly built by Hideyoshi Toyotomi in the late days of the medieval times in Osaka, were expanded in the Edo Period as they were maintained and managed at the responsibility of townspeople from different districts. Records state that ditch cleanup work, called "Suido Sarae," was carried out jointly by townspeople from these districts and the ditches repaired at their expenses. The Taiko Gesui was later transferred to the Meiji Government, and part of the system is still used at present.

The prototype of the modern urban park in Japan is said to date back to the Edo Period. Yoshimune, the eighth shogun, planted cherry trees in Asukayama Hill near Oji Gongen Shrine to make it a place for viewing cherry blossoms. In addition, the present-day guidebooks were published, including "Edo Meisho-zue" (a pictorial guide to the sights of Edo). Thus, there were places like the modern parks in the Edo Period, where people would gather and feel the nature of the four seasons.

Column Private Management of Eitai Bridge in the Edo Period

In the winter of 1657, a large-scale blaze, generally known as the "Great Fire of Meireki" set Edo on fire, reportedly burning down about 60% of all the towns of Edo. Later, Daimyo's residences, Buddhist temples and Shinto shrines were distributed in a wider area and broad streets built from a disaster preparedness viewpoint, with densely populated towns spreading into locations, such as Honjo and Fukagawa, in the Koto District then in the outskirts of Edo. In line with the expanding sphere of Edo, Ryogoku Bridge was built across Sumida River in 1660, followed by Eitai Bridge in 1698, spurting the metropolitan Edo to grow into the so-called "Eight Hundred and Eight Towns of Edo. Eitai Bridge was first built at the Big Ferry of Fukagawa, about 200m downstream from the present bridge location. The huge wooden bridge was 207 meters long and 6.8 meters wide, with clearances of at least 3 meters to allow vessels to pass even in times of spring tides.

Eitai Bridge is widely known as a passage way for the forty-seven ronin en route to Sengakuji Temple in Takanawa after they had broken into Kira's residence to take their vengeance and is also reputed as a privately managed bridge in the Edo period.

While both Ryogoku Bridge and Eitai Bridge were built by the Edo shogunate government, maintaining and managing multiple long and large bridges could have imposed a heavy burden upon the governmental finance. The removal of Eitai Bridge was decided in 1719 in the Kyoho Period as its pace of decay aggravated significantly. But as local townspeople filed a petition for continued existence of Eitai Bridge, the shogunate government authorized its survival, but subject to the bridge being maintained and managed by the townspeople on their own.

Then, the maintenance and management of the bridge by townspeople began, but it often suffered breakage as the piles were decayed by seawater and also under the influence of rainstorms and so on. In the circumstances, the shogunate government recognized that burdening the townspeople with all of the maintenance and management expenses incurred was no longer practicable and decided to authorize the collection of 2-mon per capita from the passengers, except for samurai, for a limited period of seven years from 1726. This was when the administration of the bridge, as well as its maintenance and management, by the townspeople began. The bridge toll thus collected financed the reconstruction of the bridge as early as in 1729. The shogunate government authorized the collection of bridge tolls by 1-mon and also as necessary to finance its renovations incurred by its destruction by fire, washout and so on for 10 years from 1736.

In 1807, Eitai Bridge collapsed, leaving more than 500 dead reportedly on the date on which a festival

of Tomioka Hachiman Shrine in Fukagawa was held. The following year, the shogunate government rebuilt Eitai Bridge in its entirety, putting an end to the period of bridge maintenance and management by the townspeople. This story should tell that bridges had been recognized as an essential urban infrastructures in the Edo Period as well and as such were kept under government-private management.

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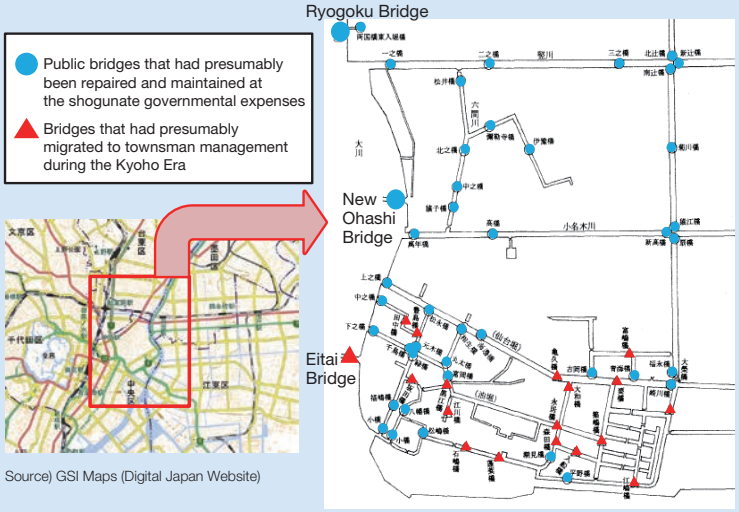
Figure 1-1-9 Status of Privatization of Bridges in the Honjo and Fukagawa Districts during the Edo Period (Kyoho Era)



Source) GSI Maps (Digital Japan Website)

Source) Hiroshi Matsumura, "Privatization of Edo Bridges during the Kyoho Era," Proceedings of Lectures on the History of Civil Engineering

Figure 1-1-10 Eitai Bridge in the Edo Period

Source) National Diet Library

(4) Modern era - Development of infrastructures in the course of Japan's steps towards modernization -

Founded in 1868, the Meiji Government returned lands and people to the Emperor, and abolished feudal domains and inaugurated prefectures and moved ahead with its goal of forging a new nation through the concepts of enriching the nation and fortifying its military strength and promoting new industry. In developing infrastructures, the government was active to introduce technologies from the U.S. and European nations, which had been progressively modernized through the Industrial Revolution, to achieve drastic leaps. The central and local governments were supposed to assume their own shares of the workload and spending needed to develop, maintain and manage infrastructures as stipulated in "River, Port and Road Repair Rules" promulgated in 1873. Examples of private capital leveraged to develop, maintain and manage infrastructures can also be found.

(Development of Traffic Infrastructures)

While the government opened the nation's first railway between Shinbashi and Yokohama (about 29 km) in 1872, the finance tightened gradually in the wake of the Seinan War or other conditions. Railway construction stalled after opening of the railway between Kyoto and Kobe in 1877. The construction of private railways financed by private capital gained more impetus subsequently. When Nippon Railways was incorporated with a view to laying private railways in 1881, the advantages of railway investment won recognition, and a private railway boom came around 1887. The Railway Construction Law enacted in 1892 consolidated a policy for driving the construction of railways in the primary initiative of the central government. As the Railway Nationalization Law was enacted in 1906, state-run railways came to command a little more than 90% of the nation's railways towards the end of the Meiji Period. With the opening of the Showa Period,

suburban train networks came to be developed keeping pace with the progress of urbanization. In 1927, Japan's first subway run by Tokyo Underground Railway came into service between Asakusa and Ueno by Tokyo Underground Railway.

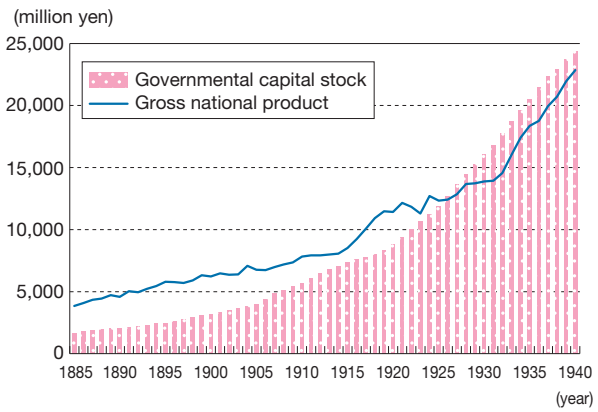
When Yokohama Port opened in 1859, it was furnished with two docks eastward and westward. Main ships would stay at anchor offshore, and smaller barges would reciprocate between the docks and the main ships to carry freight and passengers. Opening of the railway between Yokohama and Shinbashi resulted in a bulking volume export and import freight at Yokohama Port, urging the development of facilities that allow direct mooring of larger main ships, but harbor works was not commenced instantly because of financial difficulties. It was not until 1889 when Japan's first harbor renovation works set into full motion. Through the implementation of the first phase of the renovation works (1889 to 1896) and the second phase (1899 to 1916), the construction of general-purpose harbor facilities furnished with railway sidings came to completion with berthing and cargo handling made easier, turning Yokohama into one of the world's leading ports. Following the Sino-Japanese War and the Russo-Japanese War, an accelerating transition of Japan's industrial structure, with its heavy industries progressing, dictated the nation to launch a political package aimed at ports and harbors to respond to the needs of the changing times. Then, the Port and Harbor Council was inaugurated under the jurisdiction of the Minister of Internal Affairs as an advisory body concerning the construction and planning of ports and harbors. The council submitted its recommendation titled "Policy for Selecting and Constructing Key Ports and Harbors" to the government in 1907 and designated four ports as Class 1 key ports and eight as Class 2 key ports to qualify for treasury subsidization. More key ports were added in pace with the growth of domestic industries.

Japan's history of airport building dates back to the construction of a military airfield in Tokorozawa, Saitama Prefecture 1911. In 1931, a state-run airport dedicated to civil aviation opened as "Tokyo Airport" (later "Haneda Airport"), furnished with one runway 300 m long and 15 m wide. Osaka Itami Airport completed in 1939 but, with the subsequent outbreak of World War II, air transportation was no longer available to civilians for private use as the nation moved into a war regime.

Road development lagged behind railway development as a whole, because the Meiji Government had a policy of prioritizing railways.

Japan's first road legislation is said to have been the stipulation that reads "those who undertake to execute projects for flood control, road repairs, etc. for convenience's sake shall be authorized to collect dues" issued in December 1871 as Grand Council of State Edict No. 648. This edict encourages private development of roads and bridges in return for granting a right to collect dues. It helped renovate Sayo-no-Nakayama Pass on the Tokai-do Road and lay a bridge across Tenryu River. In 1876, Grand Council of State Edict No. 60 was issued to classify all roads into three categories: national roads, prefectural roads and vicinal roads. In 1885, 40 national road routes were authorized. Later, the Road Bill was debated at the Imperial Diet starting from 1896. The former "Road Law" was established in 1919, which had played a central role in Japan's road administration until the present Road Law was enacted in 1952.

Figure 1-1-11 Gross National product and Governmental Capital Stock in Modern Japan



(Note) Values are based on the 1934 to 1936 prices.
Source) Developed by the MLIT from "Economic Growth of Modern Japan" authored by Kazushi Okawa and Ryoshin Minami and from "National Income (Long-Term Economic Statistics 1" authored by Kazushi Okawa, Nobukiyo Takamatsu and Yuzo Yamamoto.

(Development of Infrastructures in Daily Livelihood)

As for river control, low-water river works were conducted to rectify and dredge channels and thus to animate river traffic, then a primary means of mass-transportation. The development of railway networks since the middle of the Meiji Period, however, eroded river traffic, with the result of the significance of low-water river works shrinking. In the meantime, flood damages occurred frequently on large rivers, such as Yodo River, Tone River and Kiso River, arousing a need to put drastic flood control measures into action. A subsequent transition to high-water works by embankment was instrumental in gradually diminishing flood damages.

Arakawa Discharge Channel was one of these. Its master plan was formulated as a drastic measure to protect downtown Tokyo from flood damages in the wake of a catastrophic flood in 1910. Its construction was commenced in 1911, the following year. The works was pursued by making maximum use of manual excavation, mechanical excavation,

mechanical dredging and so on but its progress was made most difficult by the Great Kanto Earthquake in 1923 and the like. The construction of the channel came to completion in 1930 after a 20-year period. Arakawa Discharge Channel has curbed flooding from Arakawa River or else, adding to the disaster preparedness of the surrounding areas.

With the progress of urbanization, inundation damages from heavy rainfalls and outbreaks of infections induced by stagnant sewage systems prompted the construction of European-style modern sewage systems capable of removing sewage, such as the brick-made large sewage system in Yokohama whose construction started in 1881 and the Kanda sewage system in Tokyo whose construction started in 1884. Later, the Sewage System Law was enacted in 1900, followed by Mikawajima Sewage Treatment Plant coming into service in 1922 to mark the beginning of Japan's history of sewage disposal. But such sewage systems were short of nationwide dissemination because the development of water works was prioritized over sewage systems when it came to developing a hygienic environment.

Figure 1-1-12 Former Iwabuchi Watergate at the Time of Completion

Source) MLIT

Japan's history of urban park development began in 1873, when Grand Council of State Proclamation No. 16 was released to convert those places where people would get together and amuse themselves, as by viewing green vegetation as they did during the Edo Period, to public land for use as "parks" and make them accessible to the public. In the then Prefecture of Tokyo, Asakusa Park, Ueno Park and others were designated "parks." Hibiya Park, which opened in 1903, was Japan's first modern urban park built on a planned basis. Modeled after a Western park, Hibiya Park offered a design prototype for the urban parks that were subsequently developed in various parts of Japan.

Figure 1-1-13 Large Sewage Works Made of Bricks in Yokohama

Source) MLIT

(5) From the postwar years to the present day

Emerging from a period of revitalization, Japan entered a period of rapid economic growth around 1955 and moved on to settle in a period of stable growth since the oil-triggered crises in 1973. Since the economic bubbles collapsed in the early 1990, Japan has found itself in a period of low economic growth to date.

Regarding the total usage, development and preservation of national land, a chain of five Comprehensive National Development Plans have been formulated since 1962 in accordance with the Comprehensive National Development Law to define the futures of comprehensive national land development from long-term and national economic perspectives. Regional promotion policies, social capital development programs and the like have been put into action pursuant to these plans (Figure 1-1-14). The development of infrastructures by category has been driven by formulating infrastructure-specific long-term plans, including the Five-Year Road Development Program of 1954, to define guidelines from long-term perspectives (Figure 1-1-15).

Figure 1-1-14 Comprehensive National Development Plans Developed To Date

	First Comprehensive National Development Plan	New Comprehensive National Development Plan	Third Comprehensive National Development Plan	Fourth Comprehensive National Development Plan	Grand Design for National Land for the 21st Century
Cabinet Council Decisions	October 5, 1962	May 30, 1969	November 4, 1977	June 30, 1987	March 31, 1998
Background	1 Migration to rapidly growing economy 2 Escalating overpopulated city issues and income gaps 3 Income doubling plan (Pacific Belt Zone Initiative)	1 Rapidly growing economy 2 Concentration of population and industries in major cities 3 Progress of computerization, internationalization and technical innovation	1 Consistently growing economy 2 Signs of decentralization of population and industries 3 Evidence of limited availability of national land resources, energies and so on	1 Centralization of population and facilities in Tokyo 2 Worsening of employment problems in rural areas due to rapid changes in the industrial structure, etc. 3 Progress of full-scale internationalization	1 Era of the Earth (global environmental issues, stiffening competition, exchange with Asian nations) 2 Era of depopulation and aging 3 Era of advanced computerization
Target year	1970	1985	About 10 years from 1977	About 2000	2010 to 2015
Basic goal	**Balanced inter-regional growth**	**Rich environment creation**	**Development of an integrated human living environment**	**Multipolar distributed national land building**	**Laying of groundwork for multiaxial national land structure formation**
Development method, etc.	**Site-based development method** In the light of the necessity to decentralize industries to achieve goals, lay out development sites in conjunction with existing major industrial complexes, such as Tokyo, and interconnect these sites by means of traffic and communication facilities. At the same time, drive development activity on a chain reaction basis while taking advantage of characteristics of the neighboring areas to achieve balanced inter-regional growth.	**Large-scale development project initiative** Develop networks of Shinkansen, expressways and the like to propel the implementation of large-scale projects, correcting biased patterns of land usage and dissolving the problems of overpopulation, underpopulation and inter-regional gaps.	**Settlement initiative** Promote regional development while curbing the concentration of population and industries in major cities, and keep national land usage balanced to form a human-oriented integrated living environment.	**Exchange network initiative** To build a multipolar decentralized land: (1) Drive regional development through originality and ingenuity while taking advantage of regional characteristics. (2) Drive the development of vital systems of transportation and information and telecommunications on the central government's own or pursuant to its leading guidelines. (3) Form various exchange opportunities through partnership among the central and local governments and private sector groups.	**Participation and Partnership** - National Land Planning through Participation of Various Entities and Regional Partnership - (Four Strategies) 1 Create nature-oriented living areas (small cities, agricultural and fishing villages, intermediate mountainous areas, etc). 2 Renovate major cities (fix, renew and utilize urban spaces) 3 Develop axes of inter-regional partnership (as a core of inter-regional partnership linked in an axial form) 4 Broad-area international zones (spheres of global exchange)

Source) MLIT

Figure 1-1-15 Long-Term Development Programs in Respective Fields

Name	Five-Year Road Development Program	Seven-Year Harbor Facility Development Program	Seven-Year Sewage Works Development Program	Seven-Year Airport Facility Development Program	Seven-Year Development Program for Urban Parks, etc.	Seven-Year Flood Control Program
Governing law	Emergency Measures Law for Road Development	Emergency Measures Law for Port and Harbor Development	Law on Emergency Measures concerning the Construction of Sewerage Systems	-	Emergency Measures Law for Development of Urban Parks, etc.	Emergency Measures Law for Flood Control and Forest Conservation
Planning period	First (FY1954-FY1958) Second (FY1958-FY1962) Third (FY1961-FY1965) Fourth (FY1964-FY1968) Fifth (FY1967-FY1971) Sixth (FY1970-FY1974) Seventh (FY1973-FY1977) Eighth (FY1978-FY1982) Ninth (FY1983-FY1987) 10th (FY1888-FY1992) 11th (FY1993-FY1997) New (FY1998-FY2002)	First (FY1961-FY1965) Second (FY1965-FY1969) Third (FY1968-FY1972) Fourth (FY1971-FY1975) Fifth (FY1976-FY1980) Sixth (FY1981-FY1985) Seventh (FY1986-FY1990) Eighth (FY1991-FY1995) Ninth (FY1996-FY2002)	First (FY1963-FY1967) Second (FY1967-FY1971) Third (FY1971-FY1975) Fourth (FY1976-FY1980) Fifth (FY1981-FY1985) Sixth (FY1986-FY1990) Seventh (FY1991-FY1995) Eighth (FY1996-FY2002)	First (FY1967-FY1971) Second (FY1971-FY1975) Third (FY1976-FY1980) Fourth (FY1981-FY1985) Fifth (FY1986-FY1990) Sixth (FY1991-FY1995) Seventh (FY1996-FY2002)	First (FY1972-FY1976) Second (FY1976-FY1980) Third (FY1981-FY1985) Fourth (FY1986-FY1990) Fifth (FY1991-FY1995) Sixth (FY1996-FY2002)	First (FY1960-FY1964) Second (FY1965-FY1969) Third (FY1968-FY1972) Fourth (FY1972-FY1976) Fifth (FY1977-FY1981) Sixth (FY1982-FY1986) Seventh (FY1987-FY1991) Eighth (FY1992-FY1996) Ninth (FY1997-FY2003)
Target facility	Roads	Breakwaters, sear routes, berths, etc.	Sewage systems	Airport and aeronautical navigation aids	Urban parks	embankment, dams, etc.

Source) MLIT

Categorized long-term plans have been integrated into Prioritized Social Capital Development Plans to consolidate cross-sectional inter-business collaboration and spurt the development of infrastructures in a more prioritized, effective and efficient manner. In addition, the Comprehensive National Land Development Law was refurbished in its entirety as the National Spatial Planning Law in 2005 to allow National Development Plans to respond to the needs of an increasingly

mature society while valuing more of the aspects of "preservation," such as existing stock utilization and harmony with natural environments. Responsive to this move, National Spatial Strategies[Note 3] were formulated in 2008, which have been enforced to date.

Because the work of developing, maintaining and managing infrastructures generally is not compatible with market principles, it has been carried out at the primary initiative of public offices, but a review of the shares of the responsibility between the governmental and private sectors has been underway to reflect continuing global trends towards privatization. In railways, for example, a JNR privatization reform that took place in 1987 put an end to the 115-year-long history of national railways that had been owned and run by the nation since 1872, passing over the railway services to a newly incorporated JR. The New Tokyo International Airport Authority dissolved in 2004 to launch Narita International Airport Corporation.

As a scheme of infrastructure development, maintenance and management, PFI has launched since 1999 pursuant to the provisions of the Act on Promotion of Private Finance Initiative since it came into being first in the U.K. In 2011, efforts followed to encourage further PFI usage, which included expanding the scope of facilities that qualify for PFI and inaugurating a system of suggestion by private entrepreneurs and a right to administer public offices, etc.

Thus, Japan has such a long history of infrastructures development, maintenance and management dating back to the ancient times that its infrastructures have been developed, maintained and managed to suit the social situations of the times, as well as the relationships between the nation and locals and between the governmental and private sectors. The process of plotting the futures of infrastructures maintenance and management should be pursuing the most efficient, most effective way of management to address the challenges of the times with due regard given to such historical changes.

2 Roles of Social Infrastructures

As reviewed above, the lasting development of infrastructures from the olden days afterward has been motivated by expectations of their effects to revitalize our economic activities and enrich our living for long periods. While the effects of treasury disbursements are often discussed with regard to the flow effects[Note 4], their stock effects are reviewed below.

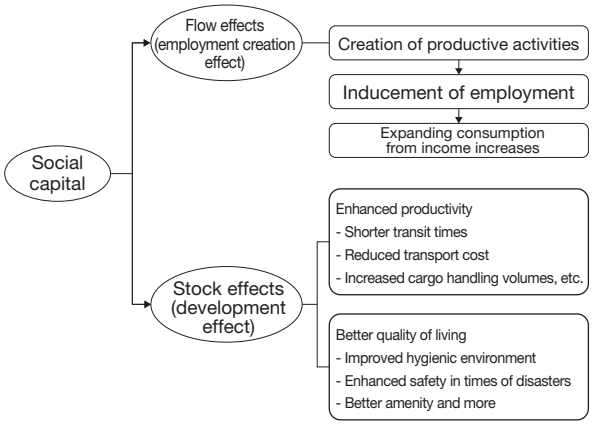
(1) Stock effects of social infrastructures

The stock effects of social infrastructures can be broken down into two categories (Figure 1-1-16):

①Productivity effect - Social infrastructures boost the productivity of economic activities by cutting transit times, reducing transport costs and so on, encouraging economic growth.

②Welfare effect - Social infrastructures help augment the quality of life by enhancing amenity, improving the hygienic environment, furthering safety in times of disasters and so on, making for better economic welfare.

Figure 1-1-16 Effects of Development of Social Infrastructures



Source) "Japan's Social Capital 2012" by the Cabinet Office

Various studies have dealt with the stock effect so far. Particularly, a number of studies have focuses on the productivity effect. Productive factors that create economic growth can be classified into labor force, capital and all other productive factors (TFP[Note 5]). Studies on productivity effects grabbed attention when the possibility of explaining the fall in the rate of rise of TFP in the 1970s and after from its level in the 1960s with reference to the then disquieting issues of aging social infrastructures and their slow development

Note 3 The planning period is about 10 years from 2008.

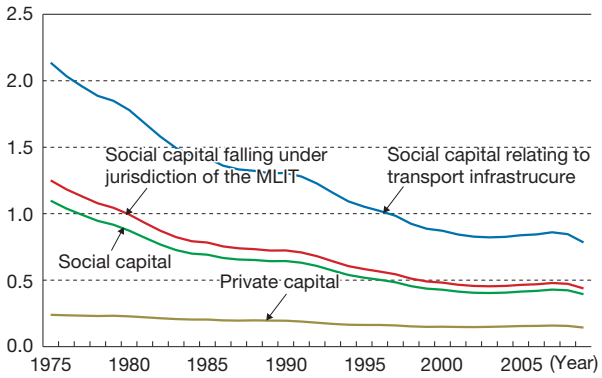
Note 4 The effects the implementation of a project aimed at developing a social infrastructure may have upon expanding consumption, as by purchasing raw materials, stimulating ripple demand for machinery and the like and inducing employment. Examples are the multiplier effect and inducement effect.

Note 5 Total factor productivity, or productivity that allows for all the factors that contribute to production, except for the quantity of labor input and the capital stock. Total factor productivity is considered to be enhanced by better productive efficiency and factors that encourage increased production, such as technical innovations.

was realized. Various kinds of empirical studies have been initiated in Japan as well[Note 6].

Figure 1-1-17 plots the results of a verification of the productivity effects of social capital using data from 1975 to 2009. A look at changes in the marginal productivity of social capital (a measure of to what extent production will increase when one additional unit of social capital is added) suggests that both private capital and social capital have diminished in marginal productivity in pace with the accumulation of capital but moved consistently with the onset of the 2000s. This is considered attributable to the effect of infrastructures that have been efficiently developed through cost-effective and other analyses since the beginning of the 2000s. Marginal productivity comparisons by social capital category indicate that social capital has high marginal productivity in those fields of transportation that presumably contribute directly to productive activities, such as roads, ports and harbors and airports. The extent to which infrastructures contribute to production is thus found to vary depending on characteristics of their categories.

Figure 1-1-17 Changes in Marginal Productivity of Social Capital

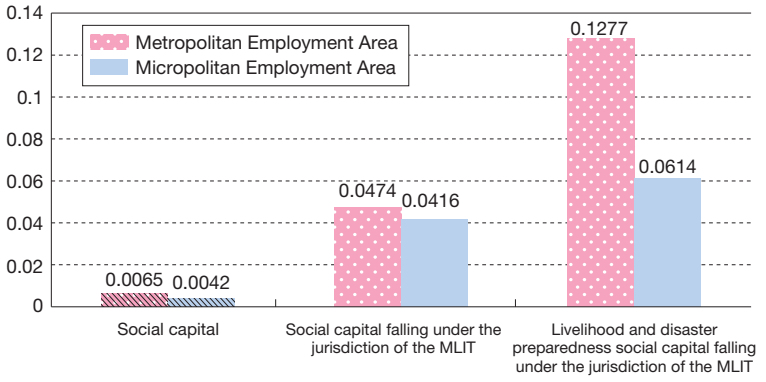


(Note) The 17 fields of social capital listed in "Japan's Social Capital 2012" by the Cabinet Office, less railways, public rental housing, water services, school facilities, agriculture, forestry and fisheries, postal services and industrial water, are used. Social capital falling under the jurisdiction of the MLIT covers the seven areas of roads, ports and harbors, airports, sewage systems, urban parks, flood control and seacoasts. Social capital relating to traffic covers the three fields of roads, ports and harbors and airports. Data from provisional calculation 3-2 has been used, in which patterns of diminishing efficiency of social capital (physical depletion, obsolescence and so on) have been set and the value of capital services derived from the future social capital estimated from these patterns has been converted to a present worth using a discount rate. For details on the estimation, see the Anotation 1.

Source) Developed by the MLIT from "National Accounts" and "Japan's Social Capital" by the Cabinet Office and from the "Japan Industrial Productivity (JIP) Database 2013" by The Research Institute of Economy, Trade and Industry (RIETI), an incorporated administrative agency and from others.

Some prior studies attempted to verify the latter welfare effect. Figure 1-1-18 summarizes the results of verification of the welfare effects of social capital by using data classified by urban employment area[Note 7]. Here, the welfare effect was verified in accordance with the concept of the capitalization hypothesis, whereby the benefit of an infrastructure developed in a given area is ascribed to the land rent (land price) as a result of increased demand for residential grounds in that area triggered by enhanced comfort and convenience. On the basis of the results of such verification, the marginal utility (a measure of to what extent the average land price will change when one unit of social capital is added) was calculated. According to information available from this website, if infrastructures are developed in a given area, the comfort and convenience of that area would be augmented and the effects of those infrastructures manifest

Figure 1-1-18 Social Capital Welfare Effects



(Notes) 1 For the method of estimation used, see Anotation 2. Marginal utilities in the average municipalities in the metropolitan and micropolitan employment areas based on the estimation results are presented.
2 Social capital results are not significant and are presented here only for reference purposes.
3 Social capital: roads, ports and harbors, aviation, agricultural, forestry and fisheries, national forest, industrial water works, public rental housing, sewage systems, waste treatment, water services, urban parks, educational facilities, flood control, forest conservation, seacoasts
Social capital falling under the jurisdiction of the MLIT: Roads, ports and harbors, aviation, sewage systems, urban parks, flood control, seacoasts
Livelihood and disaster preparedness social capital falling under the jurisdiction of the MLIT: Sewage systems, urban parks, flood control, seacoasts

Source) Developed by the MLIT from "Japan's Social Capital 2012" by the Cabinet Office, "Municipal Taxation Status Survey," "National Census" and "Housing and Land Statistics Survey" by Ministry of Internal Affairs and Communications (MIC) and "Prefectural Land Price Survey" and others by the MLIT.

Note 6 Work, etc. presented by Aschauer, D.A. (1989) in "Is Public Expenditure Productive?" Journal of Monetary Economics, vol.23, pp.177-200 are said to be the first of such studies. Summaries of empirical studies in Japan so far include "Productivity Effects of Social Capital: Survey of Empirical Studies" authored by Osamu Murata and Taishi Ono (2001), "Public Investment and Road Policy" compiled by Junichi Nagamine and Taisuke Katayama, Keisoshobo and "Economic Analysis of Social Capital: Prospects" by Yasushi Iwamoto (2002) and Grant-in-Aid for Scientific Research on Priority Areas "Empirical Analyses of Programs" Discussion Paper No. 3.

Note 7 An urban area is set by:(1) Locating central cities on the basis of a DID population, (2) Designating those municipalities having a commuting rate of 10% or more to travel to and from a central city as "urban cities" and (3) Allowing multiple central cities within each urban area. Urban employment areas are the concept of urban areas that have been suggested in "Japan's Urban Area Setup Criteria"(YoshitsuguKanamoto, Kazuyuki Tokuoka (2002)), and the scope of each urban area has been published at the University of Tokyo Center for Spatial Information Science website (http://www.csis.u-tokyo.ac.jp/UEA/uea_code.htm).

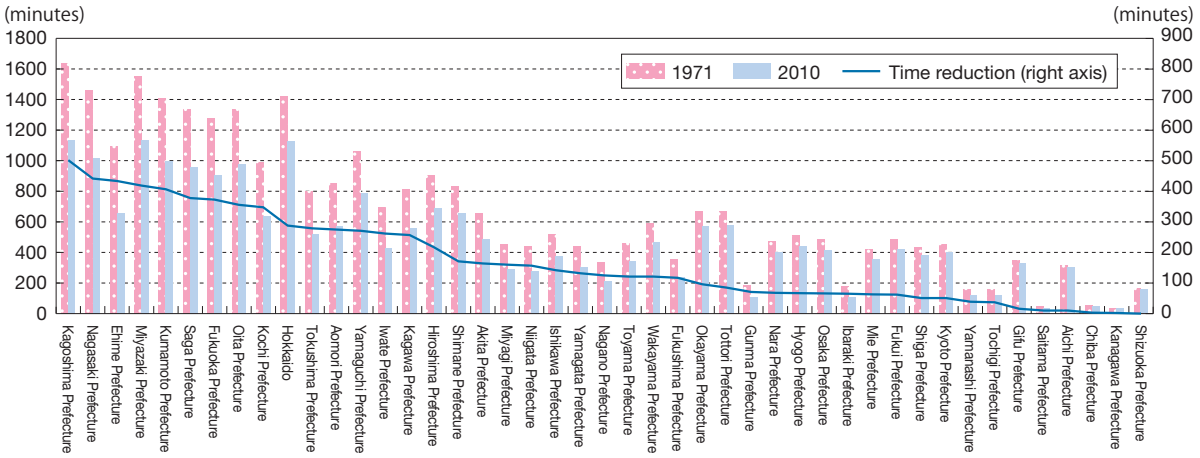
themselves as rises in the land prices. Infrastructures in the fields of living and disaster preparedness are no exception to these effects. Infrastructures relevant to livelihood, such as sewage systems and urban parks, and those relevant to disaster preparedness, such as flood control and seacoasts, are found to help enhance comfort and convenience by improving local living environments and disaster preparedness.

Because such positive analyses more often than not yield different results depending on the data and the analysis method used, the results should be interpreted with some latitude taken into account. These findings suggest that the development of social infrastructures has positive effects from both economic and welfare aspects and stimulates greater simplicity in the flow of economic activity, making for added regional comfort and convenience.

(2) Practical example of stock effects

Transit times trimmed by the development of transportation networks offer an intelligible example of the productivity effect. Figure 1-1-19 compares the times needed to transport freight to prefectural governments on roads starting from the location of the MLIT in 1971 and 2010. Obviously, enhanced transportation networks resulting from the development of expressways, etc. have cut the transit times drastically.

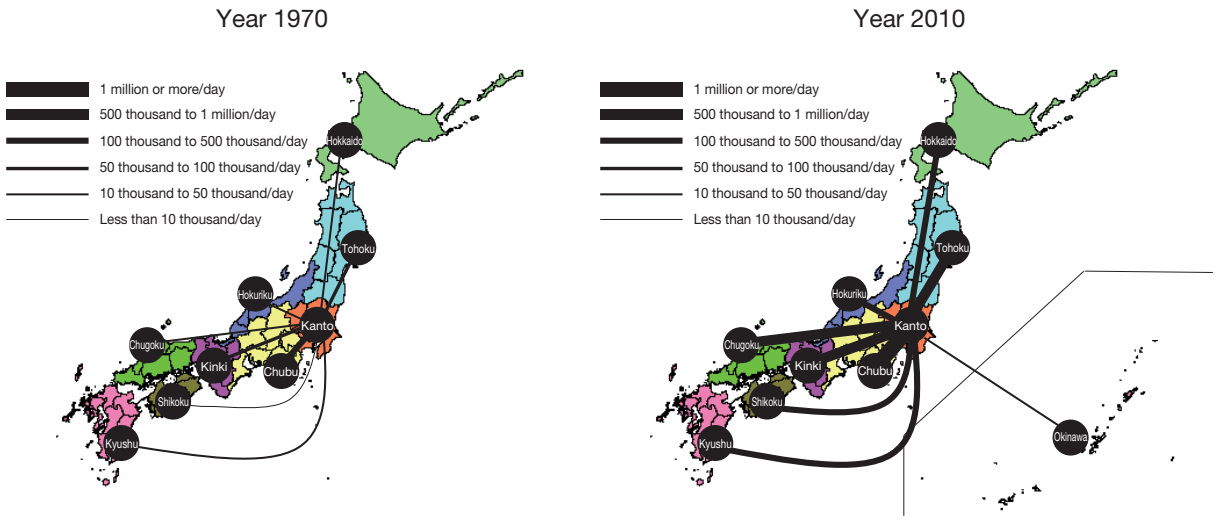
Figure 1-1-19 Times Needed to Transport Freight from Tokyo to Prefectural Governments



(Notes) 1 Measurement of the time needed to transport a 10-ton freight aboard a large truck from the location of the MLIT (Kasumigaseki, Chiyoda-ku, Tokyo) to a prefectural government office by way of a road network.
2 The difference between 1971 and 2010 lies only in the road network; the other conditions, such as travel speed, are the same.
3 For Hokkaido and Tokushima, Kagawa, Ehime and Kouchi prefectures in 1971, the cargo transportation time was caluculated based on the time on ferries in addition to time by roads.
Source) MLIT, "National Integrated Transport Analysis System (NITAS)(version2.2)"

Comparisons of the volumes of freight flow nationwide in 1970 and 2010 indicate that inter-regional transport has animated (Figure 1-1-20). Various factors, such as changes in the nation's industrial structure, are conceivable, but business activities simplified through the development of transport networks to cut on the costs of transporting raw materials, finished products and so on may be responsible in part.

Figure 1-1-20 Comparisons of the Volumes of Freight Flow Arriving at and Leaving Kanto



(Notes) 1 Volume of freight flowing between Kanto and regions (sum total of shipments from Kanto and arrivals at Kanto)
2 Regional categories
Hokkaido: Hokkaido Prefecture
Tohoku: Aomori Prefecture, Iwate Prefecture, Miyagi Prefecture, Fukushima Prefecture, Akita Prefecture, Yamagata Prefecture
Kanto: Ibaraki Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Tokyo Prefecture, Kanagawa Prefecture
Hokuriku: Niigata Prefecture, Toyama Prefecture, Ishikawa Prefecture, Fukui Prefecture
Chubu: Yamanashi Prefecture, Nagano Prefecture, Shizuoka Prefecture, Gifu Prefecture, Aichi Prefecture, Mie Prefecture,
Kinki: Shiga Prefecture, Kyoto Prefecture, Nara Prefecture, Wakayama Prefecture, Osaka Prefecture, Hyogo Prefecture
Chugoku: Tottori Prefecture, Shimane Prefecture, Okayama Prefecture, Yamaguchi Prefecture
Shikoku: Kagawa Prefecture, Ehime Prefecture, Tokushima Prefecture, Kochi Prefecture
Kyushu: Fukuoka Prefecture, Saga Prefecture, Nagasaki Prefecture, Kumamoto Prefecture, Oita Prefecture, Miyazaki Prefecture, Kagoshima Prefecture, Okinawa: Okinawa Prefecture (Year 2010 only)
Source) MLIT, "Nationwide Cargo Net Flow Survey"

Enhanced disaster preparedness and improved hygienic status are among the typical welfare effects.

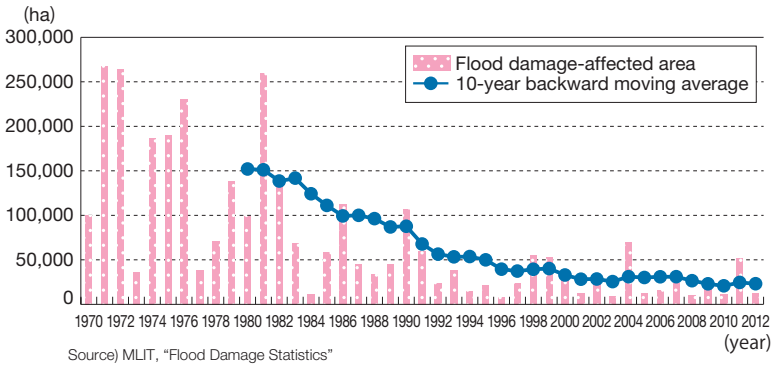
As for disaster safety, water damages have been reduced steadily through the development, etc. of social infrastructures designed to control flooding from dams, riverbanks and so on (Figure 1-1-21). Although simple year-by-year comparisons are difficult to make because torrential rains, typhoons, etc. vary in their scale from year to year, the 10-year average of the flood damage-affected areas is found to have fallen in the 2000s to about one seventh of its level in the 1970s.

By prefecture, the scale of flood damages is found to have shrunk nationwide in the 2000s from the 1970s (Figure 1-1-22).

Next, let us look at an example of how the hygienic status has improved.

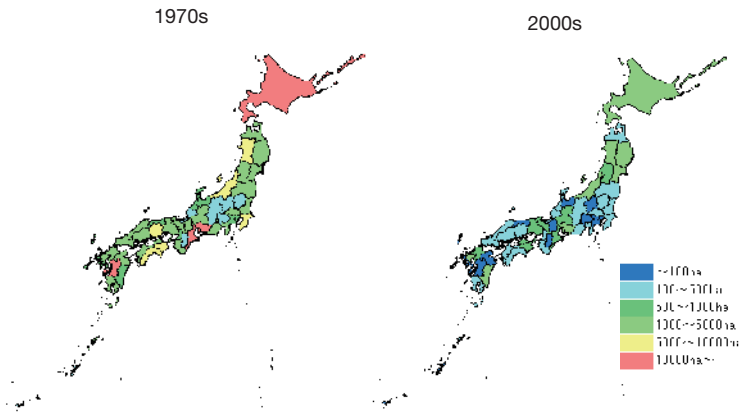
A growing stock of sewage systems, coupled with appropriate practice of their maintenance and management, has contributed greatly to the improvement of the water environment. A look at changes in the river BOD (river environmental

Figure 1-1-21 Changes in Flood Damage-Affected Areas (Nationwide)



Source) MLIT, "Flood Damage Statistics"

Figure 1-1-22 Flood Damage-Affected Area Comparison

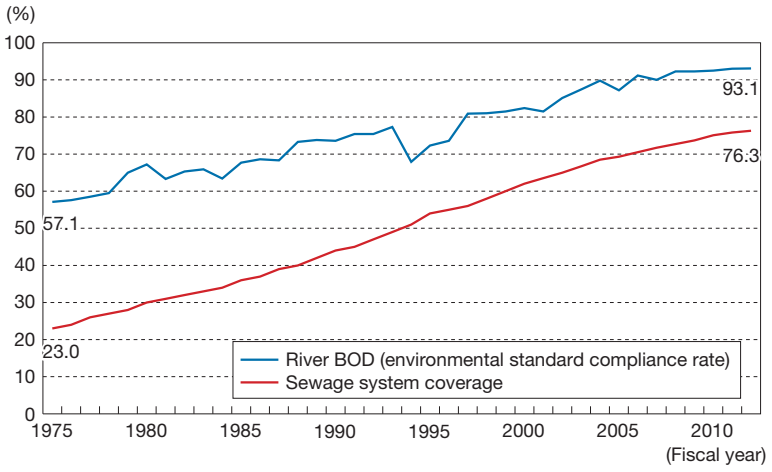


Source) MLIT, "Flood Damage Statistics"

standard compliance rate[Note 8]) and the sewage system coverage show that both have risen with time (Figure 1-1-23).

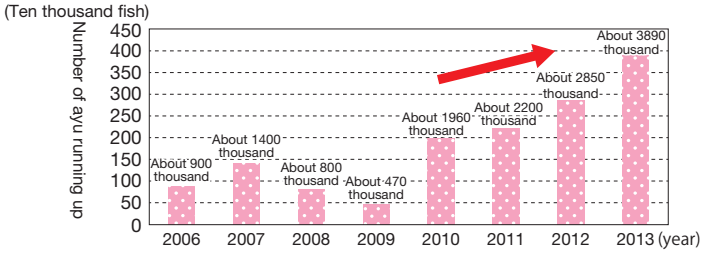
In addition, as the quality of public water improves, the estimated number of ayu (Japanese trout) running up Tama River flowing through Yamanashi, Tokyo and Kanagawa Prefectures and the catches of shijimi (Japanese freshwater clam) along the river have increased rapidly (Figure 1-1-24).

Figure 1-1-23 Changes in River BOD (environmental standard compliance rate), Sewage System Coverage, etc.



Source) Developed by the MLIT from "Public Water Quality Measurement Results" compiled by the Ministry of the Environment and from MLIT materials

Figure 1-1-24 Time-Related Changes in the Number of Ayu (Sweetfish) Running Up Tama River (Chofu Intake Weir)



Source) MLIT

The development of social infrastructures has contributed significantly to revitalization of the nation's economic activity and betterment of the national life. Such contribution has depended solely on perfection of their maintenance, management and upgrade. Continued efforts directed at the maintenance, management and upgrade of these social infrastructures should be a key to their successful functioning.

Section 2 Climate of the Economic Society Surrounding Social Infrastructures

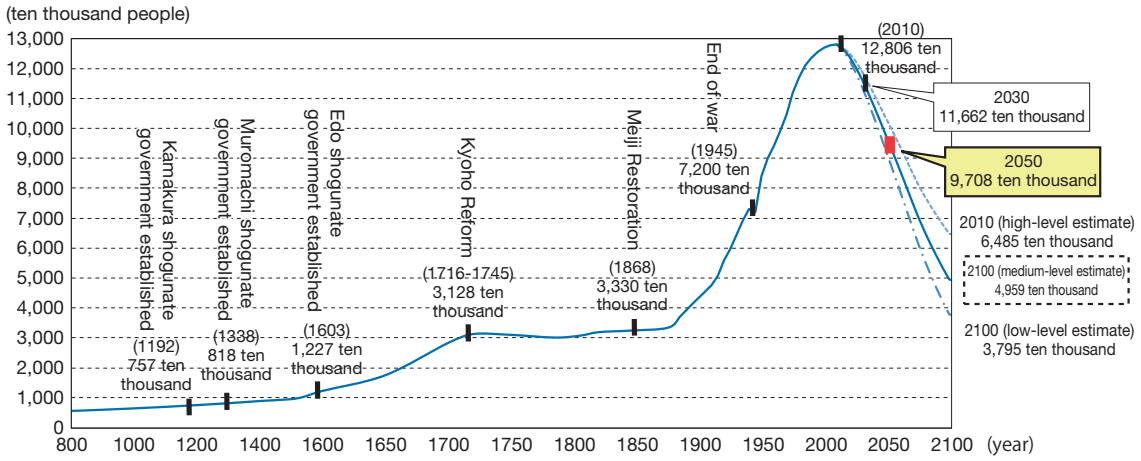
While social infrastructures have evolved in the course of a long history as reviewed in the foregoing section, the economic social status surrounding them has been changing drastically as the nation slips into a society of dwindling population, experiences tight financial positions and faces evolving disaster and other risks associated with climate changes.

1 Slipping into a Society of Sheer Dwindling Population

Japan's total population had yearly increased at an average rate of per annum since the Meiji Era but has now shifted into a period of long-term decline; it is predicted to revert to a size some 50 years ago (1965) in 2050 over a period of about 40 years from 2010 (Figure 1-2-1).

Note 8 The ratio of the number of water areas that meet the environmental criteria for BOD (biological oxygen demand), a typical water quality index of the organic contamination of rivers.

Figure 1-2-1 Long-Term Changes in Japan's Population

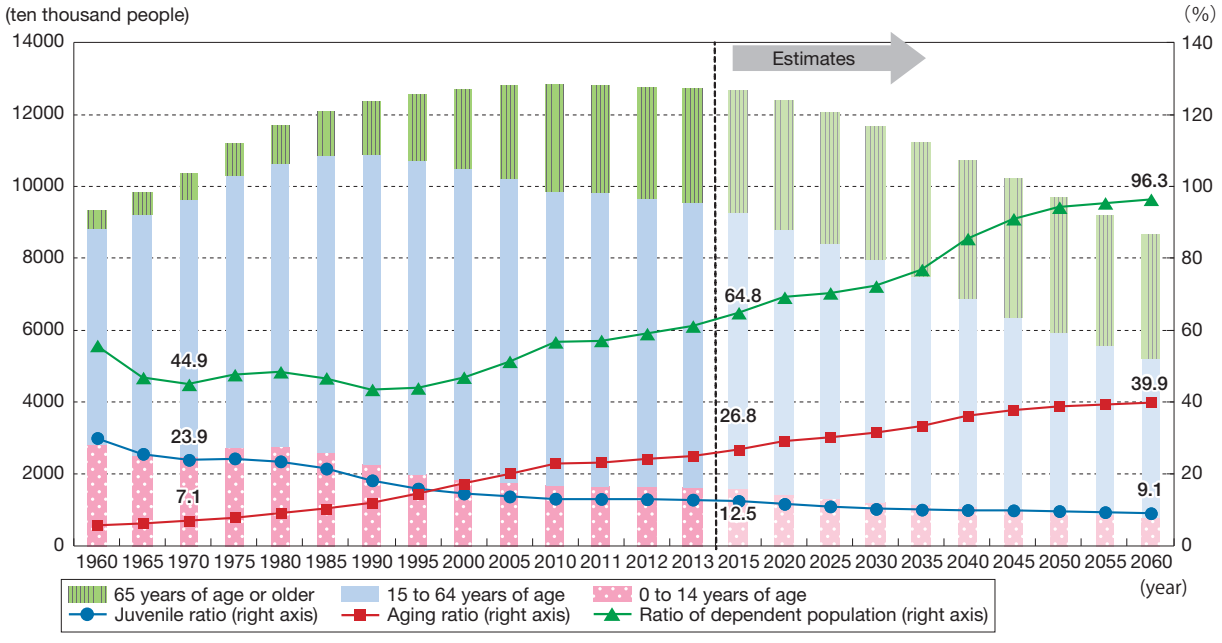


Source) Statistics for 2010 and earlier Developed by the MLIT from a "National Census" and "Basic Tallies of Population, etc. from 2010 National Census" by the MIC and "Long-Term Time Analyses of Population Distributions in the Japanese Archipelago" (1974) by the National Land Agency and statistics for 2015 and later from "Estimates of Japan's Future Population (January 2012 Estimates)" by the National Institute of Population and Social Security Research (NISS).

To view population changes in structural terms, apart from scales, the ratio of dependent population (sum total of the young population (14 years of age or younger) and elderly population (65 years of age or older) divided by the productive population (15 years of age or older but younger than 64 years of age), with the quotient being multiplied by 100) was calculated. From 1960 to the first half of the 1970s, or a period of rapid economic growth that sparked the wholesale development of social infrastructures, the ratio of dependent population remained low but started soaring from the latter half of the 1990. It is forecast to top 64.0 in 2015 and even reach 96.3 in 2060, when we brace for a society in which each worker supports one child or elderly individual.

After all, populations will continue to decline from now on a scale similar to that 50 years ago but in totally different age compositions (Figure 1-2-2).

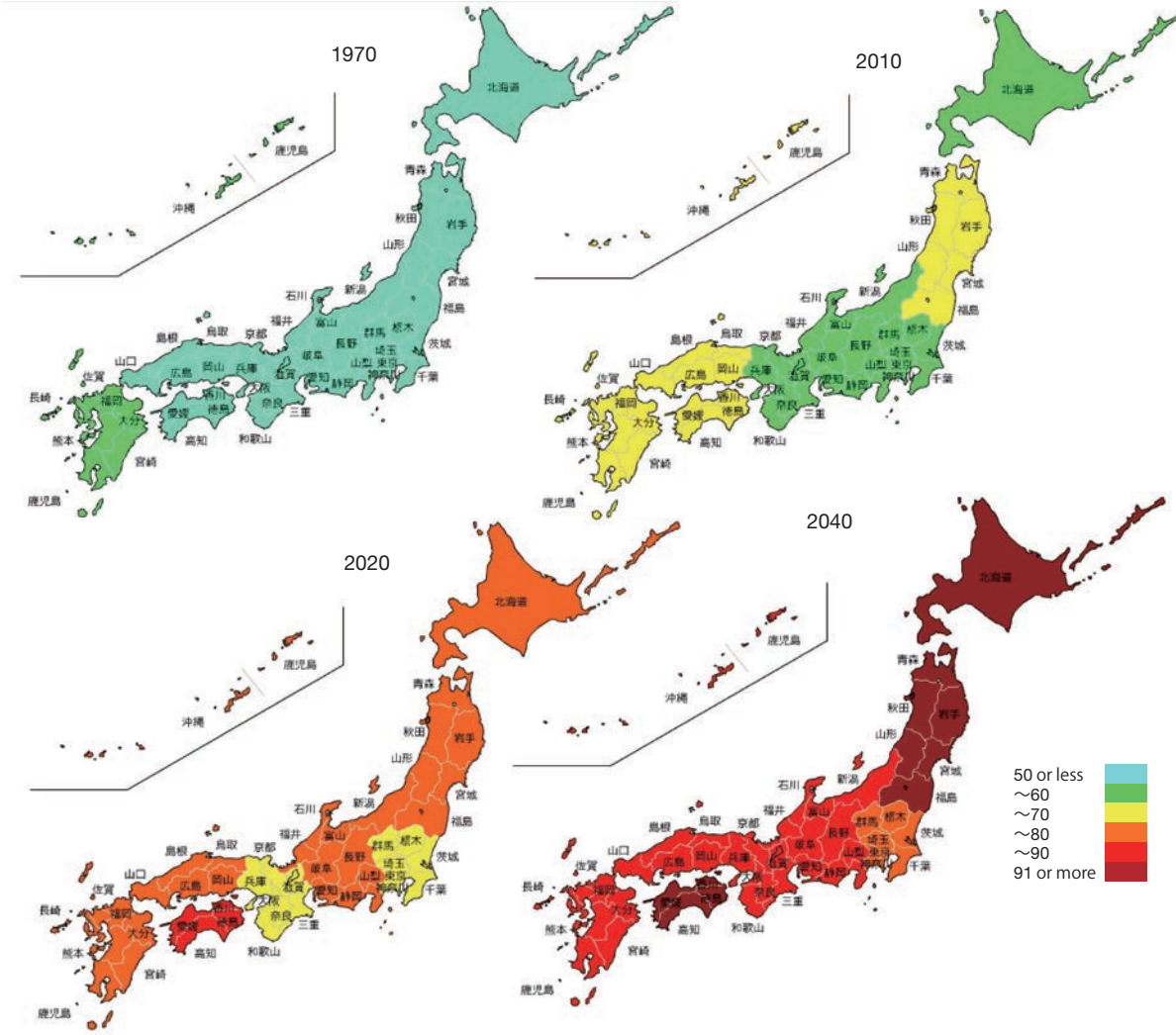
Figure 1-2-2 Changes in Population Age Compositions



Source) Developed by the MLIT from a "National Census" and "Population Estimates" by the MIC and medium-level estimates in "Estimates of Japan's Future Population (January 2012 Estimates)" by the NISS.

When looking at changes in the ratios of dependent population by region, the Kyushu region had the highest ratio of dependent population in 1970, each individual was supported by two. The Tokyo metropolitan area is predicted to have the lowest ratio of dependent population in 2040, in which each will be supported by 1.2 (Figure 1-2-3).

Figure 1-2-3 Changes in the Ratios of Dependent Population (by Region)

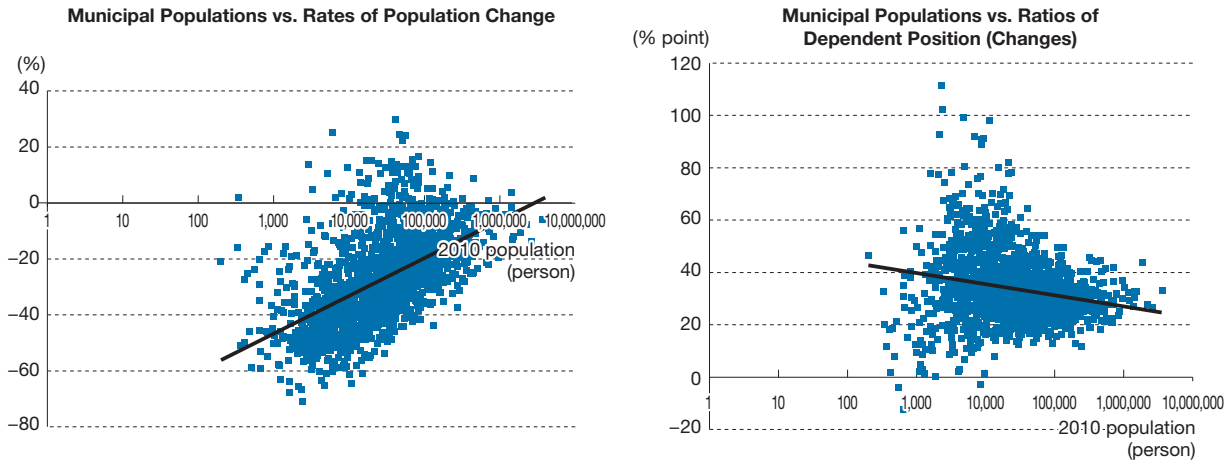


Source) Developed by the MLIT from the "National Census" for the population before 1970 by the MIC and "Estimates of Japan's Future Population (March 2013 Estimates)" for the population after 2010 by the NISS.

A look into the relationships between the municipal populations in 2010 and the anticipated rates of population rise/fall from 2010 to 2040 reveals that the less a municipality is populated, the higher its rate of population tends to get (Figure 1-2-4).

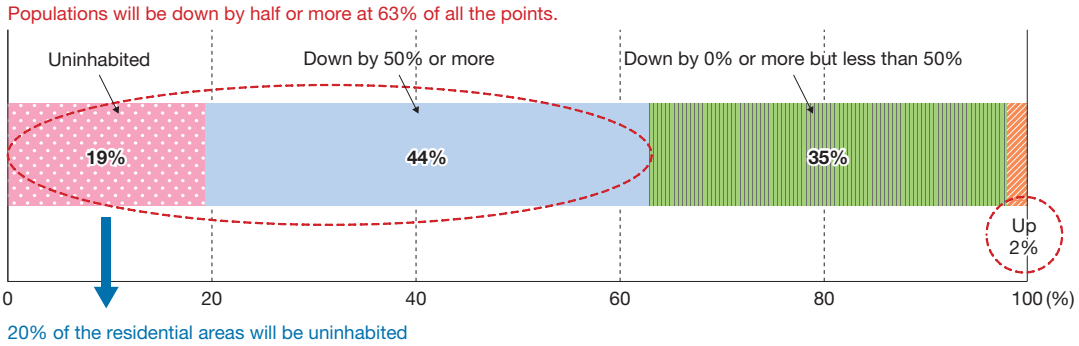
Further, in 63% of the total number of points (every 1 km^2) nationwide, populations are predicted to slip more than 50% in 2050 from their 2010 levels, with about 20% of them being left uninhabited (Figure 1-2-5).

Figure 1-2-4 Relationships between Municipal Populations and Rates of Population Change and Ratios of Dependent Population (Changes) (from 2010 to 2040)



(Note) Excluding data from Fukushima Prefecture.
Source) Developed by the MLIT from "Estimates of Japan's Future Population (March 2013 Estimates) by the NISS.

Figure 1-2-5 Number of Points Classified by Rate of Population Rise/Fall



Source) "Reference material relating to the blueprint of "New National Grand Design," MLIT.

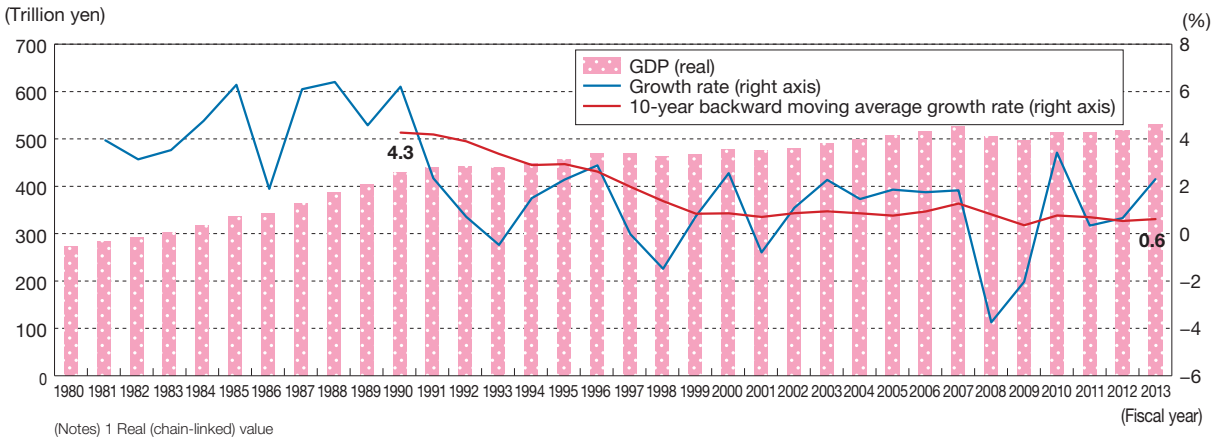
The upcoming phase of depopulation will be characterized by smaller generations working to support larger populations of elderly people. This trend will be more pronounced in rural cities holding smaller populations. It would be necessary to remember this fact in exploring the way our economic society should be.

2 Sagging Economy and Stiffening International Competition

As explained earlier, Japan's population is forecast to dwindle in the future, exerting various effects of concern on our economic society. One of such concerns is the shrinking scale of the nation's economy in pace with diminishing population.

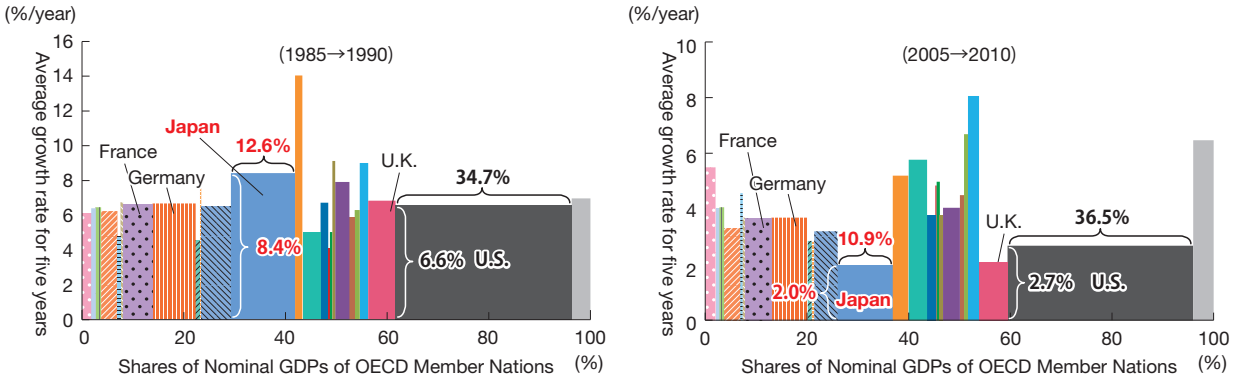
Trends in Japan's GDP suggest the growth rates in recent years have fallen from the 1980s (Figure 1-2-6). A look into the growth rates and shares of the nominal GDPs of member nations of the OECD also tells that our growth rate and share are on a downward trend (Figure 1-2-7).

Figure 1-2-6 Changes in Japan's GDP



(Notes) 1 Real (chain-linked) value
2 Values from 1980 to 2000 are adjusted according to the ratio of the 2001 values based on the 2000 standard to those based on the 2005 standard.
Source) Developed by the MLIT from "National Accounts" by the Cabinet Office.

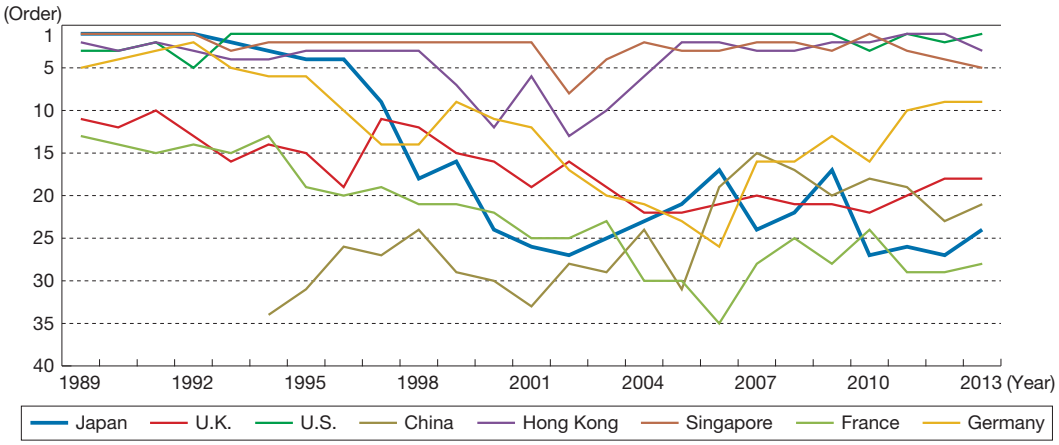
Figure 1-2-7 Growth Rates and Shares of Nominal GDPs of Member Nations of the OECD



Source) Developed by the MLIT from OECD's "National Accounts."

Japan's international competitiveness is also on the decline amid sluggish economic activity. The International Institute for Management Development (IMD) defines competitiveness in its own terms on the basis of indexes that represent economic standing, governmental efficiency and so on and releases a competitiveness ranking of countries and regions each year. Japan used to rank high in this list in the early 1990s in the world, but slipped down from the latter half of the 1990s to move sideways on the 20th rank level in recent years (Figure 1-2-8).

Figure 1-2-8 Changes in International Competitiveness

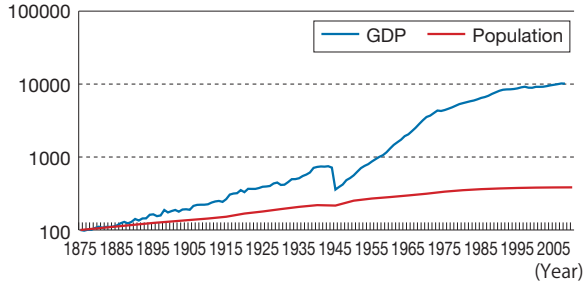


(Note) For 1989 and 1992, the orders have been published separately for the member nations (22) of the OECD and other regions (15).
Source) Developed by the MLIT from "World competitiveness report 1995" for 1989 to 1992, "The competitiveness yearbook 1997" for 1993 to 1997 and its "The world competitiveness yearbook 1999" for 1998 to 1999, "The world competitiveness yearbook 2001" for 2000 to 2001, "IMD world competitiveness yearbook 2006" for 2002 to 2006, "IMD world competitiveness yearbook 2011" for 2007 to 2011 and "IMD world competitiveness yearbook 2013" for 2012 to 2013, all compiled by IMD.

It is true that economic growths are driven in one way by population increases (growing labor population), but analyses of the nation's long-term economic growth tell that the growth of its real GDP has by far outpaced the rate of population increases (Figure 1-2-9). This fact suggests that Japan's economic growth has been intensely influenced by factors other than population increases[Note 9].

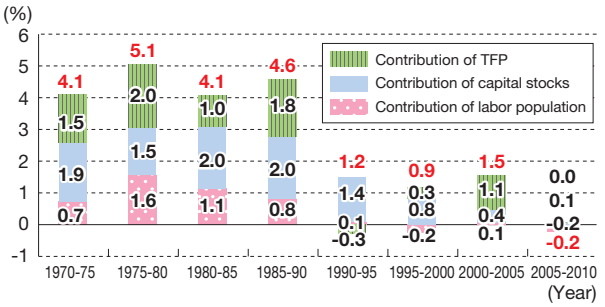
Taking a closer look at Japan's economic growth in the 1970s and after using a technique called "growth accounting[Note 10]," increasing labor population has had a relatively small share of contribution to the nation's economic growth, but it had its prime impetus derived more from increases in the capital stock and higher TFP up until 1990. In the 1990s in which the economic bubbles had burst, and after, the capital stock had a narrowing share of contribution to the nation's economic growth, when compared with a negative share of contribution of TFP from 1990 to 1995 and a zero share from 2005 to 2010 (Figure 1-2-10).

Figure 1-2-9 Japan's Population and Real GDP (1875 = 100)



Source) Developed by the MLIT from Angus Madison's "Historical Statistics of the World Economy:1-2008 AD," a "National Census" and "Basic Tallies of Population, etc. from 2010 National Census" by the MIC and "Long-Term Time Analyses of Population Distributions in the Japanese Archipelago" (1974) by the National Land Agency.

Figure 1-2-10 Changes in Growth Accounting



Source) Developed by the MLIT from the "Japan Industrial Productivity (JIP) Database 2013" by The Research Institute of Economy, Trade and Industry (RIETI), an incorporated administrative agency.

Note 9 Refer to "Deflation" by Hiroshi Yoshikawa (2013).

Note 10 Growth accounting is a technique by which the sources of an economic growth are broken down into an increased capital stock, increased labor population and higher TFP to determine quantitatively which of the three sources contributes most to the economic growth. Assuming a Cobb-Douglas production function based on Y: GDP, A: technology level, K: capital stock, L: labor quantity, α: capital share and : 1-α:labor share, GDP can be stated in an equation as $Y = AK^{\alpha}L^{1-\alpha}$. If logarithms of both sides of the equation are taken and differentiated with respect to time Y4, the following is derived:

$$\frac{\dot{Y}}{Y}=\frac{\dot{A}}{A}+\alpha\frac{\dot{K}}{K}+(1-\alpha)\frac{\dot{L}}{L}$$

(where $\dot{Y}$, $\dot{A}$, $\dot{K}$, and $\dot{L}$ are Y, A, K and L differentiated with reference to time, respectively.) Thus, the growth rate of GDP can be broken down into a technological advance, an increased captial stock, and an increased labor population.

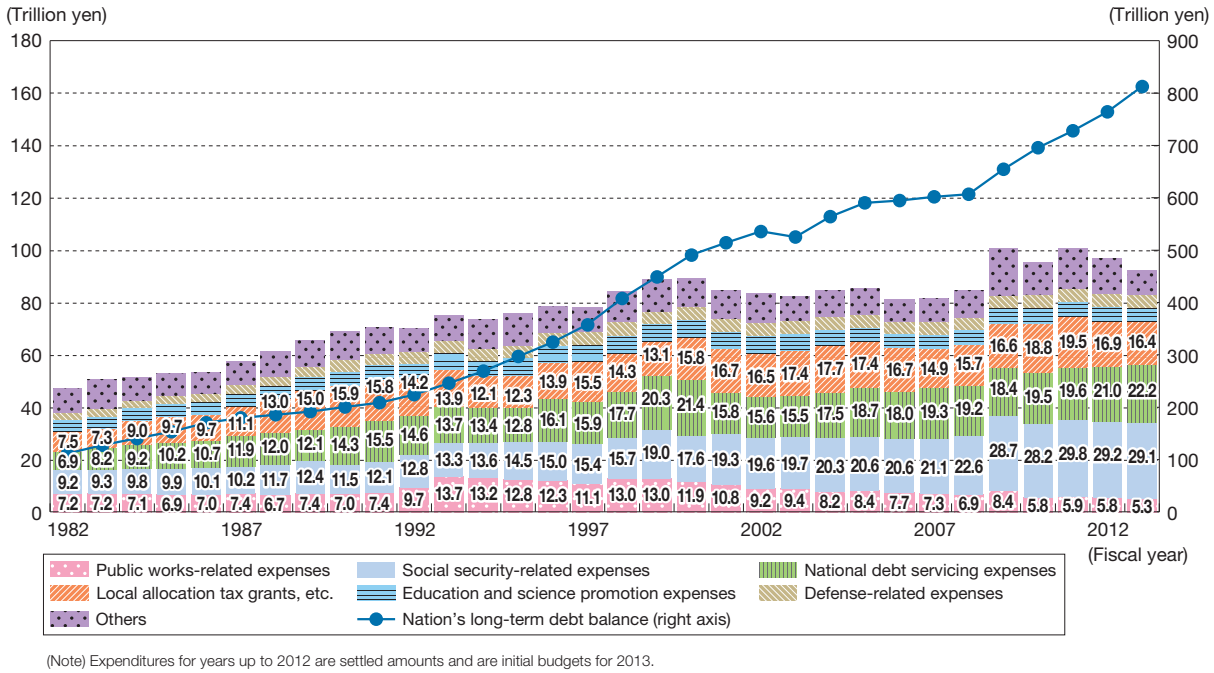
Summing up, there is no doubt that dwindling labor population has a dampening effect on the nation's economic growth, but the way other contributing factors work should deserve equal notice in weighing the future course of our economic growth. The impact of shrinking labor population may be mitigated to some extent by pursuing a continuing program to promote the employment of women and elderly people and enhance individual workers' capabilities, but keeping up economic growth should dictate more than that, building up a capital stock and boosting TFP[Note 11, Note 12].

Namely, labor productivity needs to be boosted through higher productive efficiencies, technological innovations and so on. Social infrastructures would lead to higher productivity if they can demonstrate their utilities successfully. Making intelligent use of social infrastructures would be required to revitalize our flagging national economy.

3 Tightening Financial Constraints

Under the influence of declining tax revenues from sluggish economic activity and increased budgetary spending incurred by a growing population of elderly people with falling birthrates and so on, Japan's financial standing has aggravated at a rapid tempo with its long-term balance of the government debt reaching 812 trillion (Figure 1-2-11).

Figure 1-2-11 Changes in Japan's Expenditures and Long-Term Outstanding Obligations



(Note) Expenditures for years up to 2012 are settled amounts and are initial budgets for 2013.
Source) Developed by the MLIT from "Basic Finance Data (February 2014)" by the Ministry of Finance.

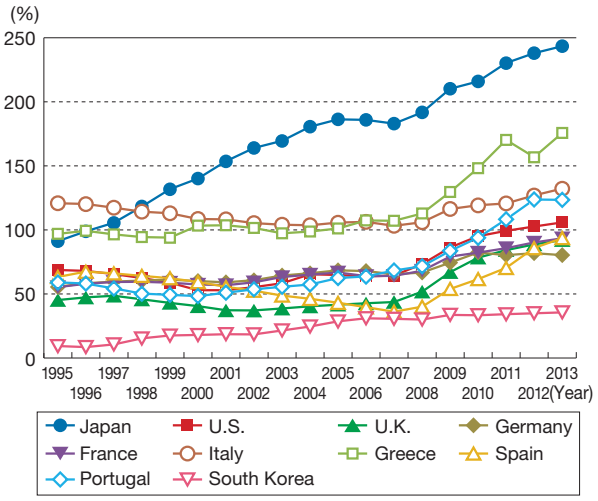
The ratio of the amount of a nation's outstanding debt balances to its GDP provides a measure of the size of its debts, which is a key indicator of its financial soundness. By comparison, Japan remains at the lowest level, above that of countries with their financial crises surfacing, such as Greece and Portugal (Figure 1-2-12).

Note 11 According to estimates compiled by the Ministry of Health, Labour and Welfare (Employment Policy Research Group), the number of workers in 2030 will be down by 8,210 thousand (from its 2012 level) if economic growth and labor participation do no make proper progress or will remain 1,670 thousand down if they do.

Note 12 The life-cycle theory foresees that a growing population of elderly people to command a larger share of the population, with falling birthrates, will result in a reduced saving rate because elderly people often dip into their savings as they live. For this reason, the funds that are dedicated to investment will decline if no allowance is made for fund inflow from overseas sources.

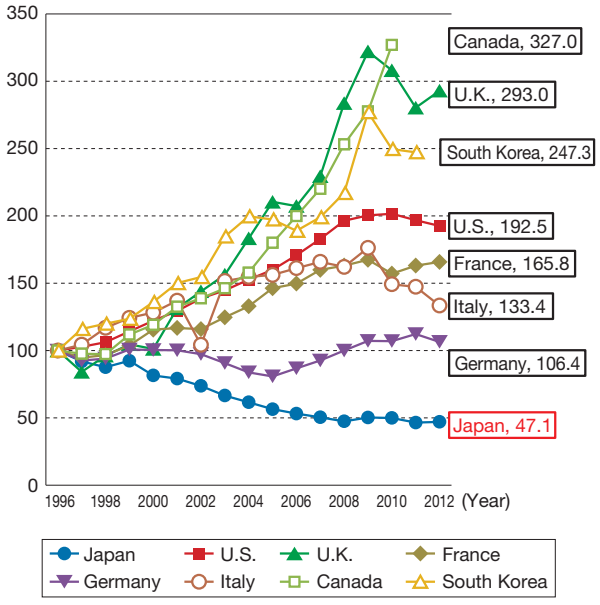
It has been pointed out to date that Japan has a higher ratio of the amount of public investment to its GDP than other advanced nations. Public investment, while on a rising trend in other advanced nations, has been continuously declining in Japan to a level on a par with member nations of the OECD as the nation has trimmed public investment since the beginning of the 2000s (Figure 1-2-13, Figure 1-2-14). To proceed with the development of social infrastructures of true need or with the proper maintenance, management and upgrade of social infrastructures that have been developed so far, ensuring the appropriate allocation of the public works-related expenditures required would be necessary.

Figure 1-2-12 International Comparisons of Outstanding Debt Balances (in relation to GDP)



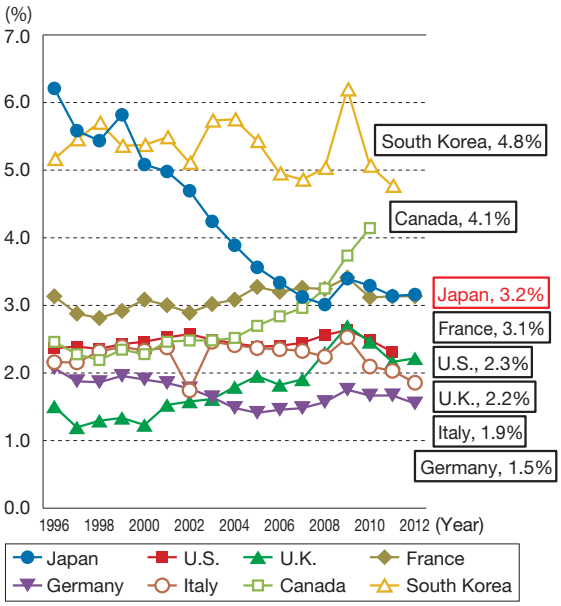
Source) Developed by the MLIT from "World Economic Outlook Database, October 2013" compiled by the OECD.

Figure 1-2-13 Changes in General Governmental Public Fixed Capital Formation (relative to 1996 as 100)



(Notes) 1 All values indicated are nominal.
2 For the U.K. in 2005, the effects of the assumption of the assets and debts of British Nuclear Fuels Limited (BNFL) by the central government (approximately £1.4 billion) are excluded.
3 Data based on 08SNA used since July 2013 for the U.S. and data based on 93SNA for other nations.
Source) Developed by the MLIT from OECD Stat. Extracts "National Accounts" for countries other than Japan and from "Fiscal 2012 National Accounts (2005 basis, 93SNA)" (Authentic Information) compiled by the Cabinet Office for Japan.

Figure 1-2-14 Changes in the Ratio of Public Investment (Ig/GDP) in Major Advanced Nations



(Notes) 1 All values indicated are nominal.
2 For the U.K. in 2005, the effects of the assumption of the assets and debts of British Nuclear Fuels Limited (BNFL) by the central government (approximately £1.4 billion) are excluded.
Source) Developed by the MLIT from OECD Stat. Extracts "National Accounts" for countries other than Japan and from "2012 National Economic Accounting (2005 basis, 93SNA)" (Authentic Information) compiled by the Cabinet Office for Japan.

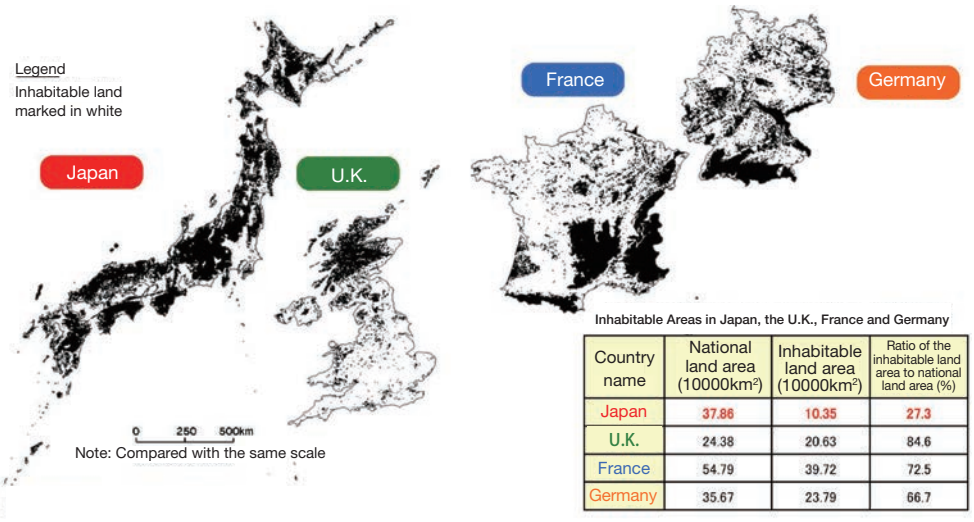
4 Fragile National Land and Heightening Disaster Risks

Exploring directions for the nation's social infrastructures, as well as its demographics and economic and financial status, should pay heed to characteristics of the national land as well.

(1) National land conditions and climate

Japan sits on a narrow strip of land covering 2000 km from north to south, with steep mountains traversing its middle part longitudinally. A greater proportion of the land is dominated by mountains, with inhabitable plains being scattered in small areas. The nation's ratio of the inhabitable land area to the total land area is 27%, by far lower than 60 to 80% in Europe (Figure 1-2-15).

Figure 1-2-15 Comparisons of Inhabitable Land Areas in Japan and Europe



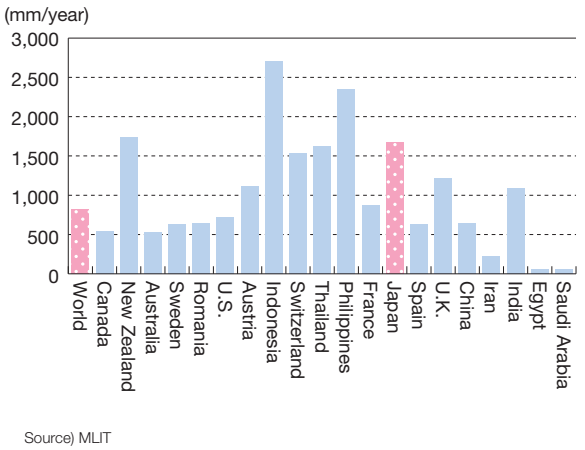
Inhabitable Areas in Japan, the U.K., France and Germany

Country name	National land area (10000km²)	Inhabitable land area (10000km²)	Ratio of the inhabitable land area to national land area (%)
Japan	37.86	10.35	27.3
U.K.	24.38	20.63	84.6
France	54.79	39.72	72.5
Germany	35.67	23.79	66.7

(Note) In this diagram, inhabitable land and noninhabitable land are distinguished as follows:
Noninhabitable land: Mountainous land 500 m more above sea level, and the land that is presently used as woodland, marshes or the like and that would be unfit for habitation even if developed.
Inhabitable land: Area other than noninhabitable land. More specifically, land that is up to 500 m above sea level and that is presently used as urban land, farm, rice field, grass field, fruit farm or the like (open forest, bushes, a grass field containing sparsely planted trees or shrubs, sparse vegetation (grass, shrubs, trees) or a mix of agricultural and other forms of vegetation).
Source) Developed by the Geospatial Information Authority of Japan from global mapping data.

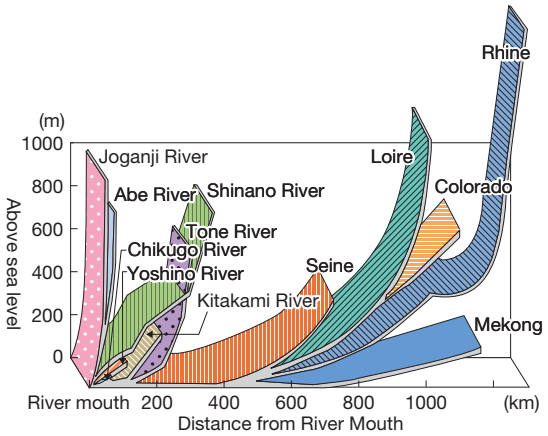
Japan has about a two times higher rate of mean annual precipitation than the rest of the world, with rainfalls converging during on the nation's rainy or typhoon season (Figure 1-2-16). Rivers are so short and steep that, once a heavy rain fails, it would pour from mountains into the sea at once to threaten floods and landslide disasters (Figure 1-2-17). In addition, because many cities are based in the plains lower than the water level of a river, they are exposed to the risks of extensive damages once to the river floods.

Figure 1-2-16 Mean Annual Precipitations in the World



Source) MLIT

Figure 1-2-17 Comparisons of River Gradients in Japan and Foreign Nations

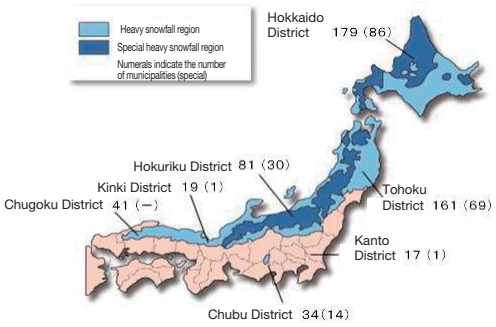


Source) MLIT

Further, about 51% of the national land is a heavy snowfall area, which is inhabited by about 15% of the nation's total population (Figure 1-2-18). Sustaining the lives and economic activities of the people living there requires keeping them protected from avalanches and snowstorms and taking measures, such as clearing and melting the snow. In February 2014, heavy snowfalls hit Japan centering in Kanto and in Yamanashi and Nagano prefectures, dumping the deepest snowfalls in 100 years. Those heavy snowfalls caused huge damages paralyzing public traffic services and isolating many villages in the City of Kofu and elsewhere.

Japan is located in a quake-prone zone at the boundaries of four tectonic plates, where about 20% of the world's earthquakes having a magnitude of 6 or higher occur. In addition, Japan is prone to suffer from major damages from tsunami as the nation is surrounded by seas on its four sides, with the long and complex contours of its coastlines. A stage for recurring occurrences of widespread damages in history, the Nankai Trough, in particular, has hosted subduction-zone earthquakes measuring on the 8-magnitude order, each 150 years apart, since about 100 years ago. An increasingly impending risk of the occurrence of earthquakes in this region has been suggested in consideration of the frequencies with which quakes have occurred there in the past (Figure 1-2-19). Subduction-zone earthquakes measuring on the 8-magnitude order, equivalent to the Great Kanto Earthquake that occurred in 1923, are thought to hit the Tokyo metropolitan area every 200 to 400 years apart. Though the next occurrence is forecast to come 100 to 300 years ahead, it is forecast to be preceded with several occurrences of epicentral earthquakes on the 7-magnitude order occurring underneath the Tokyo metropolitan area (Figure 1-2-20).

Figure 1-2-18 Heavy Snowfall Region Specification Map, and Populations and Areas

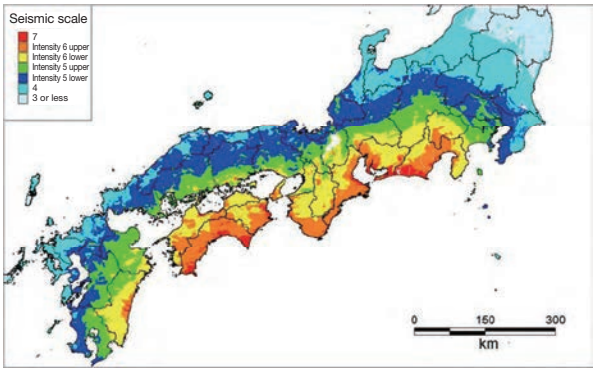


Populations and Areas of Heavy Snowfall Regions

Category	Nationwide	Heavy Snowfall Region (percentage ratio to nationwide)	Special Heavy Snowfall Region (percentage ratio to nationwide)
Population (thousand)	128,057	19,634 (15.3)	3,209 (2.5)
Area (km²)	377,950	191,798 (50.7)	74,898 (19.8)
Number of municipalities	1,720	532 (30.9)	201 (11.7)

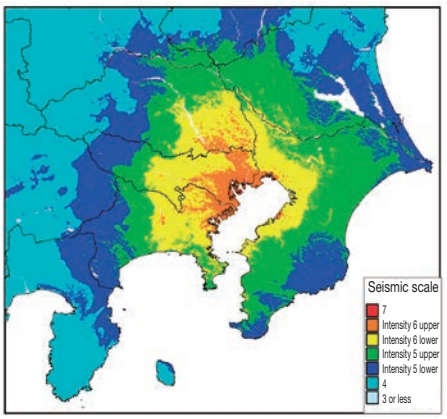
(Notes) 1 The number of municipalities (special wards counted as one each) as of April 1, 2012. Populations are based on the 2010 National Census (as of October 1, 2010).
2 Areas are based on "Nationwide Prefectural and Municipal Area Survey" by Geospatial Information Authority of Japan (as of October 1, 2010).
Source) MLIT

Figure 1-2-19 Distributions of Largest Seismic Intensities Assumed from a Nankai Trough Huge Earthquake



Source) Report by the Nankai Trough Megaquake Preparedness Review Working Group, Disaster Preparedness Measures Promotion Review Meeting, Central Disaster Management Council, Cabinet Office.

Figure 1-2-20 Distributions of Seismic Intensity Assumed from an Epicentral Earthquake Occurring underneath the Tokyo Metropolitan Area (downtown south)



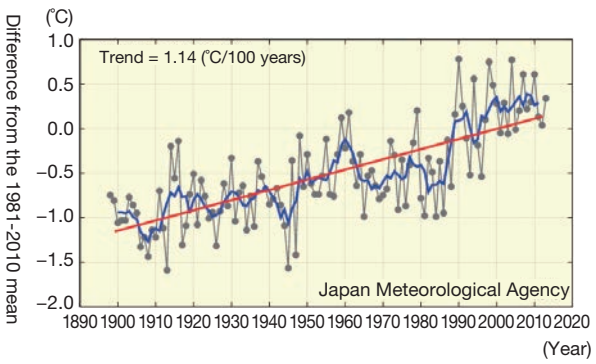
Source) Report by the Tokyo Metropolitan Area Epicentral Earthquake Preparedness Review Working Group, Central Disaster Management Council, Cabinet Office.

(2) Vulnerabilities brought by climate changes and urban modernization

The Working Group I Report (Physical Science Basis) of the United Nations Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report released in September 2013 says, "Warming of the climate system is unequivocal," and proceeds to predict, " Extreme precipitation events over most of the mid-latitude land masses and over wet tropical

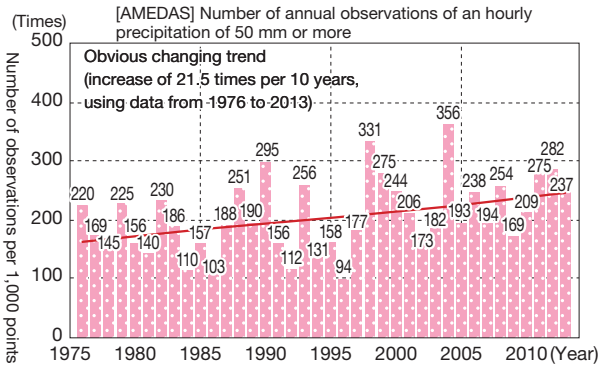
regions will very likely become more intense and more frequent by the end of this century, as global mean surface temperature increases." The annual mean temperature has been rising in Japan as well. Though the statistical period is too short to draw any clear conclusion on the relationship between the rising annual mean temperature and global warming, the number of occurrences of an hourly precipitation of 50 mm or more as observed by AMEDAS (Automated Meteorological Data Acquisition System) is on the rise. This occurrence count is predicted to rise further towards the end of the 21st century in line with the progress of global warming ("Global Warming Prediction Information Volume 8" by the Japan Meteorological Agency), with the risks of occurrence of flood damages and landslide disasters mounting (Figure 1-2-21, Figure 1-2-22).

Figure 1-2-21 Japan's Annual Mean Temperature Deviations



Source) Japan Meteorological Agency

Figure 1-2-22 Number of Annual Occurrences of an Hourly Precipitation of 50 mm or More (per 1,000 points)



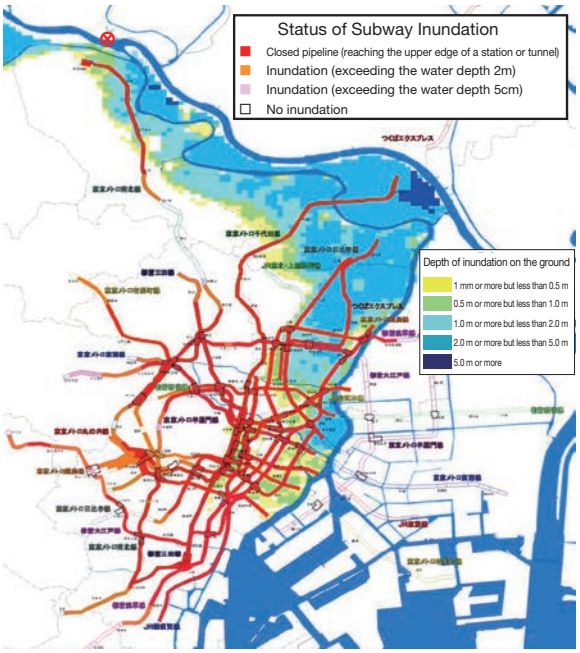
Source) Japan Meteorological Agency

Amid growing concerns over imminent megaquakes and increases in the frequency with which torrential rainfalls occur, urban areas have been made increasingly vulnerable to the effects of natural disasters, such as exposure to urban-specific damages or escalating damages, as more populations, assets, traffic and so on continue to pour into them. It has been pointed out that big cities rely on electricity, public transport services and more to such extent that they could give rise to a huge number of commuters unable to find ways back home once these facilities are disrupted in times of quakes, throwing the cities into turmoil because of their crowding. Further, the continuing proliferation of high-rise condominiums in the urban areas threatens major oscillations during long-period seismic motion, which could shut down elevators on upper floors to hamper evacuation or the convenience of daily living up until the elevators are restored to normal.

Usage of underground spaces, as for shopping malls and subways, has been more developed in the nation's major cities than other nations, leaving them exposed to the risks of flood damages during heavy rainfalls. Large-scale floods hitting the Tokyo metropolitan area could give extensive damages to such underground spaces; e.g., ripping banks of Arakawa River are forecast to dip 17 subway routes and 97 stations, with a total extension of about 147 km (Figure 1-2-23).

With such characteristics of its land and harsh natural conditions, Japan is sought to build a high level of disaster preparedness facilities, such as advanced quake resistance and soft-ground improvement, into the social infrastructures

Figure 1-2-23 Assessment of Inundation from Flooding Arakawa River



Source) Report by the Expert Committee on Large-Scale Flood Preparedness, Central Disaster Management Council, Cabinet Office.

it develops. In addition, bridges, tunnels and other structures command a greater proportion of the nation's networks of roads, railways and so on to address its steep topographical features than other nations. These social infrastructures are considered to cost more to maintain, manage and upgrade (Figure 1-2-24, Figure 1-2-25).

Figure 1-2-24 Comparisons of Bridge Beams in Japan and France

Hanshin Expressway bridge beams

Bridge beams of an access road at Charles de Gaulle International Airport

Source) MLIT

Figure 1-2-25 Comparisons of the Proportion of Structures by Country

Comparisons of the Proportions of Structures by Country		
Japan	24.6%	National expressway mean (2005)
U.S.	7.0%	Interstate highway mean (2003)
U.K.	4.4%	Superhighway and general highway mean (2001, England)
France	2.6%	Directly managed expressway and highway mean (2005)
Germany	10.1%	Federal Autobahn mean (2005)

(Note) Proportion of structures = (Bridge beam length + Tunnel length)/Total length
Source) Infrastructure Development Institute

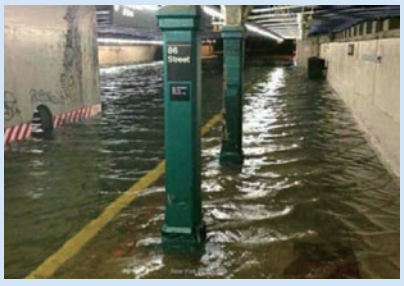
In the present context of an increasingly harsh climate surrounding social infrastructures, including dwindling populations and tight financial constraints, how to respond to the vulnerabilities of the national land summarized so far should be integral part of our process of formulating evolving concepts of maintenance, management and upgrade of social infrastructures.

Column Hurricane Sandy vs. U.S. Disaster Preparedness

On October 29, 2012, Hurricane Sandy landed on the East Coast of the U.S., dealing major storm-surge damages to New York for the first time in 74 years since 1938. The first massive disaster ever to deliver destructive damages to a major city in an industrialized nation packed with an advanced integration of urban facilities, the storm-surge damages claimed a total of 8,000 billion yen in the States of New York and New Jersey – the second-largest economic loss incurred in the U.S. history of natural disasters.

Hurricane Sandy landed on the U.S. as a huge storm speeding at an average wind velocity of about 36 m/s, equivalent to a Category 1 hurricane, with its sphere of influence covering about 1400 km. Since its landing concurred with a period of high tide, it brought about serious flood damages associated with storm surges in urban areas in the City of New York, including Manhattan, and the State of New Jersey. Floods caused by storm surges infiltrated subway, road and railway tunnels and substations, closing public transport services. A substation located on East 13th street of Manhattan exploded as it was inundated by storm surges, blacking out the southern part of Manhattan. In addition, the New York Stock Exchange closed for two days to cancel transactions, adversely affecting the core of the nation's socioeconomic activities, including banking.

Figure 1-2-26 86th Street Station Flooded



Source) Metropolitan Transport Authority (MTA).

By comparison, Hurricane Sandy is said to have brought 2.7 times more blackout damages and 14 times more business impact to the key urban City of New York than Hurricane Katrina attacking on the rural City of New Orleans in the State of Louisiana in

2005. Big cities integrated with diverse social infrastructures are thus found more vulnerable to the magnified effects of natural disasters than smaller cities.

While Hurricane Sandy has brought devastating damages, responses taken by a U.S. hurricane preparedness program are said to have been greatly instrumental in mitigating its effects. U.S. disaster preparedness plans call upon the organizations concerned with disaster preparedness to act in a preprogrammed time-series sequence of events, called "timeline," to respond to natural disasters when they occur, within their respective preassigned shares of responsibility. Disaster preparedness coordinators and firefighters are also supposed to have taken shelter safely by the time of disaster occurrence ("zero hour").

Pursuant to this timeline, New York City Subway gave a prior notification to passengers one day before the scheduled date of landing of Hurricane Sandy and managed to resume train services in certain sections in two days at the shortest, despite some damages from flooding. In the State of New Jersey, the Governor called upon the residents to take shelter 36 hours before the landing of the hurricane.

Such "anticipatory responses" may well have helped mitigate the impact of the hurricane as there was a time lag between its landing and the ensuing development of its damages.

Japan's metropolitan regions have not experienced storm-surge damages for nearly 60 years since the Ise Bay Typhoon in 1959. Because Japan' three major metropolitan areas are populated by a huge number of residents each, with the so-called "zero-meter regions" below seal level and huge subterranean spaces underneath, once a massive natural disaster of similar dimensions hits them, it could claim numerous human lives, threatening a tremendous impact on the nation's economic activities as a whole. Lessons learned from this disaster should be factored into the future formulation of our approaches to disaster preparedness and actions.

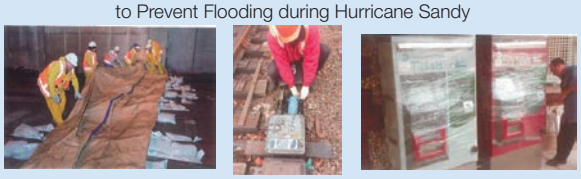
(Reference)
Joint Investigation Team (2013) formed by the MLIT and academic associations relating to disaster preparedness "Field Report on a Survey of Hurricane Sandy in the U.S."

Figure 1-2-27 Timeline (State of New Jersey)

Decision	Time
Level 2 state, and prepare for Levels 3 and 4	120
Plan and prepare for evacuation centers	96
Plan and prepare for evacuation	96
Declare a state of emergency	72
Level 3 state	72
Local governments and state prepare emergency centers	48
Plan and prepare traffic regulations	48
Order evacuation	36
Open evacuation centers	36
Begin traffic regulations	36
Public transport services shut down	12
Level 4 state	24
Order on-the-spot evacuation	12
End traffic regulations	3
Supporters take shelter	0
*The zero hour is the time at which strong winds arrive as a result of a hurricane landing on the State of New Jersey. *Each time indicated is a time tracing back from the 0 hour.	

(Reference) Joint Investigation Team (2013) formed by the MLIT and academic associations relating to disaster preparedness "Field Report on a Survey of Hurricane Sandy in the U.S."

Figure 1-2-28 Measures Taken by the Railway Operator to Prevent Flooding during Hurricane Sandy



(Note) Left: sandbags used to cut off water; middle: motor removed at a point; right: ticket-vending machines guarded to cut off water
(Reference) Joint Investigation Team (2013) formed by the MLIT and academic associations relating to disaster preparedness "Field Report on a Survey of Hurricane Sandy in the U.S."

Section 3 Status of Maintenance and Management of Social Infrastructures

As the climate of the economic society surrounding social infrastructures varies, how to maintain and manage the social infrastructures that have been developed to date should be a task of key importance in plotting the futures of our nation. This section sheds light on the status of aging social infrastructures and their maintenance and management to help develop a preliminary understanding of the evolving tasks of their maintenance and management.

1 Aging Social Infrastructures

In Japan, the infrastructures that have been developed since its period of rapid economic growth, including Metropolitan Expressway Route 1 built around the 1964 Tokyo Olympic Games, have been aging rapidly, suggesting an accelerating proportion of those facilities that have been aged for 50 years or older since initial construction for the 20 years to come (Figure 1-3-1).

Figure 1-3-1 Percentage Ratios of Social Infrastructures over 50 Years Old

	March 2013	March 2023	March 2033
Highway bridges [approx. 400 thousand bridges (*1) (of the about 700 thousand bridges at least 2 m long)]	Approx. 18%	Approx. 43%	Approx. 67%
Tunnels [approx. 10 thousand tunnels (*2)]	Approx.20%	Approx. 34%	Approx.50%
River management facilities (such as sluices) [approx. 10 thousand facilities (*3)]	Approx. 25%	Approx. 43%	Approx. 64%
Sewerage pipes [total length: approx. 450 thousand km (*4)]	Approx. 2%	Approx. 9%	Approx. 24%
Harbor quays [approx. 5 thousand facilities (*5) (at least 4.5 m in water depth)]	Approx. 8%	Approx. 32%	Approx. 58%

(Notes) 1 About 300 thousand bridges whose year of construction is unknown have been excluded from the ratio calculations.
2 About 250 tunnels whose year of construction is unknown have been excluded from the ratio calculations.
3 Government-managed facilities only, including about 1,000 facilities whose year of construction is unknown. (Since the facilities developed within the last 30 years generally have a documented history, the facilities whose year of construction is unknown have been sorted as being 50 years old or older.)
4 Including sewerage pipes about 15,000 km long whose year of construction is unknown. (Since the pipes developed within the last 50 years generally have a documented history, the pipes whose year of construction is unknown have been sorted as being 30 years old or older and the lengths of the developed extensions of these unknown facilities have been prorated on the basis of the ratio of the developed lengths of the facilities having a documented history by the number of years elapsed.)
5 About 100 pier facilities whose year of construction is unknown have been excluded from ratio calculations.
Source) MLIT

Figure 1-3-2 Aging of Various Infrastructures

[Examples of River Structures] Aging Sluiceways

[Examples of Bridges] Rupture of a diagonal bracing

Wear, corrosion, etc. of pumping facilities

Scour and settling of bridge piers

Oil leakage from pump motors

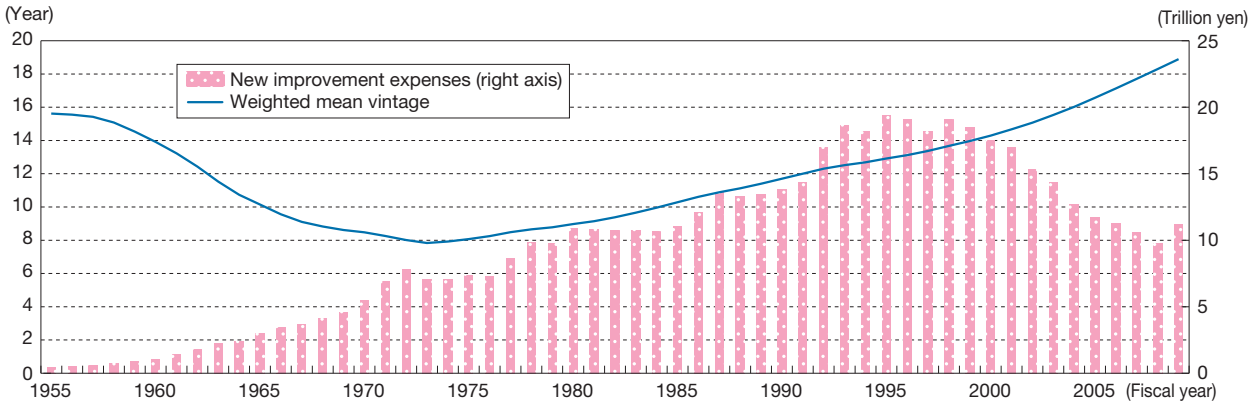
Status of pump impeller rusting

Source) MLIT

To what extent aging of the nation's infrastructures has progressed as a whole will be examined using a concept called "vintage[Note 13]." Figure 1-3-3 presents preliminary calculations of the changes in the vintage of the infrastructures in eight sectors of national land and transportation based on data, such as that found in the Cabinet Office's "Japan's Social capital 2012." In the early postwar period, when Japan had a limited accumulation of infrastructures, their vintage would decline (the average number of years that have elapsed on the infrastructures decreased) in line with the progress of new investment. When infrastructures were accumulated to some extent as Japan emerged from the period of rapid economic growth, their vintage turned to rise. Continuing cuts in public investment since the onset of the 2000s have resulted in a proportionate reduction in the percentage ratio of new social capital, with the result of growing vintage.

Note 13 "Vintage" refers to how old a facility and, in this context, means the average number of years that have elapsed on social infrastructures at a given point of time.

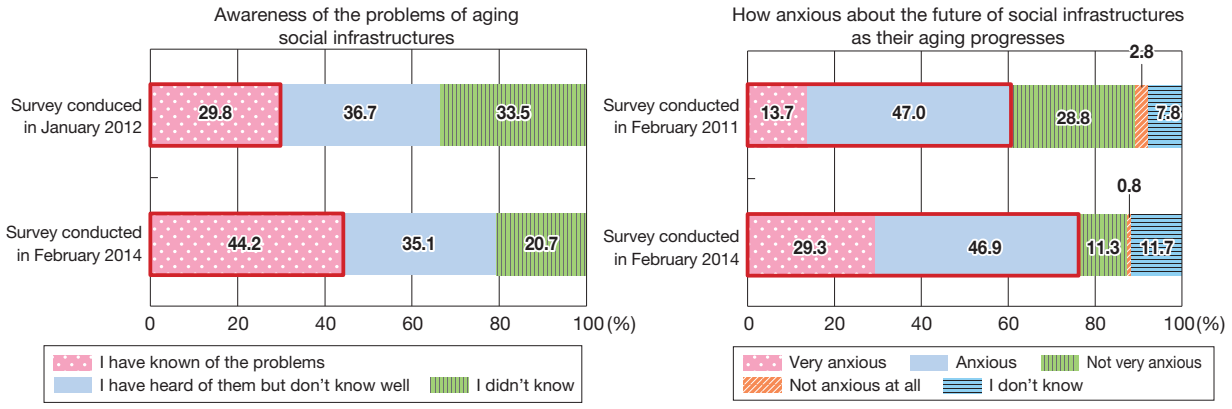
Figure 1-3-3 Vintage of Infrastructures in Eight Sectors of National Land and Transportation Relevant to the MLIT



(Note) Calculated with regard to roads, ports and harbors, public rental housing, sewerage, urban parks, flood control and seashores in the following methods:
(1) The amount of investment made from 1885 to 1953 is determined by dividing the amounts of new investment in the respective fields in 1953 by the growth rate of total public fixed capital formation.
(2) It is assumed that the social capital stock in 1885 is 0 (accordingly, a vintage of 0 at the point of 1885) and the amount of investment in each year will last for the length of useful years (sudden death method) indicated in "Japan's Social Capital 2012."
(3) Mean of the number of elapsed years on the amount of investment made in a given year, weighted by the percentage ratio of the amount of investment to the stock.
Source) Developed by the MLIT from the data on the vintage of infrastructures in various sectors from the Nomura Research Institute and from "Japan's Social capital 2012," Cabinet Office.

Under the circumstances, public concerns over the aging social infrastructures continue to mount. On December 2, 2012, ceiling boards fell down in the Sasago Tunnel on Chuo Expressway, with road structures falling under the normal conditions of usage, incurring human deaths and injuries in an unprecedented serious accident in Japan. A questionnaire survey conducted by the MLIT (hereinafter "Public Awareness Survey")[Note 14] indicates that a growing population of people are aware of the problems of aging social infrastructures and are also anxious about the futures of such social infrastructures in the wake of this accident, attesting to the growing public interest in the aging of social infrastructures (Figure 1-3-4).

Figure 1-3-4 Consciousness of Aging Social Infrastructures



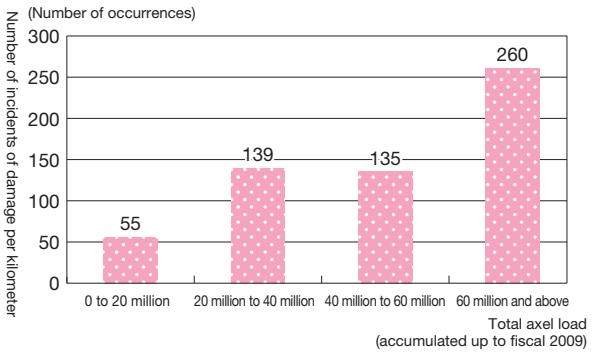
Source) "Public Awareness Survey", MLIT

To what extent individual social infrastructures will age varies depending on where they are located, under what conditions they have been used and so on, they should generally get damaged progressively in pace with their length of service and repeated exposures to tough usage conditions, unless they are treated by major renovations and upgrades after their services commenced. A survey conducted by Metropolitan Expressway Co., Ltd., for example, confirms that the number of incidents of damages its facilities per kilometer grows in proportion with the length of service and cumulative traffic volumes (Figure 1-3-5).

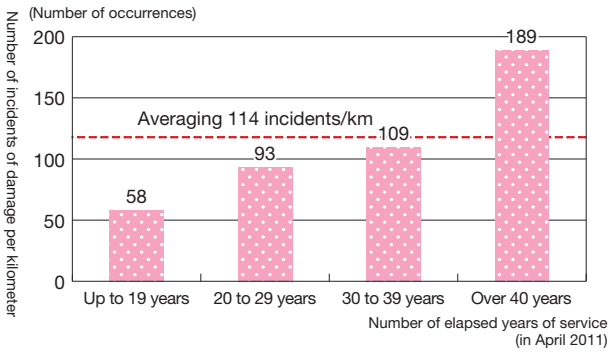
Note 14 Conducted through the Internet from individuals nationwide in February 2014 (3,002 responses available). Survey findings used for comparison purposes are those of the surveys conducted on individuals nationwide through the Internet at the respective points of time.

Figure 1-3-5 Metropolitan Expressways Aging Status

Cumulative Axle Load and Number of Incidents of Damage per km

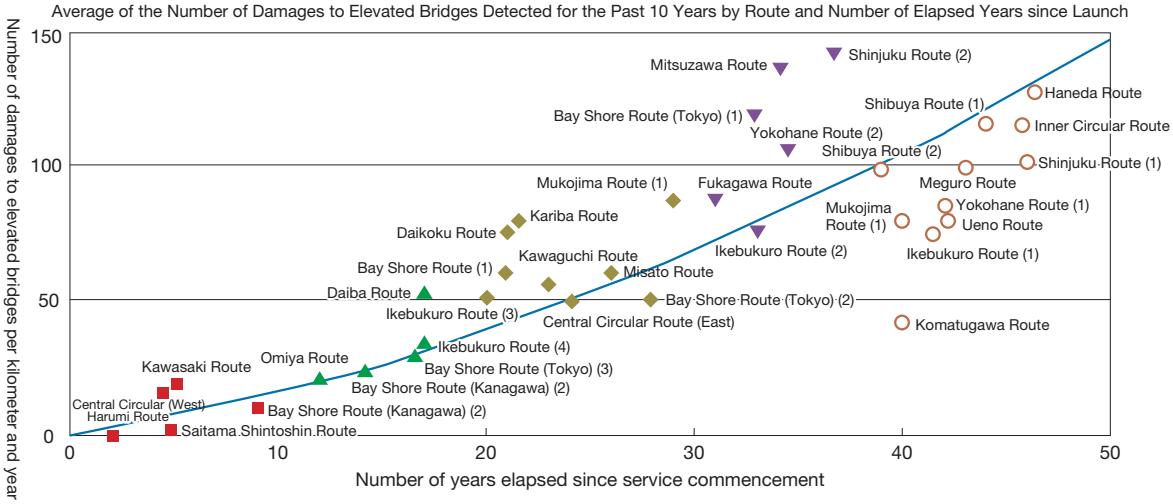


Number of elapsed years of service and number of incidents of damage per kilometer



(Note) Cumulative axle load: A 10-ton equivalent of the cumulative volume of traffic since launch.
Source) Experts Panel on Revitalization of Metropolitan Expressways, MLIT

Average of the Number of Damages to Elevated Bridges Detected for the Past 10 Years by Route and Number of Elapsed Years since Launch

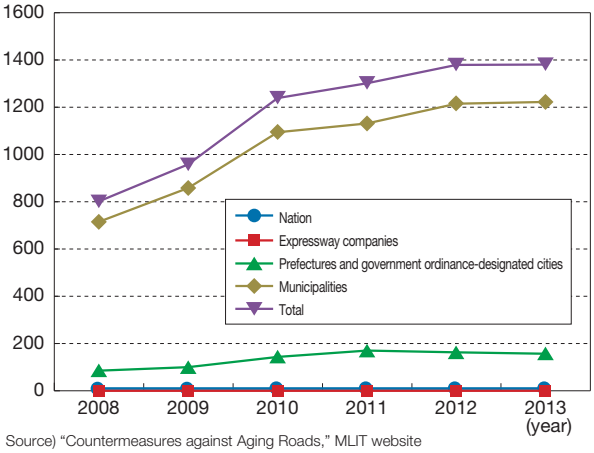


(Note) A summarized compilation of the number of damages to elevated bridges detected from 2001 to 2013.
Source) "Report by the Research Committee on the Direction for Major Upgrading of Metropolitan Expressway Structures" by Metropolitan Expressway Co., Ltd.

Desirably, aging infrastructures should be properly renovated and repaired to maintain their functionalities. Some, however, have been damaged to threaten safety to such extent, without appropriate renovations and repairs, that they can no longer be kept in service. These circumstances are considered more serious in municipalities. The number of bridges blocked and those with regulated traffic has increased in municipalities having more bridges to manage than the nation or other entities (Figure 1-3-6).

Figure 1-3-6 Number of Bridges Blocked and Bridges with Regulated Traffic Nationwide

Trend in the Number of Bridges with Regulated Traffic Nationwide (longer than 15m)



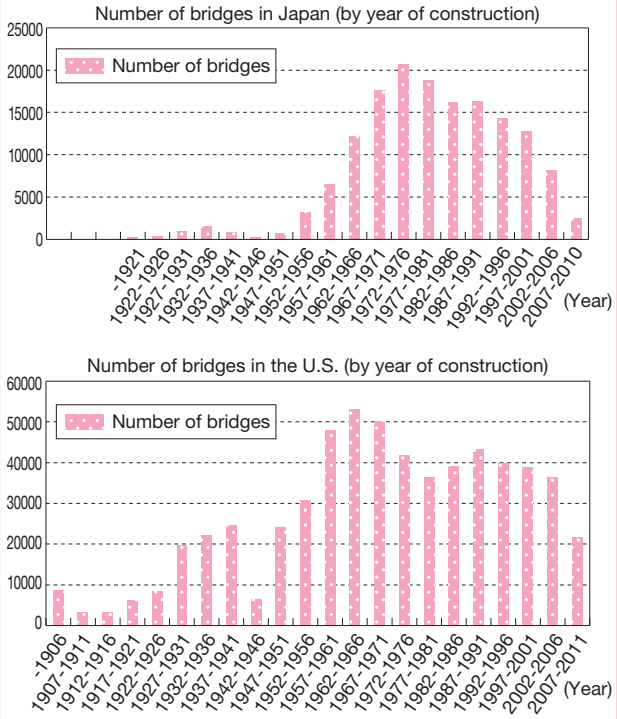
Source) "Countermeasures against Aging Roads," MLIT website

2 "America in Ruins" and Subsequent Approaches

Figure 1-3-7 compares Japan and the U.S. in terms of the number of bridges by the year of construction. The number of bridges built is found to soar in Japan after the period of rapid economic growth, whereas the development of infrastructures has been driven on an extensive scale in the U.S. since the New Deal policy enforced in the 1920s. Thus, the U.S., which embarked on the development of infrastructures ahead of Japan, had the problems of aging infrastructures manifest earlier than in Japan.

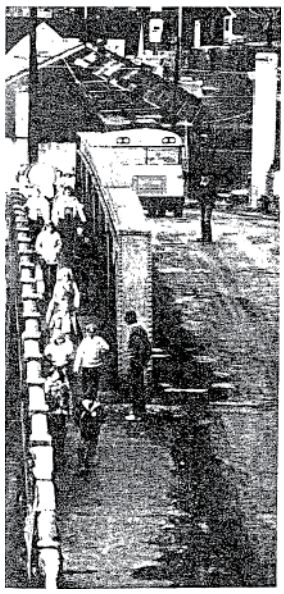
In the U.S. in the 1980s, the worsening issues of aging infrastructures had impacted various aspects of the national economy and living. According to records dating back to those days, kids commuting to school on a school bus were forced to take a detour because of weight limitations on the bridges the bus passed or get off before the bridges and walk by[Note 15]. As shown in Figure 1-3-9, while Manhattan Island is connected to surrounding areas by bridges, damage accidents had occurred on multiple bridges in the 1980s, sparking the execution of major renovations everywhere in the island. Under the circumstances, a book authored by Pat Choate and Susan Walter was published in 1981 as "America in Ruins" to warn of the status of decaying infrastructures. This book was translated into Japanese as well. The term "America in Ruins" has become a term

Figure 1-3-7 Number of Bridges in Japan and the U.S. (by year of construction)



Sources) National Institute for Land and Infrastructure Management Document No. 645 "Collection of Basic Data on Road Structures in Fiscal 2009 and Fiscal 2010.
Federal Highway Administration, U.S. Department of Transportation.

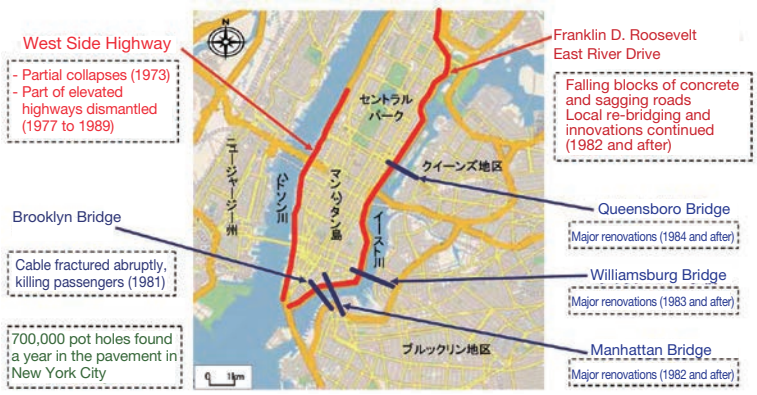
Figure 1-3-8 Kids Crossing a Bridge after Getting off a School Bus (State of Pennsylvania)



(April 27, 1981 issue, TIME)

Source) ""Japan in Ruins, and Managing Roads to Save Japan from Ruins" - Taking Lessons from America in Ruins - Vol. 3," Road Bureau, MLIT

Figure 1-3-9 Bridge Damage Accidents in Manhattan Island in the 1980s and Major



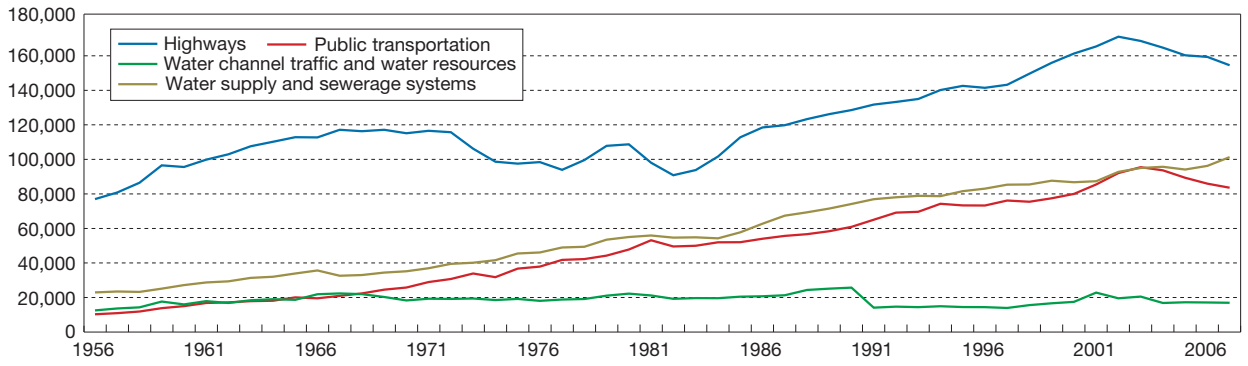
Source) ""Japan in Ruins, and Managing Roads to Save Japan from Ruins" - Taking Lessons from America in Ruins - Vol. 3," Road Bureau, MLIT

Note 15 ""Japan in Ruins, and Managing Roads to Save Japan from Ruins" - Taking Lessons from America in Ruins - Vol. 3," Road Bureau, MLIT

symbolic of the U.S. in the 1980s as it was confronted with the challenges of aging infrastructures.

This situation incurred in the U.S. might be attributable in part to continuing highway budget cuts from the late 1960s to the 1970s to inhibit sufficient maintenance, management and upgrade (Figure 1-3-10).

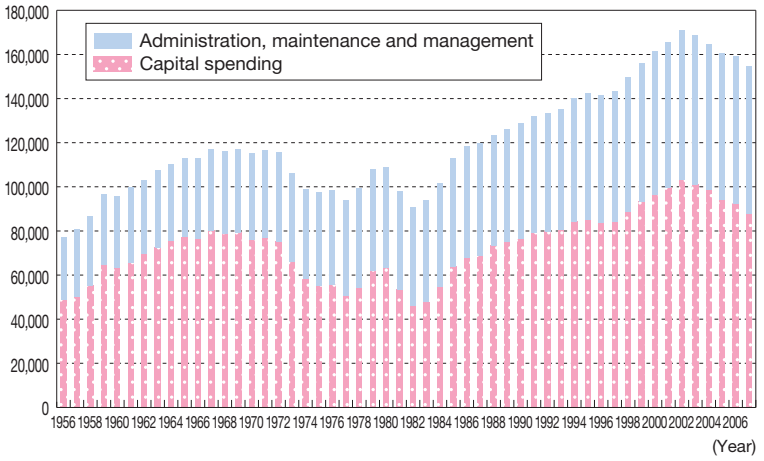
Figure 1-3-10 Amounts of Investment in Infrastructures by the Federal, State and Local Governments (10 million dollars, real (2009 base))



Source) Developed by the MLIT from ""A CBO Study - Public Spending on Transportation and Water Infrastructure" Detailed Data on Infrastructure Spending, by Level of Government and Type of Infrastructure, 1956 to 2009" by the Congressional Budget Office (2010).

As decaying infrastructures loomed into an issue of broad public concern, the U.S. raised the gas tax by 5 cent in 1983 to nearly double from its 1959 level, at which it had been kept in defiance of lingering inflation, in its effort to replenish its financial resources[Note 16]. Figure 1-3-11 shows changes in the federal spending of highway expenditures broken down into capital spending and operation, maintenance and management. The chart suggests that the maintenance and management expenditures have been funded by not simply cutting new investment but by maintaining directing investment into the infrastructures as a whole to combine the proper maintenance of legacy infrastructures with the development of strategic infrastructures. The number of defective bridges in the U.S. has been consistently declining through the implementation of continuing efforts to maintain, manage and upgrade them (Figure 1-3-12).

Figure 1-3-11 Changes in Highway Spending by the Federal, State and Local Governments (million dollars, real (2009 base))



(Note) Capital spending: Purchase, new construction, improvement and so on of infrastructural assets
Operation, maintenance and management: Operation, maintenance and management, R&D, publicity and so on

Source) Developed by the MLIT from "Public Spending on Transportation and Water Infrastructure" Supplemental Material - Detailed Data on Infrastructure Spending, by Level of Government and Type of Infrastructure, 1956 to 2009 - Total Public Infrastructure Spending by Federal, State, and Local Governments, 1956-2007 (in millions of 2009 dollars) by the Congressional Budget Office

It should also be noted that such series of political responses to combat decaying infrastructures has been driven by formulating long-term, strategic schemes to define the nation's traffic policy. While President Reagan advocated the "New Federalism" initiative in his pursuit of the formation of a "small government" by delegating federal authorities to state government and cutting federal spending, the Surface Transportation Assistance Act (STAA) enforced in 1983 amid the realities of "America in Ruins" to retain a greater proportion of federal government and secure revenues[Note 17].

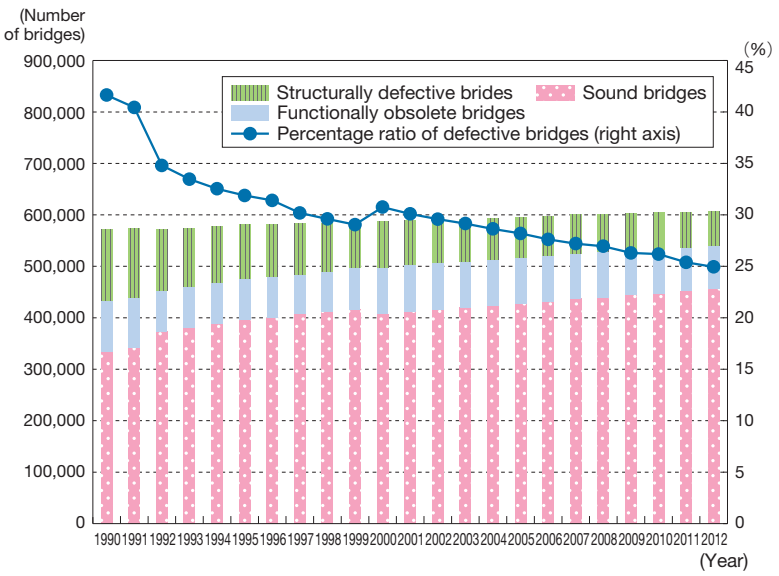
The Obama Administration currently in office has also expressed its keen consciousness of the need to maintain high-

Note 16 The gasoline tax had been pegged at 4 cent per gallon since the 1960s but was raised up to 9 cent in 1983. Subsequently, it was raised each time a new program was formulated, reaching 14.1 cent in 1990 and 18.4 cent in 1994.

Note 17 Richard Weingroff, "Highway History – In Memory of Ronald Reagan," Federal Highway Administration website http://www.fhwa.dot.gov/infrastructure/reagan.cfm

quality infrastructures to spur the accumulation of businesses and the creation of employment in a global economic climate. In his 2013 State of the Union Address, President Obama proposed, among else, the appropriation of 50 billion dollars to investment in the development of infrastructures, including a spending 40 billion dollars by the "Fix-It-First" program to maintain infrastructures needing urgent innovations and fixed, the inauguration of an "Infrastructure Bank" and the like to extend loans and provide debt guarantees to the infrastructural projects pursued on a public-private collaboration basis and the simplification of paperwork procedures relevant to the authorization of infrastructural projects. As a result of confusions, such as government closures, arising from twists between the Upper and Lower Houses and conflicts over the nation's financial policy between the Republican and Democratic Parties, many of the political programs, including Fix-It-First, were not put into action, but the betterment of the quality of infrastructures has remained a key political challenge for the Obama Administration as President Obama called upon Congress in his 2014 State of the Union Address to pass traffic bills to reinforce the facilities of the infrastructures[Note 18].

Figure 1-3-12 Number of Defective Bridges in the U.S.



Source) Developed by the MLIT from "National Transportation Statistics" by the Bureau of Transportation Statistics.

As Japan is also about to enter a sheer period of aging infrastructures, it should take lessons from the experience of the U.S. that endeavored to combat its seriously ailing infrastructures dubbed as "America in Ruins" in the 1980 and put forth long-term, strategic approaches to keep up the facilities of the infrastructures to avert "Japan in Ruins."

3 Trends in the Maintenance and Management of Social Infrastructures

A summary insight into the status of social infrastructure maintenance and management works is given below, along with discussions of their characteristics and challenges from standpoints of local governments and builder.

Note 18 The White House "Fact Sheet: The President's Plan to Make America a Magnet for Jobs by Investing in Manufacturing" 2013.2.20
http://www.whitehouse.gov/the-press-office/2013/02/13/fact-sheet-president-s-plan-make-america-magnet-jobs-investing-manufacture
The White House "President Barack Obama's State of the Union Address" 2014.1.28
http://www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address
Washington Post website "Obama's 2013 State of the Union proposals: What flopped and what succeeded"
http://www.washingtonpost.com/blogs/fact-checker/wp/2014/01/28/obamas-2013-state-of-the-union-proposals-what-flopped-and-what-succeeded/

(1) Diversity and characteristics of maintenance and management services

The term "maintenance and management" may sound simple but the actual work involved varies greatly its embodiment depending on the kind of infrastructure involved, the kind of know-how required and how often and to what extent and with what emphasis it is carried out.

Figure 1-3-13 Diverse Maintenance and Management Services

Road maintenance and management services outsourced during Fiscal 2013 in a certain city

- Development of basic information
  - Public property management system maintenance service
  - City road improvement planning service
  - Road ledger update service
- Maintenance and management of road surfaces and ancillary facilities
  - Street cleanup service
  - Road maintenance works
  - Pedestrian bridge elevator security service
  - Pedestrian bridge elevator maintenance and management service
  - Pedestrian deck firefighting facility maintenance and management service
  - Drainage channel maintenance work
  - Dredging work for catch basins, etc.
- Roadside facility maintenance and management
  - Security light repair service
  - Traffic safety light repair service
  - Road reflector repair service
  - Management service for public trees, etc.
  - Public garden planting service

(Note) Road maintenance and management services outsourced in Fiscal 2013 in a certain city, classified by the MLIT by nature
Source) MLIT

Figure 1-3-14 Embodiments of Maintenance and Management Services

Replacement repairs conducted in the nighttime

Closeness to surrounding structures**

Underwater electrolytic protection work in harbor facilities**

Bridge inspection work at an elevated location**

Source) * Metropolitan Expressway Co., Ltd. ** MLIT

Further, services relevant to maintenance and management activities are often implemented on the infrastructures that are in service. Services for roads carrying heavy traffic, for example, need to be carried out during hours in which traffic is low, such as in the night, to minimize user inconveniences. In addition, infrastructures are sometimes surrounded by a complexity of other structures, such as railways and elevated bridges, which could restrict the work hours and environment. Some infrastructures, such as dams and harbor facilities, have a greater proportion of their geometries submerged in water. Some, such as large bridges, have their maintenance and management points located at higher elevations. Maintenance and management services for these infrastructures are bound to take place in a harsh work environment.

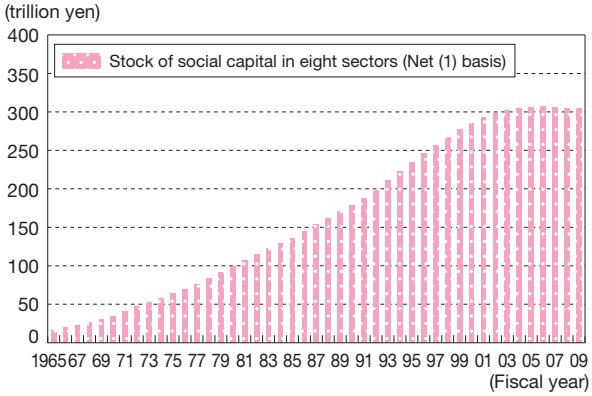
(2) Trends in maintenance and management spending

It is considered that maintenance and management spending is affected by the degree of accumulation of social infrastructures (Figure 1-3-15).

Estimates of the sum total of the expenditures needed to keep existing social infrastructures maintained, managed and upgraded were worked out in December 2013 by the Infrastructure Development Council and the Transport Policy Council, MLIT on the basis of their maintenance, management and upgrade results collected by probing into the number of facilities in 10 sectors of social capital (roads, flood control, sewage systems, ports and harbors, public rental housing,

parks, seacoasts, airports, navigation aids, governmental facilities) falling under jurisdiction of the MLIT, local governments, Local Road Public Corporations and the Japan Water Agency, an incorporated administrative agency. On the assumption of the current state of technology and framework, the maintenance and management spending is estimated to rise from 3.6 trillion yen in fiscal 2013 to reach approximately 4.3 to 5.1 trillion yen 10 years later and approximately 4.6 to 5.5 trillion yen 20 years later[Note 19]. Uncertainties prevail over the perspectives of land usage, structural changes in urban and rural areas, possible cuts in the maintenance, management and upgrade spending resulting from technical developments, benefits of infrastructures and so on, but what is important is to get prepared for taking not an insignificant burden of the maintenance, management and upgrade spending and for putting relevant measures into action to keep economic competitiveness from being degraded and safety and security from being threatened by ailing infrastructures over a long period of time to come.

Figure 1-3-15 Changes in the Amount of Social Overhead Capital



(Note) The amount of the social capital stocks in eight sectors is the sum total of the amounts of the net capital stocks of roads, ports and harbors, airports, public rental housing, sewage systems, urban parks, flood control and seacoasts (provisional calculation (1)).
Source) Developed by the MLIT from "Japan's Social Capital 2012" by the Cabinet Office.

(3) Maintenance and management from a local government's perspectives

Local governments play a major role in developing appropriate responses to the challenges of social infrastructures maintenance and management.

If the social infrastructures managed by the central and local governments are broken down by facility, 90% or more of bridges 2 m long or more and 65% of the river management facilities are administered by prefectures, government ordinance-designated cities and municipalities. Generally, local governments take the responsibility for maintaining, managing and upgrading social infrastructures, though to a varying extent depending on the kind of infrastructure involved, highlighting the need for the local governments to reinforce their framework and to develop and maintain technicians (Figure 1-3-16).

Figure 1-3-16 Percentage Ratios of Facilities by Management Body

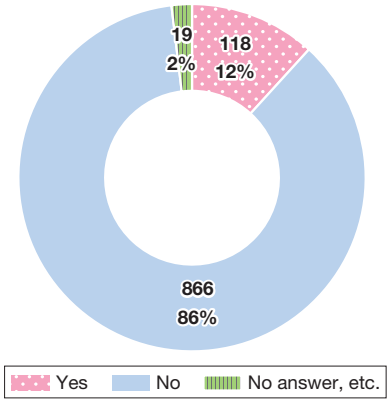
	Expressway company	Airport company	Nation	Prefecture	Municipalities (including government ordinance-designated cities)	Port management body
Roads (bridges at least 2 m long)	2%	-	4%	19%	75%	-
Roads (tunnels)	15%	-	13%	46%	26%	-
Roads (pavements)	3%	-	7%	21%	69%	-
Rivers	-	-	35%	65%		-
Sand erosion control (sand-control dams, floor fixing)	-	-	-	100%	-	-
Sewage systems (pipes and conduits)	-	-	-	2%	98%	-
Sewage systems (treatment plants)	-	-	-	9%	91%	-
Ports and harbors	-	-	9%	-	-	91%
Public rental housing	-	-	-	43%	57%	-
Parks	-	-	0.02%	1%	99%	-
Seacoasts	-	-	-	100%		-
Airports	-	3%	29%	68%		-
Navigation aids	-	-	100%	-	-	-
Governmental facilities	-	-	100%	-	-	-

(Note) Ratio of the number of facilities by owner for ports only
Source) Developed by the MLIT from "Recommendations on the Future Concepts of Social Infrastructures Maintenance, Management and Upgrade (December 2013)" by the Infrastructure Development Council and the Transport Policy Council, MLIT.

Note 19 Refer to "Recommendations on the Future Concepts of Social Infrastructures Maintenance, Management and Upgrade, Chapter 1 (December 2013)" by the Infrastructure Development Council and the Transport Policy Council, MLIT and Annex "Estimating the Amount of Future Maintenance, Management and Upgrade Spending."

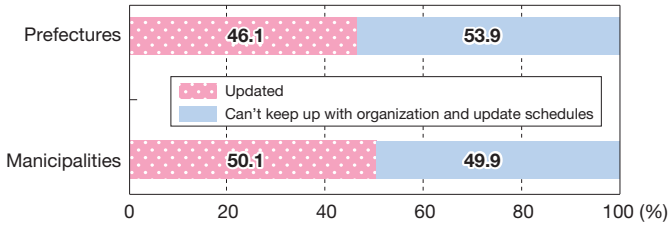
However, local governments do not necessarily have an adequate framework or staff of technicians or the like ready to maintain, manage and upgrade their infrastructures. According to a survey conducted on local governments by the MLIT, only a little more than 10% of the local governments maintain a department or group to organize infrastructure maintenance and management activities. Moreover, only about half of the total number of prefectures and that of municipalities surveyed keep ledgers updated to summarize the status of infrastructures under their management. Local governments are thus found late to organize and update information about their infrastructures (Figure 1-3-17, Figure 1-3-18).

Figure 1-3-17 Presence of Departments or Groups That Organize Infrastructure Maintenance and Management Activities as a Whole



Source) Developed by the MLIT from findings of a questionnaire survey conducted on local governments (November 2013).

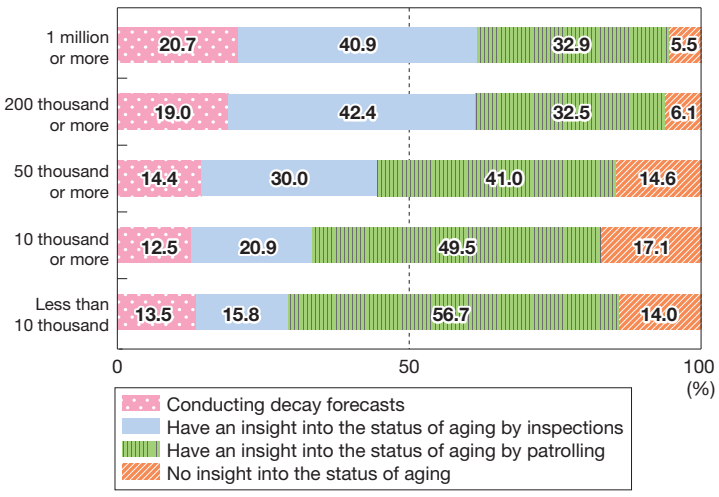
Figure 1-3-18 Ledgers Organization Status



(Note) Of those local governments that responded to the survey, those that answered "Keep ledgers of all facilities organized and update them promptly upon completion of improvement or other works" or "Keep ledgers of all facilities organized but update them in a batch as soon as changes build up to some extent, because there are too many of the facilities involved" are classified as "Updated." Those that answered "Keep ledgers of all facilities organized but have too many facilities to catch up with update schedules," "Keep ledgers organized, except for some facilities developed a long time ago" or "Keep ledgers organized, except for many facilities" are classified as "Can't keep up with organization and update schedules." Data presented here is the sum total, by prefecture and municipality, of the number of "Updated" or "Can't keep up with organization and update schedules" responses given in the nine fields of roads, rivers, sand erosion control, sewage systems, ports and harbors, public parks, seacoasts, airports and public rental housing.
Source) Developed by the MLIT from findings of a questionnaire survey conducted on local governments (December 2012).

Seriousness of such status is particularly pronounced in small-size local governments. By size of population, the smaller a local government is, the less it has an understanding of the status of aging infrastructures or the more it uses a simple method of understanding it (Figure 1-3-19).

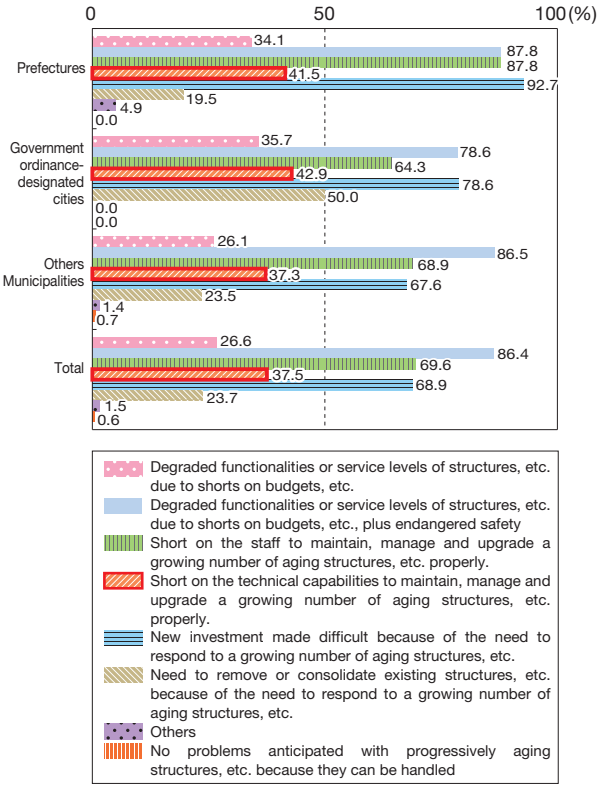
Figure 1-3-19 Status of Local Governments' Gaining an Insight into the Status of Aging Infrastructures (by size of population)



(Note) Averages of the percentage ratios of the number of local governments under survey working to take their own mixes of measures in each of the five sectors of infrastructures (roads, rivers, sewage systems, public rental housing, parks) in which these local governments are dominant.
Source) Developed by the MLIT from findings of a questionnaire survey conducted on local governments (December 2012).

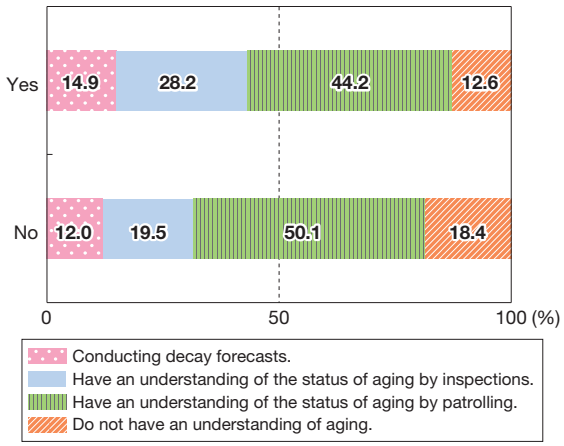
The reason why local governments have not necessarily taken adequate approaches to maintain and manage their infrastructures is that they have a limited staff of technically versed experts. According to Figure 1-3-20, most local governments cite shorts on budgets and manpower as concerns over aging infrastructures. In addition, about 40% of them mention a lack of technical capabilities as such. These constraints account in part for the inability of the local governments to take smooth responses to aging social infrastructures. Local governments that do not maintain a technical staff tend to resort to simpler methods to understand the aging status or to lack their understanding of the aging status when compared with those that maintain a technical staff. About 40% of the local governments wanting in their understanding of the mid- and long-term costs of infrastructure maintenance, management and upgrade blame it on a shortage of their technical knowledge (Figure 1-3-20 to Figure 1-3-22).

Figure 1-3-20 What Are Disquieting about Progressive Aging?



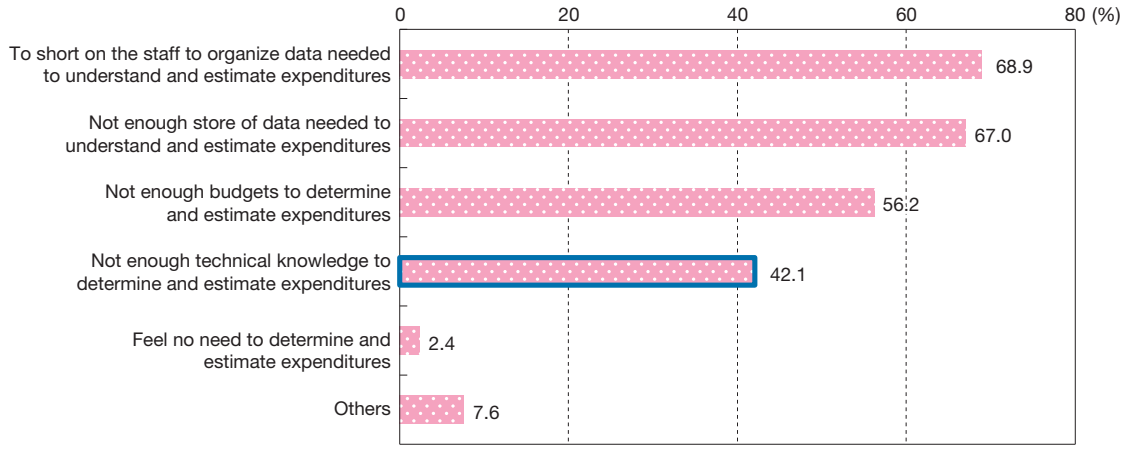
Source) Developed by the MLIT from "Recommendations on the Future Concepts of Social Infrastructures Maintenance, Management and Upgrade (December 2013)" by the Infrastructure Development Council and the Transport Policy Council, MLIT.

Figure 1-3-21 Status of Understanding of Aging by Local Governments (Have Technical Staff or Not)



(Note) Averages of the percentage ratios of the number of local governments under survey working to take their own mixes of measures in each of the five sectors of infrastructures (roads, rivers, sewage systems, public rental housing, parks) in which these local governments are dominant.
Source) Developed by the MLIT from findings of a questionnaire survey conducted on local governments (November 2013).

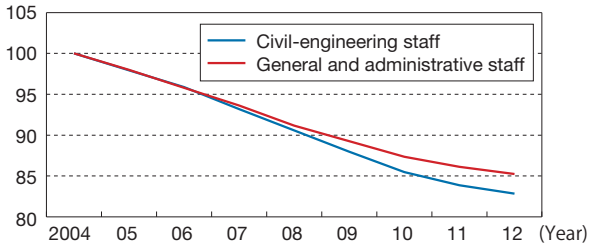
Figure 1-3-22 Reasons for Not Understanding the Costs of Maintenance, Management and Upgrade



Source) Developed by the MLIT from "Recommendations on the Future Concepts of Social Infrastructures Maintenance, Management and Upgrade (December 2013)" by the Infrastructure Development Council and the Transport Policy Council, MLIT.

Civil engineering is sometimes called "experience engineering." It means that technicians acquire practical experience in the field, which is passed on from generation to generation to build a store of technical know-how. Amid recent tight budgets and administrative reforms, local governments have a linearly shrinking civil-engineering staff (Figure 1-3-23). Concern grows in the circumstances as local governments find it increasingly more difficult than before to build a store of technical know-how relevant to infrastructure maintenance and management.

Figure 1-3-23 Changes in the Number of Local Government Employees



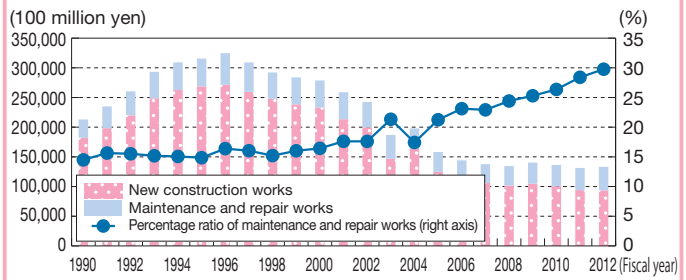
(Note) Indexed in relation to the number of employees in 2004 as 100. "General and administrative" means the total number of employees in the fields of the council, administrative and planning, tax, labor, agriculture, forestry and fisheries, commerce and civil engineering.
Source) Developed by the MLIT from the "Local Government Employee Count Management Survey", MIC.

(4) Trends in the execution of infrastructure maintenance and management works

The percentage ratio of infrastructure maintenance and management works to public works ordered had moved at around 15% in the 1990s but tended to rise subsequently to account for nearly 30% in recent years (Figure 1-3-24).

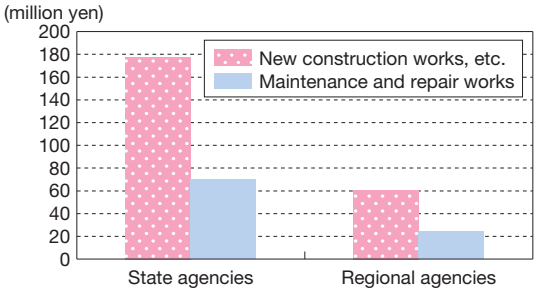
In the meantime, a greater proportion of the orders for maintenance and management works awarded by public offices are smaller than the orders for new construction and other works in terms of the amount of contract per order. If the scale of construction works is compared by ordering office and by work category on the basis of the findings of "Construction Works Order Dynamic Statistical Survey" released by the MLIT, the maintenance and management works command about 40% of the new construction and other works for both the central and local governments (Figure 1-3-25).

Figure 1-3-24 Changes in the Amount of Prime Contractors' Construction Revenues in the Implementation of Public Works (New, and Maintenance and Repair Works) and Percentage Ratio of Maintenance and Repair Works



(Note) "Maintenance and repair works" in "Construction Works Execution Statistical Survey" means all kinds of works other than new construction and includes routine repairs conducted to preserve the original functionalities of existing structures and ancillary facilities, renovation, relocation, disaster recovery, partition marking and other works (operations).
Source) MLIT, "Statistics on Construction Undertaken"

Figure 1-3-25 Amounts of Contract per Order (New, and Maintenance and Repair)

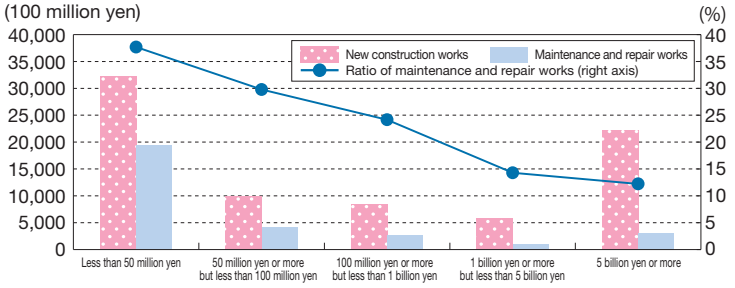


(Note) "Maintenance and repair works" in "Current Survey on Orders Received for Construction" means routine repairs conducted to preserve the original functionalities of existing architectural structures, etc., renovation and other kinds of works intended to restore them by fixing their breakages, tear and wear, failures and other conditions.
Source) MLIT, "Fiscal 2012 Current Survey on Orders Received for Construction"

A look at the amounts of new construction works and prime contractors' amounts of maintenance and management works completed by contractor's capital size suggests that the maintenance and management works account for a greater share of the prime contractors' amounts of completed works (Figure 1-3-26).

Let us look at the findings of a questionnaire survey conducted on civil-engineering consultants (hereinafter called "Constructor Questionnaire on Maintenance, Management and Repair

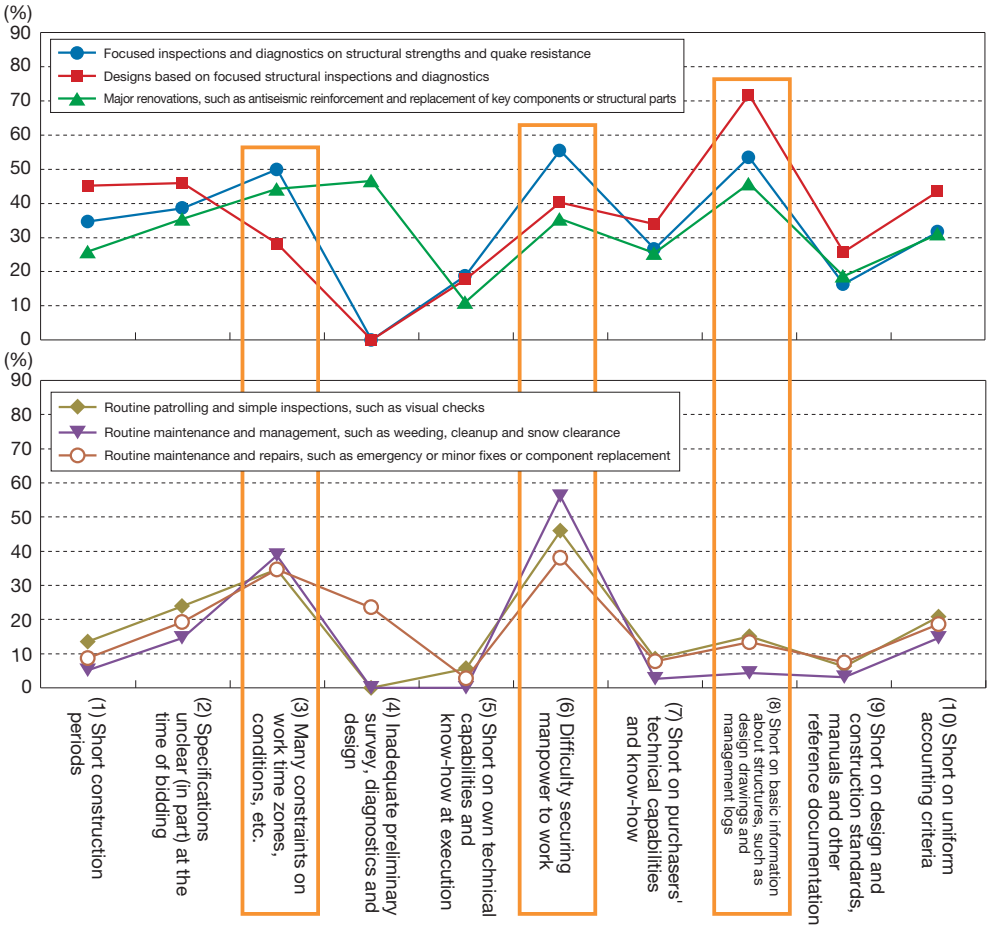
Figure 1-3-26 Changes in the Amount of Prime Contractors' Construction Revenues by Capital Level (New, and Maintenance and Repair Works) and Percentage Ratio of Maintenance and Repair Works



(Note) Amount of construction revenues in the implementation of public works by full-time constructors, corporations and constructors authorized by the Minister and Prefectural Governors
Source) MLIT, "Statistics on Construction Undertaken (Fiscal 2012)"

Services")[Note 20]. Figure 1-3-27 summarizes the results of a hearing about what kind of difficulty respondents had experienced in executing maintenance and management services. According to these results, many had experienced difficulties securing manpower to carry out works centering on daily patrolling and minor repairs.

Figure 1-3-27 Difficulties Experienced by Constructors and the Like in Executing Maintenance and Management Services



(Note) Percentage ratios of the number of constructors who reported difficulties in any of categories (1) to (10) to the total number of constructors who have experienced some kind of difficulty in the respective service categories.
Source) MLIT, "Constructor Questionnaire on Maintenance, Management and Repair Services"

Many respondents mention shorts on basic information, such as drawings and management logs, in their execution of those services that require a detailed knowledge of the conditions of the target structures, such as focused inspections and resultant designs and subsequent major renovations, suggesting that the development of an infrastructure information base is urged. A large share of respondents also pointed out problems in all categories of services mainly involving fieldwork, evidencing the difficulty of working on the infrastructures that are in service.

(5) Status of labor force in the construction industry

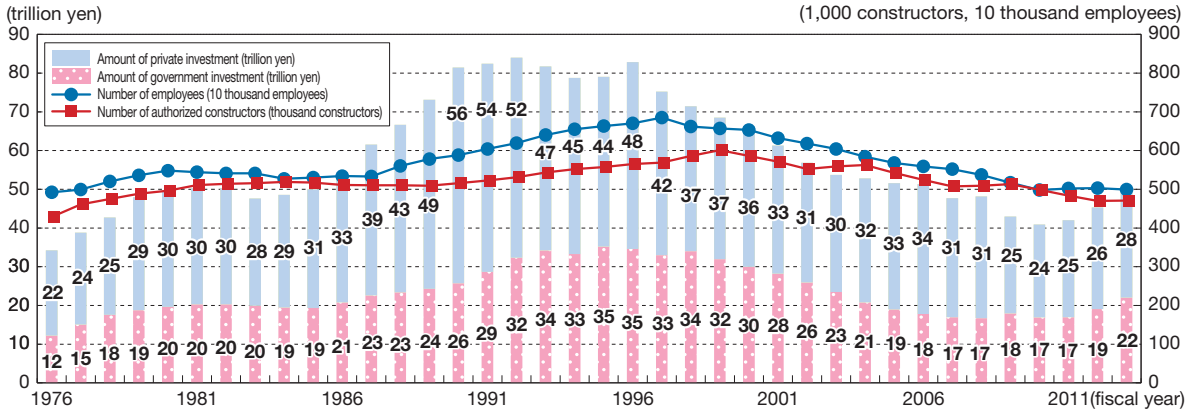
As many constructors talk of the difficulties gaining human resources, the availability of appropriate labor force to the construction industry should be of vital importance to provide a positive solution to the issues of infrastructure maintenance and management that are anticipated to set into full motion from now on. Obviously, from Figure 1-3-28, the number of authorized constructors and the number of employees in the construction industry have been declining rapidly since 1997 in pace with sagging construction investment, with greater decreases in the number of employees when compared with the rest of the industries (Figure 1-3-29).

As can be seen from changes in the number of employees in the construction industry by age group shown in Figure

Note 20 A survey was conducted by the MLIT in February, 2014 through The Associated General Constructors of Japan, Inc., All-Japan Smaller Construction Contractors Association and The Japan Civil Engineering Consultants Association, with responses collected from 521 constructors and 150 civil-engineering consultants.

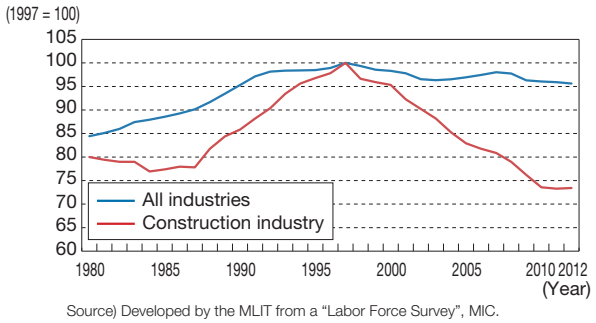
1-3-30, peaks in the number of employees in the construction industry are found in the age groups of the late 20s and the early 50s in 2000, and these peaks have since shifted to right as they got smaller. According to the chart, the number of employees in the construction industry is found to decline as aging workers retire, urging the construction industry to encourage retirees to get back to their previous jobs and secure a new population of younger workers.

Figure 1-3-28 Changes in Construction Investment, Number of Authorized Constructors and Number of Employees



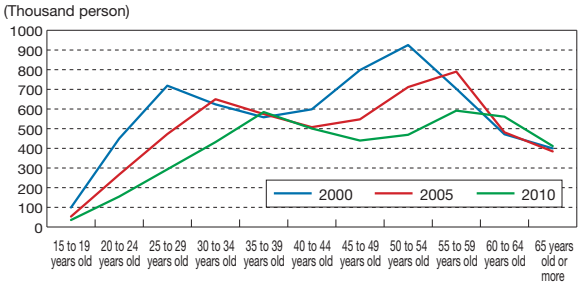
(Notes) 1 The amounts of investments are actual up to fiscal 2010, estimates for fiscal 2011 and 2013 and forecasts for fiscal 2013.
2 The number of authorized constructors is the value effective at the end of each fiscal year (end of March of the following year)
3 The number of employees is a yearly average. The 2011 value was estimated from a projected population based on the results of the 2010 National Census after a retrospective correction to allow for complementarily estimated values derived from the three quake-stricken prefectures of Iwate, Miyagi, Fukushima.
Source) "Costruction Investment Estimates" and "Licensed Contractor Count Survey" by the MLIT and "Labor Force Survey" by the MIC

Figure 1-3-29 Changes in the Number of Employees (in All Industries and the Construction Industry)



Source) Developed by the MLIT from a "Labor Force Survey", MIC.

Figure 1-3-30 Changes in the Age Composition of Employees in the Construction Industry



Source) Developed by the MLIT from a "National Census", MIC.

As the number of employees in the construction industry continues to fall in the future, degrading the added value (value of production) that can be created by the construction industry, the implementation of relevant anti-aging measures could be affected. To keep social infrastructures properly maintained, updated and upgraded for long, continuing efforts would be necessary to develop and maintain human resources on a planned basis to take these tasks and to boost labor productivity in the construction industry.

Column Lives of Concrete

When you hear about the title "useful lives of concrete," you might wonder if concrete has a life in the beginning. As we have seen in Figure 1-3-4, the public awareness of the problems of aging social infrastructures has been mounting since the Sasago Tunnel accident, but more than half of the respondents answered that they "did not know" or "have heard of but know little" about them.

This Column introduces to you, by way of an interview of Professor Toshiaki Mizobuchi, at the Faculty of Engineering and Design, Hosei University, the author of "How To Get Prepared Against Collapsing Concrete Crises,"* that even concrete, which appears robust, could have its life varied depending on its materials, the method of construction used, the environmental conditions in which it is constructed and so on.

(*Toshiaki Mizobuchi (2013); "How To Get Prepared Against Collapsing Concrete Crises," PHP, Inc.)

○ You also touch upon the history of concrete in your book.

- The oldest cement material known to date dates back to the one excavated found at the ancient ruins of Iftah, Israel, though it does not have the same composition and process as concrete as we use it today. Concrete excavated from a floor of a large dwelling site has a compressive strength of 15 to 60 N_{newton} / mm^2, which is equivalent to or better than the concrete used today. Since Iftah dates back to some 7000 years BC, this concrete can be said to have a life of 9,000 years at least.

○ I see concrete has such a long history. Does the fact that concrete is found in such ancient runs suggest that it is considerably long-lived?

- Characteristically, concrete is resistant to pushing forces but vulnerable to pulling forces. As a solution to these problems, iron-reinforced concrete, or concrete internally reinforced with iron bars, came to be developed with the coming of the 19th century. A gardener named "Joseph Monier" is recorded to have exhibited iron-reinforced flowerpots at the Paris Exposition of 1867. While the advent of iron-reinforced concrete opened a way for building architectures of unprecedented shapes, it raised the problems of decaying internal iron bars in the meantime, which have trimmed the lives of concrete from several hundred years to several ten years.

The life of concrete is also a parameter of the method of construction used at a construction site. Prewar practice had been to carry hard concrete in a hand cart to construction sites, but in the ages of mass and quick construction following a period of rapid economic growth, the method of pumping concrete to a site needing it after it had been transported from a factory gained popularity. In order for concrete to be pumped under pressure, it must be mixed with lots of water to soften it.

Concrete thus constructed is said to be lived for one hundred years or so under relatively favorable conditions and for 50 years or so under harsher conditions, such as those encountered seaside.

○ Well, do you mean that the life of concrete is also varied by metrological conditions?

- Factors, such as materials, temperature and humidity, the moisture content and the amounts of chlorides and carbon dioxides present at the installation environment, can also affect the life of concrete. Decaying concrete goes through a number of diverse and complexes processes. As one example, concrete placed in the vicinity of a seaside or concrete kept in contact with a snow melting agent in the winter time could be internally permeated by salt to react with steel reinforcements to corrode them. As another, concrete made of materials, such as andesite, is known to develop alligator cracks as a result of a process called "alkali silica reaction." This phenomenon made a topic as a "concrete crisis" in the 1980s.

Thus, seemingly everlasting concrete decays progressively inside over time for various reasons. Giving proper maintenance to concrete to sustain and care for the functionalities of the concrete structures is important.

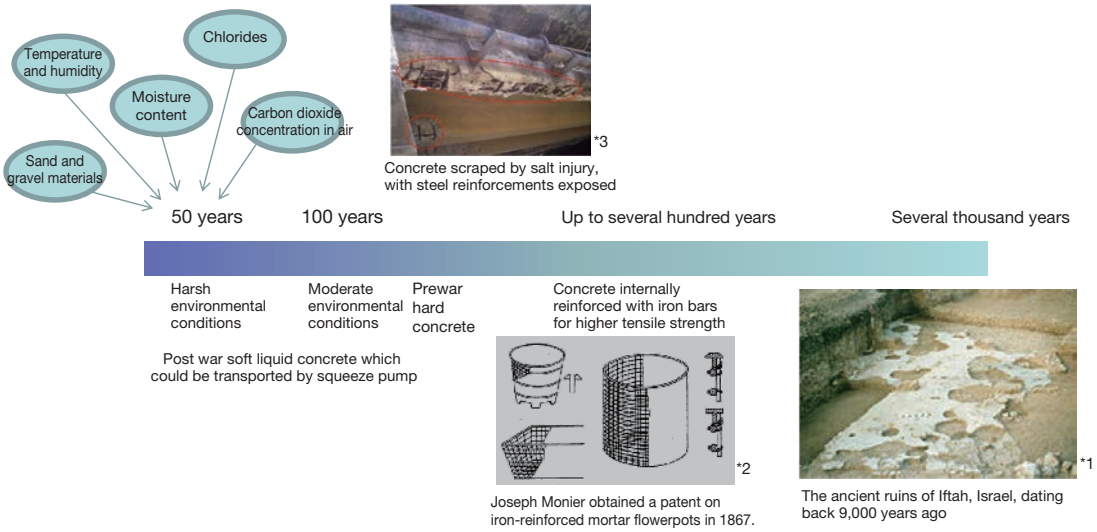
○ Now aging social infrastructures have been

looming into major concern, would you please tell us about the future approaches you feel particularly significant?

- That should be the development of human resources above anything. Civil engineering had been a very popular segment of industry in the postwar period, because it had a close bearing on the rehabilitation of the national land and on nation-building. But civil engineering is no longer as popular among students as it used to be. Further, modern students joining in civil-engineering faculties seem greatly interested in such issues as planning, community renovation and rehabilitation. As their interest focuses on planning and community renovation, they appear to take less interest in the lectures on maintenance as I deliver them.

Utilizing a qualification system, for example, might be one way to motivate students to learn more about the concepts of maintenance and gain know-how about them. Since modern students are highly oriented towards career development, appealing the advantages of acquiring a socially accredited and esteemed qualification to them should naturally lead to the growth of young engineers.

Figure 1-3-31 Variations in Useful Lives of Concrete and the Causes



*1 Garfinkel Yosef - Originally uploaded by Yaels (Transferred by Matanya)
http://upload.wikimedia.org/wikipedia/commons/4/4e/Yiftahel_structure_with_plastered_floor1.jpg
*2 Pieter Sijpkes (School of Architecture, McGill University) website
http://www.arch.mcgill.ca/prof/sijpkes/abc-structures-2005/concrete/04concrete.gif
*3 MLIT

Column Aging Condominiums

Today, social infrastructures alone are not decaying at a serious tempo in Japan.

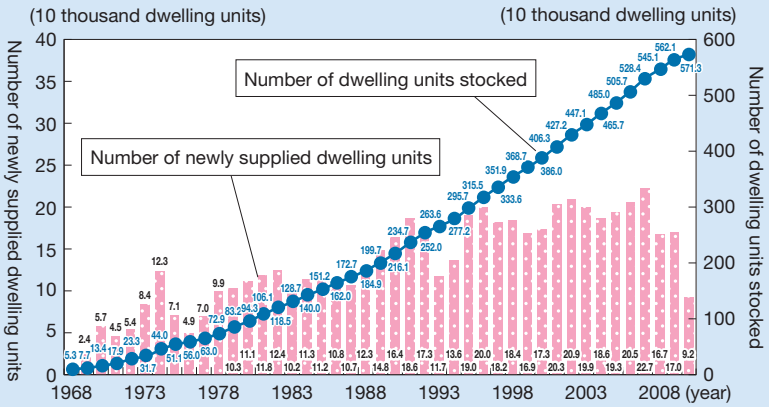
Postwar Japan has followed a continuing pace of urbanization, creating a large supply of condominiums to house the population flowing into urban areas since the onset of the 1970s. From now on, many of these condominiums are entering a period of major repairs and renovations as they have been in existence for long since their initial construction.

Condominiums that have aged without appropriate maintenance and management care could not only suffer losses of structural safety and worsening residential environments but might induce a host of problems, such as a worsening of the surrounding living environment or urban environment.

As distinct from office buildings or privately owned houses, which are commonly owned by single entities, condominiums are each inhabited by a population of owners varying in value and in economic status, each holding ownership of one or more apartments of the condominium. Because of this characteristic, owners of the apartments of a condominium sometimes find it difficult to form consensus on the implementation of major repairs or the like.

In addition, there are problems of shorts on human resources and money. As condominiums grow old, the residents get aged as well, so that an increasing number of management associations are short of volunteers to work as officials. According to a survey conducted by the MLIT, about one fourth of all the condominium management associations are anxious about possible shorts on their renovation reserve funds, while about 15% feel uneasy about condominium common service fees in arrears and the difficulty of running their management associations.

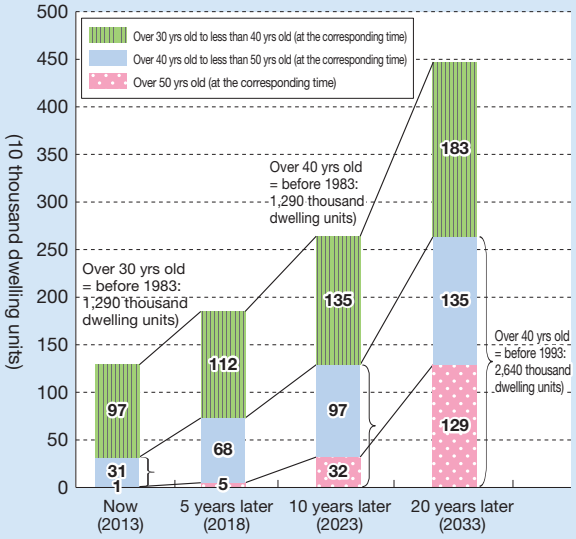
Figure 1-3-32 Number of Condominium Dwelling Units Stocked Nationwide



(Notes) 1 The number of newly supplied dwelling units is estimated on the basis of building starts statistics or the like.
2 The number of dwelling units stocked is the number of dwelling units at the end of each year estimated on the basis of the cumulative number of newly supplied dwelling units, etc.
3 The term "condominium" means a medium- to high-rise (three stories or more) dwelling house.
4 Condominium resident populations were calculated on the basis of 2.46 residents per household on the average from the 2010 National Census.

Source) MLIT

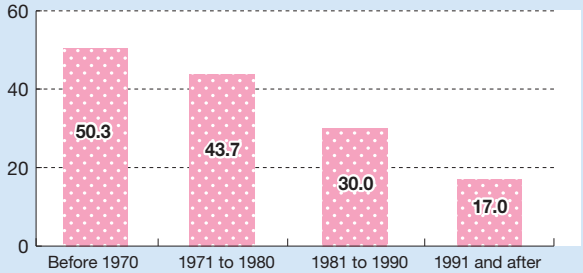
Figure 1-3-33 Number of Condominiums Over 30, 40 and 50 Years Old



Source) Document released at the 11th session of the Building Standards Systems Workgroup, Panel on Infrastructure Development, MLIT

Figure 1-3-34 Aging Condominium Residents

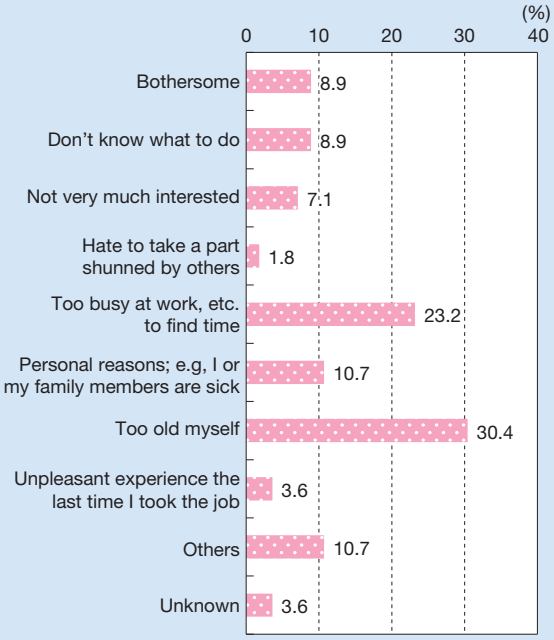
Status of Aging Residents of Condominiums by Year of Completion (households consisting solely of 60-year-old or older residents)



Source) Document (part) released at the 11th session of the Building Standards Systems Workgroup, Panel on Infrastructure Development, MLIT.

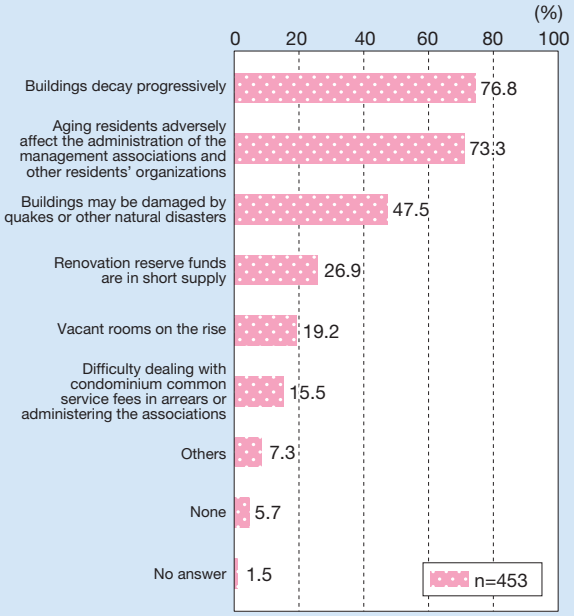
The MLIT implements Projects Aimed at Normalizing the Management of Condominiums and Promoting Their Renovation to drive the maintenance and management and renovation of condominium stocks. In June 2014, the Law That Partially Amends the Law Concerning the Facilitation, etc. of the Reconstruction of Condominiums came into effect, opening a way to sell the sites of aged condominiums to facilitate their renovation. (For detailed information about the approaches taken by the MLIT, see Section 1, Chapter 5, Part II.)

Figure 1-3-35 Reasons for Not Accepting Position As an Official at Your Management Association (multiple choices)



Source) "Fiscal 2013 Condominium General Survey," MLIT.

Figure 1-3-36 Concerns over the Administration of Condominium Management Associations



Source) "Questionnaire on the Status of Review of Plans to Reconstruct Condominiums, etc." MLIT.

Conclusions

Thus discussed, Japan has long developed social infrastructures in history, with the resultant store of social infrastructures underlying various activities of our present-day economic society and our daily lives.

As Japan continues to slip into a society of dwindling population, it needs to keep up with consistent economic activities to achieve a certain rate of economic growth amid predictions of sharply falling population while tiding over the problems of tight financial conditions. Japan also needs to keep the nation assured of safety and security under the framework of the tough land conditions specific to the country. Just as concrete has a life, so does a developed infrastructure. The usefulness of an infrastructure won't last permanently. What is important is to keep the social infrastructures already developed so far under proper maintenance and care to allow them to demonstrate their utilities to a successful extent and also to develop vital social infrastructures at a higher level of refinement. A strategic scheme of keeping these initiatives in continuing progress would be necessary for the sake of our future generations.

To this end, "intelligence" is sought to make efficient and effective of the social infrastructures stored so far amid tight financial positions. Because social infrastructures have as their function to support economic activities, the relevant perfection of such function could support economic growth. Making more intelligent use of the existing social infrastructures should help augment our growth potentials.

Further, it is true that social infrastructures have been developed, maintained and managed in the initiative of public entities as the history tells us, though public entities have not done everything and various kinds of stakeholders have been at work according to urges of the times. Just as some bridges had been managed by local residents in the Edo Period, various kinds of stakeholders working in accord while leveraging their own wisdom in their properly defined shares of responsibility would be essential for the sake of "shared support" of essential social infrastructures.

Then, promoting future-oriented initiatives at all times while taking lessons from the history would be essential to sustained growth of our economic society. "America in Ruins" offers a significant lesson for us to learn in probing into the future scheme of maintenance and management of the nation's social infrastructures. The cost of being overly concerned with immediate benefits and lacking in a long-term perspective would be passed on to our future generations. Future generations would be unable to reverse the decisions made by their predecessors. It would be necessary, therefore, to promote the implementation of "farsighted initiatives," including drastic scrapping of social infrastructures no longer in effective use, with future risks, burdens and so on taken into consideration.

Chapter 2 introduces various initiatives now being pursued from the three standpoints of intelligent usage, shared support and farsightedness and proceeds discuss why these initiatives are sought.

Chapter 2 Social Infrastructure in the Future

Section 1 Using it Wisely

Social infrastructures are indispensable for supporting Japan's economic society and people's lives. However, the various functions diminish with the passage of time. To ensure that its functions do not become obsolete unnecessarily, social infrastructures must be properly reviewed and maintained.

One of the main reasons the functions of the current social infrastructures start to decline is the aging population. While the aging population is an important issue in and of itself, changes in the economic and social environment surrounding the social infrastructures are also factors affecting its functional decline. For example, when the demand for a certain social infrastructure increases greatly, the infrastructure will not be able to carry out its original function due to congestion. On the other hand, if use of a specific social infrastructure decreases significantly due to a decrease in population, there is less opportunity for the infrastructure to perform the function for which it was originally created.

When there is a gap between the functions of a social infrastructure in place and the demands of the society, the gap must be closed by 'using it wisely.' Furthermore, with other considerations such as severe financial constraints, there is a need to be creative and find ways to improve the functions of social infrastructure.

In this chapter we will explore how we can work towards using social infrastructures wisely by considering the following aspects: using the market mechanism, creativity in use, and efficient use by integration.

1 Using the Market Mechanism

Within the phrase, 'use it wisely,' there is an expectation that either the number of benefits derived from the current infrastructure will be expanded, or that the same level of benefits will be provided at a reduced cost. Though market mechanism generally refers to the balancing of supply and demand through pricing, and though the social infrastructure supply is limited, we can still use pricing as a signal to establish a system that identifies an entity that can be utilized most efficiently.

(1) Adjusting the Demand

Currently, the number of hours a driver spends in a vehicle is approximately 13 billion hours a year (about 100 hours per driver), and approximately 5 billion hours—about a fourth—of that time (about 40 hours per driver) is estimated to be spent in backed up traffic[Note 21]. This means that we are losing the labour hours of about 2.8 million workers each year[Note 22]. If by resolving major traffic jam areas we are able to decongest traffic, using the roads would be more convenient for drivers, and would also help alleviate the impact on the surrounding environment by decreasing noise and exhaust pollution, leading to a much more effective use of the roads.

Below are examples of ideas for how to make the use of the road network more efficient.

Note 21 Probe data from FY2012. Probe data is a variety of data gathered from each vehicle, such as its location, speed, and acceleration to the front, rear, left and right. Refer to page 63.

Note 22 Calculated by dividing 5 billion hours by the actual working hours of one person (1,788 hours/year (average working hours of an employee in a company with more than 30 employees, from "2011 Monthly Labour Survey" by the Ministry of Health, Labour and Welfare))

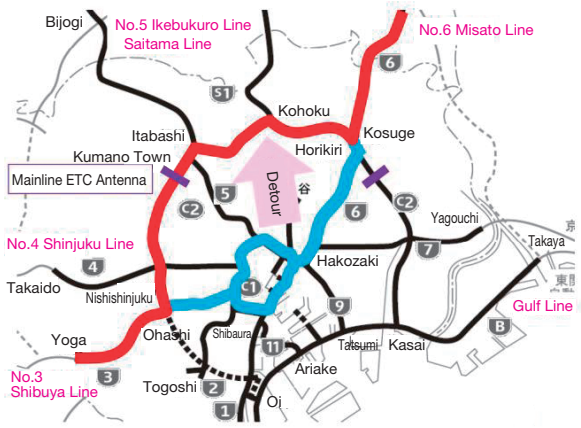
Inducing Traffic Diversion with Toll Discounts

Heavy traffic is becoming a chronic problem due to regular and through traffic on roads going to and from the suburbs to the city center, particularly in metropolitan areas. Normally, there are two routes for getting from one point to another, and if the toll is the same for both routes, most people will choose to take the shorter route. However, this can be one of the causes for the traffic jams. By creating a price difference between using the central circular route and using the inner circular route to make the central circular route a more attractive choice, we can ameliorate the traffic congestion and both routes can be used more efficiently.

In January 2012, the Metropolitan Expressway decided to implement a discount for using the central circular route bypass (2-1-1), in order to divert the traffic flowing into the city center to the central circular route to help alleviate the heavy traffic on the inner circular route. Under this scheme, if a driver used the central circular route to go around the city center, a standard vehicle would get a discount of JPY100, and large vehicles would get a discount of JPY200 (JPY210 discount since April 2014). The scheme – which was limited to ETC vehicles – would apply the discount to a vehicle as it went through the entrance and exit to the central circular route, the discount was applied when using the central circular route was a longer route than using the inner circular route.

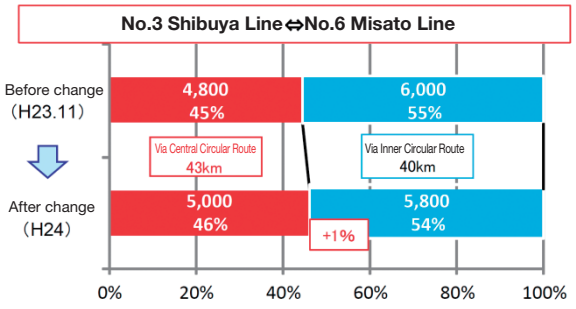
As a result of implementing this scheme, the amount of traffic on the inner circular route has decreased, and the amount of traffic diverted to the central circular route has increased (Figure 2-1-2).

Figure 2-1-1 Discount for using Central Circular Route Bypass



Source) Ministry of Land, Infrastructure and Transport Social Infrastructure Development Council, Roads Subcommittee's 5th Land & Highway Panel (February 2013)

Figure 2-1-2 Changes in Traffic due to Discount



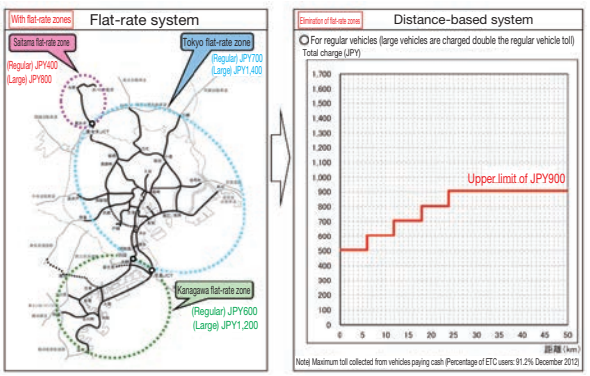
Source) Ministry of Land, Infrastructure, Transport and Tourism (MLIT) Social Infrastructure Development Council, Roads Subcomittee's 5th Land & Highway Panel (February 2013)

Elimination of Flat-Rate Zones

In 2012, the Metropolitan Expressway and the Hanshin Expressway transitioned from a system with flat-rate tolls for each zone to a distance-based toll, where the toll is charged according to the mileage travelled (Figure 2-1-3). Previously, if a driver drove through flat-rate toll charging zones, it would be end up being an expensive toll, so drivers would get off the expressways right before the toll charging zones and use the bypass roads, making this one of the causes of traffic congestion on the bypass roads.

For example, if a driver entered the Yono on ramp in Saitama and drove to the Tomigaya exit in Tokyo, the driver would go through both the Saitama and the Tokyo flat-rate toll charging zones, amounting to a total charge of JPY1,100 in tolls. For this reason, many drivers would choose to use the Shinomiya bypass, which runs parallel to the expressway without going through the toll-charging zones, causing traffic congestion on the Shinomiya bypass. However, when the toll-charging system changed to distance-based, the toll became JPY900 (JPY930 as of April 2014).

Figure 2-1-3 Transition to Distance-based Toll Calculation on Metropolitan Expressway

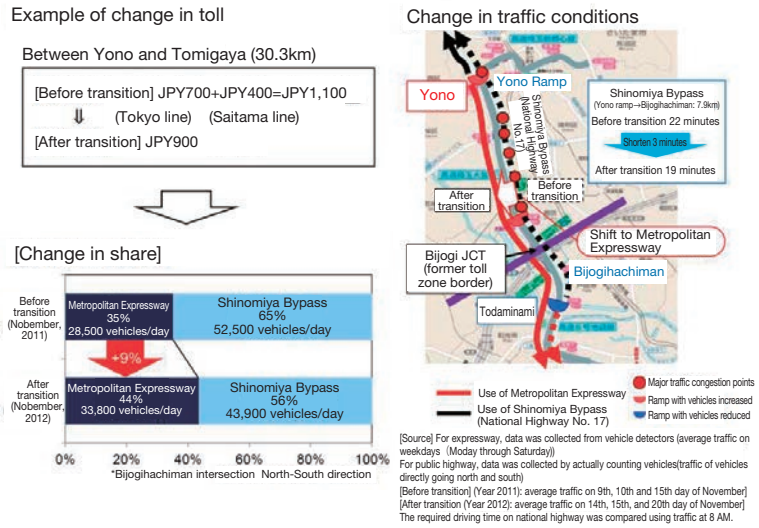


Source) MLIT Social Infrastructure Development Council, Roads Subcomittee's 5th Land & Highway Panel (February 2013)

This caused the ratio of drivers using the expressway and drivers using the bypass to change, with a rise in the number of drivers using the expressway and an alleviation of traffic congestion on the Shinomiya bypass (Figure 2-1-4).

By being more flexible with the use of the toll-charging system in this way, we can increase the utilization rate of the infrastructure, as well as decrease the societal loss caused by traffic jams, making it possible to use the infrastructure wisely.

Figure 2-1-4 Change in Usage due to Elimination of Toll-Charging Zones (Tokyo Line – Saitama Line Example)



Source) MLIT: Social Infrastructure Development Council, Roads Subcommittee's 5th Land & Highway Panel (February 2013)

Column Use of Toll-charging System Overseas

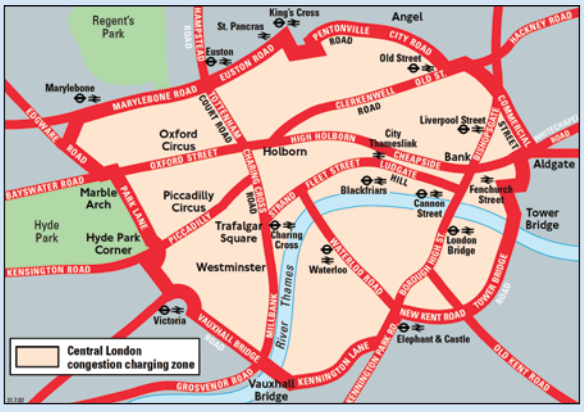
The London Example

Other cities overseas are working on controlling the amount of traffic by road pricing, and London is one such example. In London, in order to alleviate the traffic congestion in the downtown area, in February 2003, a road pricing system was implemented wherein all vehicles passing through certain areas between 7:00 – 18:30 on a weekday paid a GBP £5 /day toll[Note 1] (Figure 2-1-5). The toll could be paid online or via phone cameras that automatically read the license plates were set up around the toll-charging areas to check that only vehicles that had paid the toll were driving through these areas.

Since the implementation of road pricing, vehicles that entered toll-charging areas decreased by 18%, vehicles driving through the toll-charging areas decreased by 15%, and traffic congestion was decreased by 30%. At the same time, the number of public transport users increased, leading to an increase in the number of buses running by 23%, and decreasing the percentage of delay in the bus arrival times by 60%.

In addition to the impact on the amount of traffic, Transport for London is also measuring the benefits and the cost of implementing road pricing in terms of market value. The impact was measured by separating the impact on each entity (ex: toll implementation, etc.) and the societal impact (ex: decrease in traffic congestion) and calculating the costs and benefits for each aspect. The results showed that the overall societal benefit totalled over GBP71 million more than the cost, showing that the implementation of road pricing system had a desirable impact on society as a whole (Figure 2-1-

Figure 2-1-5 Toll Collection Areas



Source) Developed by MLIT from "Impacts Monitoring Second Annual Report" (2004) by Transport for London

Note 1 There were price differences in tolls according to area, vehicle type, and payment method.

6).

Furthermore, the system can be adjusted and changed according to various trends, such as raising the price of the toll charged per day to GBP8 in 2005, then to GBP10 in 2011, and expanding the toll-charging areas in 2007, then reverting back to the original areas in 2011.

In this way, London is using road pricing to wisely use the social infrastructure of roads to benefit the overall society more effectively.

The Stockholm Example

Road pricing has also been implemented in Stockholm. Road pricing was trialled in Stockholm from January to July in 2006 to reduce the heavy traffic in the city center and also improve living conditions (reduce exhaust emissions, improve living environment), and since August 2007 has been implemented as a permanent system.

Figure 2-1-6 Effect of Road Pricing

		Item	Benefit, Cost (One million GBP)
Effect on each entity			
	Administration	Toll revenue	215
		Operating cost	109
		Infrastructure maintenance cost	25
		Reduction of fuel tax	25
		Reduction of value-added tax	13
		Decrease in parking revenue	15
	Private sector		
	General user	Benefit of reduction in time	89
		Improvement in punctuality	13
		Reduction in car operation cost	9
		Taxation cost	6
		Toll payment	72
		Cost of stopped travel	12
	Businesses (excluding transport operators)	Benefit of reduction in time	142
		Improvement in punctuality	22
		Reduction in car operation cost	17
		Taxation cost	16
		Toll payment	143
		Cost of stopped travel	8
	Transport Operators (ex: Bus drivers)	Bus revenue	19
		Bus operating cost	18
		Decrease in parking revenue	10
Societal Impact		Decrease in traffic accidents	14
		Improvement of environment	3
Total benefit			543
Total cost			472
Benefit - Cost			71

(Note) 1 Blue font is benefit, red font is cost.
2 Results based on cost-benefit analysis from when toll per day was GBP5.
Source) Developed by MLIT from "Central London Congestion Charging Scheme" (2007) by Transport for London

The system implements a toll-charge for vehicles that drive in and out of the center of Stockholm between 6:30 and 18:30 on weekdays[Note 2]. There are 18 toll collection points, and at these collection points a laser will detect a vehicle as it passes by and photographs the license plates at the front and back of the vehicle (Figure 2-1-7, Figure 2-1-8). The price of the toll charged differs according to the time of day, ranging from SEK10, SEK15, and SEK20 (approximately JPY150, JPY225, and JPY300[Note 3]) per passage[Note 4].

Due to the implementation of road pricing, Stockholm has also seen an increase in the number of people using public transportation, and the traffic through the city center has been improved. The number of vehicles passing through the toll collection points between 6:00 and 19:00 on weekdays have decreased to almost half the number of vehicles that used to pass through the same area before the trial period from January to July in 2006, and the permanent implementation in August 2007 (Figure 2-1-9).

Furthermore, this system has been unique in that it has been accepted by the residents quite favorably. In the survey taken of the residents before the trial period, only 36% of the residents answered, "In favor" or "Somewhat in favor" of implementing the toll-charging system. However, in the survey taken after the trial period, 53% of the residents supported the continuation of the toll-charging system. Since the toll-charging system was re-implemented as a permanent measure in August 2007, each year the number of residents that support the system has increased every year. By May 2011, the results from the survey conducted in Stockholm and its surrounding regions showed that over 70% of the residents support the system.

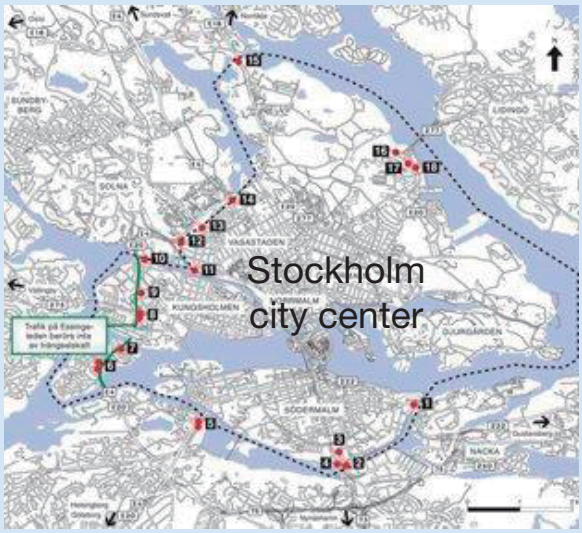
(References)

·Transport for London "Impacts Monitoring Second Annual Report" (2004)

Note 2 Exemptions apply for emergency vehicles, buses, diplomat vehicles, and motorcycles.
Note 3 Calculation based on exchange rate of February 2014, at JPY15/SEK1.
Note 4 Daily maximum limit of SEK60 (JPY900).

·Transport for London “Central London Congestion Charging Scheme” (2007)
·Road Traffic Technology website http://www.roadtraffic-technology.com/projects/stockholm-congestion/stockholmcongestion3.html
·Swedish Transport Agency website http://www.transportstyrelsen.se/en/road/Congestion-tax/Congestion-tax-in-stockholm/How-do-control-points-work1/
·Maria Bör jesson, Jon as Eliasson, Muriel Hugosson, Karin Brundell-Freij “The Stockholm congestion charges – five years on. Effects, acceptability and lessons learnt” Royal Institute of Technology

Figure 2-1-7 Toll Collection Point

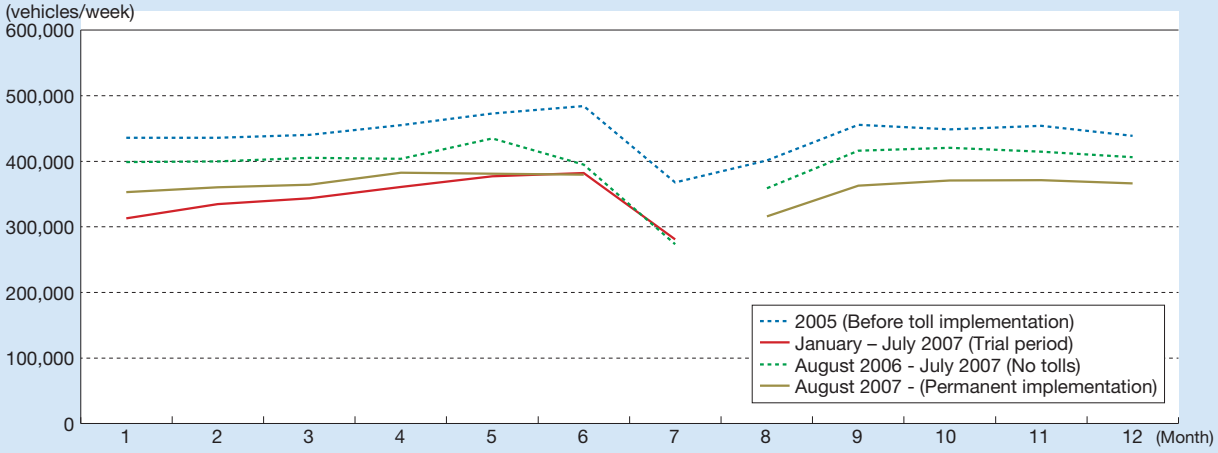


Source) Developed by MLIT from Road Traffic Technology information

Figure 2-1-8 Image of Toll Collection

Source) Swedish Transport Agency information

Figure 2-1-9 Average Number of Vehicles that Pass Through Toll Collection Points between 6:00-19:00 on a Weekday in One Week



Source) Developed by MLIT from ‘The Stockholm congestion charges - lessons after 5 years’ by Maria Börjesson, Jonas Eliasson, Muriel Hugosson, Karin Brundell-Freij, Professor Transport Systems Analysis,Royal Institute of Technology

(2) Devising a Structure for Selecting the Most Efficient Supply and Usage Agents for Social Infrastructure

By using the market mechanism, we are able to supply services that have the characteristics of social infrastructure as efficiently as possible, and select ideas and agents that make the best use of social infrastructure. In this section we will introduce some of the related efforts being undertaken both nationally and overseas.

(Examples from Overseas)

From abroad, we have the example of having a structure that incorporates an auction-like system to choose companies that can most efficiently use the infrastructure to supply services.

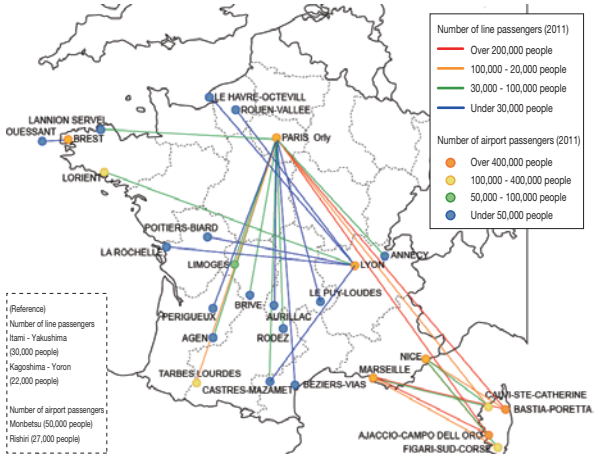
■ PSO in the EU

In the EU, having airlines that connect remote areas and islands to the wider transportation network is recognized as a service to be provided as the national minimum. The auction-style system is used to issue business licenses and subsidies for providing these transportation lines, which tend to operate at a deficit.

In EU member states, when airlines that connect remote islands are lifelines that are not provided on a commercial basis, that transport line is recognized as being designated a Public Service Obligations (PSO)[Note 23] (Figure 2-1-10).

When a transport line is designated as a PSO route, any airline licensed in the EU can operate the route under the specified service conditions. However, if there is no airline that voluntarily decides to operate the route, there is a public tender for entering into the operation of the route. In other words, the government that designated the PSO transport line will establish the criteria in regards to the frequency of flights, type of aircraft, timetables, fare prices, etc., and each bidder must submit an operation plan that meets the criteria, along with the amount of subsidy necessary[Note 24] (Figure 2-1-11). Details regarding the system for selecting the flight operator is left to the national government to determine, but in regards to the presentation of subsidies, the system is the same within all of EU. Once an airline company has been selected as the operator for the said transport line, that airline is designated as the sole operator for that route during the contract period.

Figure 2-1-10 PSO Line in France



Source) 'Transportation Policy Council Aviation Subcommittee Basic Policy Group Interim Report, Reference Materials' by MLIT

Figure 2-1-11 Minimum Service Level for PSO Transport Lines

Country name	Minimum number of flights operated	Minimum capacity	Minimum aircraft size	Timetable requirements	Maximum one-way fare
France	○	×	○	○	×
Germany	○	▲	○	○	○
Ireland	○	○	○	○	○
Italy	○	○	○	○	○
Portugal	○	○	×	○	○
Spain	▲	○	×	▲	○
Sweden	○	○	×	×	×
UK	○	×	○	×	○
Iceland	○	×	○	○	○
Norway	○	○	○	○	○

Note) ○ = Set for all transport lines ▲ = Set for some transport lines × = Not set
Place of origin: Prepared based on European Commision, Official Journal of European Community

Source) 'EU's Public Service Obligation in the Field of Aviation and its Effect on Airport Operations,' from "Transportation and Economy" No. 72, Volume 4 '12 .4 by Hitoshi Oguma (2012)

Note 23 REGULATION (EC) No 1008/2008 Article 16
Note 24 'EU's Public Service Obligation in the Field of Aviation and its Effect on Airport Operations,' from "Transportation and Economy" No. 72, Volume 4 '12 .4 by Hitoshi Oguma (2012)

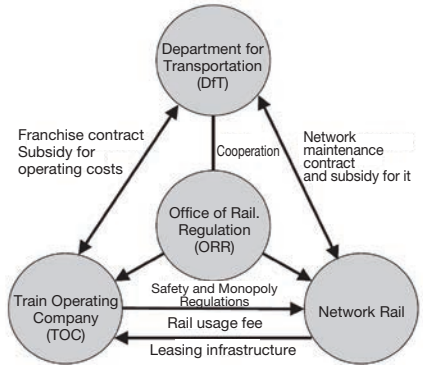
Railway Business Rights in the United Kingdom

The use of a similar competitive system for selecting a public transportation operator can also be seen in the United Kingdom's tender for the railway business rights.

In the UK, the railway infrastructure, such as the railway lines and facilities, are managed by the non-profit company, Network Rail Corporation. Transportation operators must bid for the right to conduct their passenger transportation business by leasing railway lines from Network Rail through a two-tiered bidding system[Note 25].

The first step of the process for selecting the transportation operator for a railway line is a preliminary information notice posted by the Department of Transportation, detailing the end date of the current contract (franchise), and the decision schedule for the new franchise. Next, they will go through a consultation process between the Department of Transportation and market participants, then there will be a deliberation regarding the specification details within the Department of Transportation. Once that is done, the service requirements and a draft of the franchise contract will be posted. When potential bidders receive the posted specifications, they will then submit preliminary review documents that detail their company's business performance and stability to prove their operational ability. The Department of Transportation will review these documents to decide which companies are eligible for submitting a tender. Companies deemed eligible for submitting a tender will then submit a tender that details a business plan that fulfills the service requirements, along with either the amount of subsidy required or the compensation value (premium) to be paid to the Department of Transportation for executing the business plan during the contract period. Finally, each bid will be scored according to a predetermined formula that weighs the premium or subsidy amount and service level, and a contractor will then be selected from the bids[Note 26].

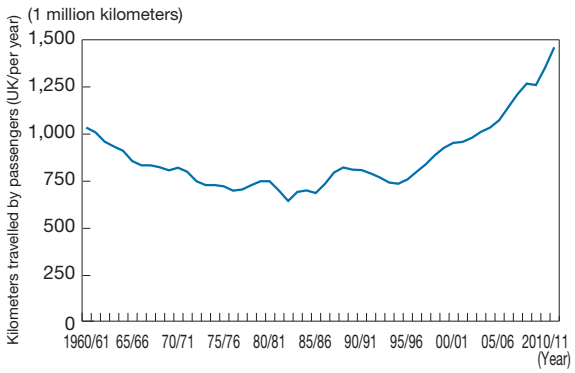
Figure 2-1-12 Railway Industry Organizations



Source) Efficiency and regulations of the UK passenger rail,' "Kobe University Economic Research Annual Report, Vol.54" by Takashi Yanagawa, Kozo Harimaya, and Ichiro Yoshino (2007)

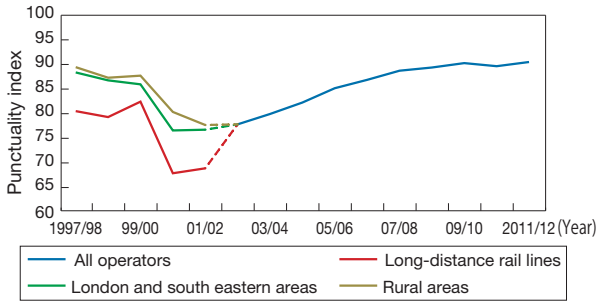
In the UK, the privatization of the railways and the franchise system was implemented in 1994. The trends in the railway business since then shows that the number of kilometers that passengers travel has steadily increased (Figure 2-1-13). In terms of the quality of service, the punctuality index shows a worsening trend up to the time of the Hatfield train crash in 2000, but then a steadily improving since then[Note 27] (Figure 2-1-14). In addition, the impact on government expenditure on railway operators seems to be on a decreasing trend from 2003/04 onwards (Figure 2-1-15).

Figure 2-1-13 Trends in Kilometers Travelled by Passengers by Railways in the UK



Source) "The Brown Review of the Rail Franchising Programme" by Secretary of State for Transport

Figure 2-1-14 Trends in Punctuality Index of Railways in the UK



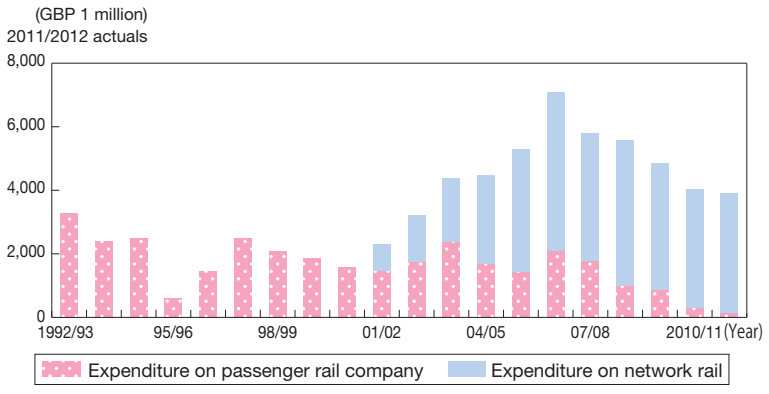
(Note) The 'Punctuality Index' measures the percentage of trains that reached their final destination by scheduled time or within 1 minute delay of scheduled time
Source) 'The Brown Review of the Rail Franchising Programme' by Secretary of State for Transport

Note 25 'Efficiency and regulations of the UK passenger rail,' "Kobe University Economic Research Annual Report, Vol.54" by Takashi Yanagawa, Kozo Harimaya, and Ichiro Yoshino (2007)

Note 26 For more details regarding the bidding process, please refer to: Department for Transport 'Rail Franchising Competition Guide' (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208428/franchise-competition-guide.pdf)

Note 27 The Hatfield train crash is a major derailment accident that occurred in 2000 due to lack of investment in maintenance and inspections and insufficient supervision over outsourcing by the company Railtrack, which had been entrusted with the management and operation of the rail infrastructure after its privatization in 1994.

Figure 2-1-15 Government Spending on Service Operators and Network Company



Source) "The Brown Review of the Rail Franchising Programme" by Secretary of State for Transport

(National Measures)

Japan has also in recent years started using a more competition based process in order to select implementation entities that have exceptional ideas and abilities, to help improve the use of the current social infrastructures.

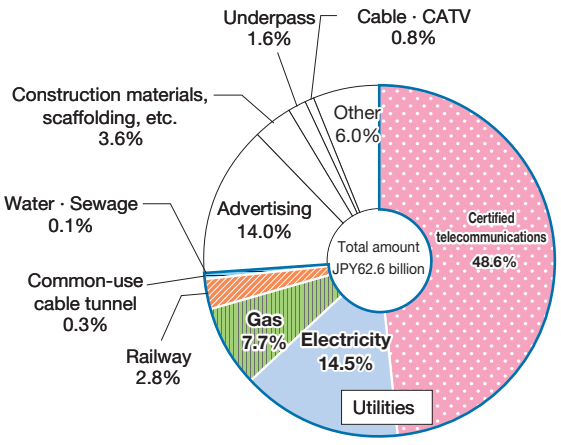
Introducing the Bidding System to Occupation of Roads

The road sector has decided that a system with auction-like characteristics would be introduced for selecting road space users for road space available in places such as under elevated railway structures. Formerly, because the main purpose of roads was for general traffic, permission for occupation of road space for a specific purpose would be granted only if there was no space outside the road space to install property. In actuality, when we look at the percentages of the types of industries occupying such spaces for revenue, the majority of the space is occupied by conduits necessary for utility companies, with only a small percentage occupied by commercial businesses (Figure 2-1-16).

Meanwhile, with the acceleration in population decline and aging, there is a growing demand for urban functions to be consolidated. Considering the matter from a local revitalization and urban development perspective, we can assume that there will be an increase in entities such as stores applying for road occupancy permissions. In such cases, we must consider selecting principal occupants that—in addition to the previous criteria of outlines such as business maintenance ability and business hours—will be able to generate the greatest amount of occupancy revenue.

From this line of thinking, the occupancy standards for road space under elevated structures was mitigated, and the 'Act for Partial Revision of the Road Law' was established in May 2014 to implement a system that ensured that—depending on the occupying entity selected—out of all bid participants that satisfied the standards, the bidder that bid the highest amount of occupancy revenue would win.

Figure 2-1-16 Ratio of Occupancy Revenue by Industry (For National Highways under Direct National Control)



Source) Road PPP Study Group Subcommittee Material on the Consideration regarding the Occupation of Road Space by MLIT

Contest for Airport Arrival and Departure Slot Allocation Policy

In September 2013, the aviation sector—realizing that the running and maintenance of a low demand route to the airport was unsustainable by the efforts of airline companies alone[Note 28]—held a "Haneda Arrival & Departures Framework Scheme Contest," which called for joint proposals on how the region could cooperate with the airline companies to run these routes. Once the committee of experts had evaluated the submitted proposals, the region that submitted the best proposal would be awarded the allocation of Haneda Airport's domestic landing and departure slots (maximum 3 slots). The proposals were evaluated not only in terms of the profitability of the route itself, such as demand prospects, and efficiency of operating costs, but also in terms of the structure of cooperation with the local government and wider range of stakeholders, as well as regional tourism opportunities and business demand development strategies.

This contest received entries from four regions, and the top three applicants, the Haneda – Iwami line, Haneda – Yamagata line, and the Haneda – Tottori line, were each allocated a route. The proposal which placed first in the contest, the Haneda – Iwami line, included a mechanism for risk sharing between the region and airline company in case the number of users dropped below target after increasing the route, as well initiatives for supporting the development of travel products.

For the use of social infrastructure and supply of public services, we must not only consider an economic rationale but also a variety of social demands, such as ensuring that the service supplied is of a highly public nature, with consideration for equality between regions and individuals. We cannot deploy the market mechanism to every area indiscriminately. However, as evident from the examples described in this section, in situations where the market mechanism is appropriate, it is an advantageous way of having a fair, transparent method for making the supply of public services more efficient, and for encouraging scarece social infrastructures to maximize its benefits.

2 Ingenuity in Using Existing Stock

As Japan faces financial constraints, we are required to be even more efficient and effective when moving forward in developing new social infrastructures. However, within the existing social infrastructures, there are some aspects that are not being used as efficiently as possible, due to the changing economic society. Because of this, when reviewing the usage of the current social infrastructure, we must use ingenuity to find ways of increasing the benefits for the users without incurring additional costs. In this section we will discuss examples in which ingenuity is making the use of existing social infrastructures more effective.

(1) Multifaceted Use of Social Infrastructures

The benefits derived from an existing social infrastructure can be expanded if said social infrastructure, which has been maintaining a certain level of usage, can also be used for other purposes beyond its original function. In addition, by continuing to use the existing social infrastructure while using that same space more effectively, the value of that social infrastructure will increase. Below are some concrete examples.

The Various Possibilities of "Michi-no-Eki"

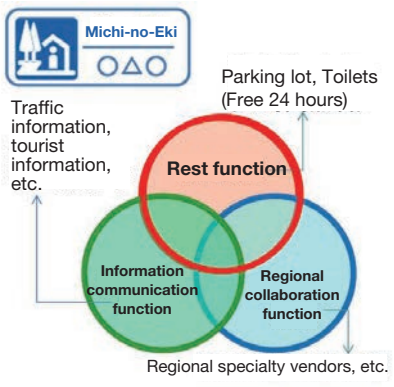
"Michi-no-Eki" have grown over the past 20 years, since its start in 1993, reaching areas nation-wide as a place for drivers on expressways to stop for rest and to find information, and as a place for regional community collaboration. As of March 2014, there are 1,014 stations registered. The scale of these stations amounted to about JPY210 billion in national annual sales, and the national annual number of purchasing individuals arriving at these stations were about 220 million people (both figures as of 2011).

At the start, the services were geared mainly toward expressway users that were passing through, but in recent years, the services have expanded to include attractions that incorporate features that highlight the characteristics of the region through agriculture, tourism, welfare and disaster prevention.

Note 28 Opening of new flight routes or increase in flight routes for lines subject to rules, "Single Service Rule" and "Triple Service Rule" (Shonai, Saga, Tottori, Misawa, Hachijojima, Noto, Ishigaki, Wakkanai, Nanki-Shirahama, Odate-Noshiro, Nakashibetsu, Amami Oshima, Miyako, Iwami, Monbetsu, Yamagata, Oshima, Miyakejima, Chubu, Kumejima)

The stations also support the regional agriculture, forestry, and fisheries businesses through a sixth industrialization process which includes direct sales of local agricultural and fishery products, as well as product development, processing and sales. For example, at the roadside station 'Munakata' in Munakata City, Fukuoka prefecture, 99.9% of total sales in 2012 was accounted for by local products, due to particular emphasis being put on direct sales of fresh fish and produce from the local area, thereby supporting the vitalization of the local industry.At the Michi-no-Eki 'Motegi' in Motegi Town, Tochigi prefecture, local agricultural products are processed and sold at the Michi-no-Eki, with 18 types of new products being developed there at the station.

Figure 2-1-17 Functions of "Michi-no-Eki"



Source) MLIT

The station is also contributing to the promotion of the local tourism industry, by developing region-specific tours and special farming experience holidays, as well as compiling information from local residents on the best spots to see in the region. Naganuma Town, Hokkaido's Michi-no-Eki, 'Maoi Hill Park,' has a special farming experience holiday run by local farmers that started mainly because of the face-to-face selling experiences at the Michi-no-Eki. By mid-2012, over 4000people had come to take part in the farming experience holiday. At the Michi-no-Eki, "Akagikougen," in Iina Town, Shimane, the Michi-no-Eki got certified as a travel industry certification, and started planning and selling tours, such as those featuring forest therapy. These are some examples of how "Michi-no-Eki" have helped in the vitalization of local communities through supporting the regional agriculture, forestry, and fisheries, and the local tourism industry.

Along with the vitalization of the region, the roadside stations also support everyday living for the local residents. At the Kozagawa Town, Wakayama's Michi-no-Eki, "Takinohaitaro," there is both a clinic and a branch of the town hall that provide medical care and administrative services to the local residents (Figure 2-1-18). Other places, such as the Michi-no-Eki, 'Information Center Kawamoto,' in Kawamoto town, Shimane prefecture, provide a parcel delivery service. With over 10% of the elderly households in town using this service, the Michi-no-Eki is becoming an integral part of the local residents' lives.

Figure 2-1-18 Michi-no-Eki 'Takinohaitaro' (Kozagawa Town, Wakayama prefecture)

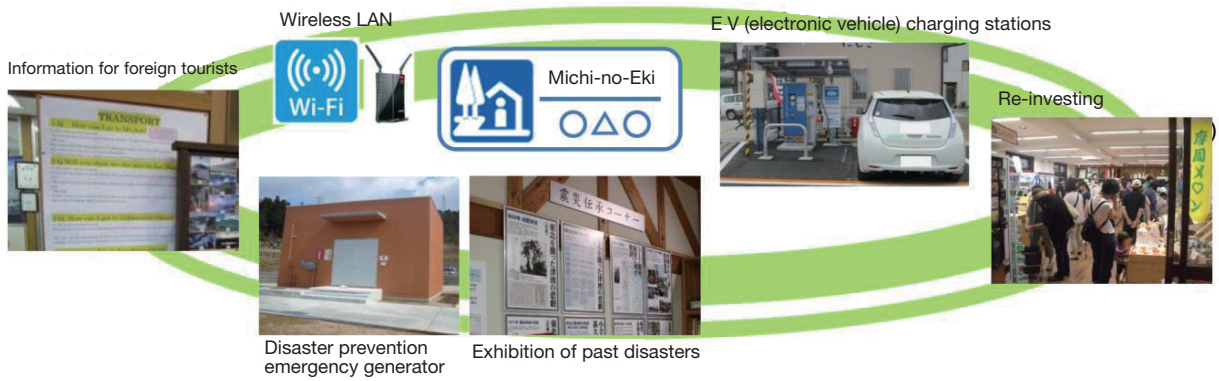
Source) MLIT

The Michi-no-Eki also play a major role as a support bases for disaster relief. When the Great East Japan Earthquake happened, some of these stations became the bases for the self-defense forces' activities and restoration support activities. When the distribution channels were disrupted right after the earthquake, the Michi-no-Eki "Yamada" in Yamada Town in Shimohei County, Iwate prefecture, supported the earthquake victims by restarting the sale of items as quickly as possible through direct shipments from local farmers.

As the above examples show, "Michi-no-Eki" have evolved from being a place to provide services for drivers passing by " to being places that support the lifestyle of the local region," a place to help solve the challenges of the local region.'

Next we will focus on the 'strengthening the regional bases functions' and 'networking' components, to work on making "Michi-no-Eki" a destination point in and of itself, rather than a stopping point on the way to somewhere else. Specifically, we are planning to look at how to make Michi-no-Eki reciprocal, install municipal functions, and strengthen the cooperative ties between parties involved, such as the stationmasters, while working on raising the quality of the Michi-no-Eki, re-investing in current Michi-no-Eki by collaborating with ministries and agencies, and providing focused support for unique efforts (Figure 2-1-19).

Figure 2-1-19 Improving the Various Functions of "Michi-no-Eki"



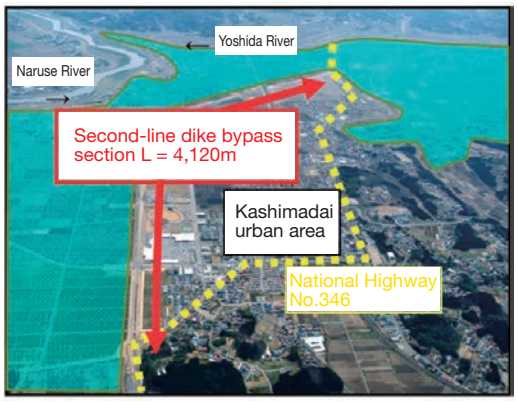
Source) MLIT

Adding Disaster Prevention and Mitigation Functions to Social Infrastructure

As seen in the previous section's examples regarding Michi-no-Eki, social infrastructures are expected to have the capabilities of functioning as a base during emergency or disaster. With a slight enhancement in such social infrastructures however, and by improving their operations, it would be possible to add the function of disaster prevention and mitigation.

The Miyagi prefecture, in cooperation with MLIT, took the road that functioned as both the bypass National Highway No.346 and the second-line dike (the second embankment built parallel to the first one along the river bank to minimize the damage caused by floodwater in the event of the river flooding) and merged the construction of a 5m high embankment structure with said road and opened it for service in May 2013 (Figure 2-1-20). This not only helps with traffic safety and congestion mitigation on the National Highway No.346, if either the Naruse River, which flows around the peripheral, or the Yoshida River were to overflow, the 860 residences and buildings like the Kashimadai General Branch Office and the General Hospital within the second-line dike—approximately 230ha of surface area—would be protected from flooding.

Figure 2-1-20 The Second-line Dike and National Highway No.346 Kashimadai Bypass (Osaki City, Miyagi)



Source) MLIT

In another example, the overpasses and elevated bridges in Himeji City, Hyogo, have been designated as tsunami shelter areas. The information is published on websites and on local disaster prevention maps created by the voluntary disaster prevention organization, to make sure that information is well-known by the local residents. This way, in the event of an emergency or disaster, the elevated roads and bridges can be used as disaster prevention and mitigation functions.

These are just some examples of ways in which ingenuity and creativity in development and operation can add disaster prevention and mitigation functions to social infrastructures, in addition to its original purposes. Going forward, we need to consider how social infrastructure can be used from the angle of disaster prevention and mitigation, in addition to the original function.

Turning Freight Lines into Passenger Lines

Previously, most of Japan's freight transport over land was by railway, and in areas like the coastal industrial zones, we laid dedicated railway tracks to be used only by freight trains. Since then, because of the rise in population in the metropolitan areas, residential areas have spread along areas with freight lines. With this in mind, to make effective use of existing stock to ensure that local commuters have efficient transportation, and to improve and revitalize these urban area functions, the existing freight lines have been converted to double tracks and quadruple tracks to allow these railway lines to be used both as freight lines and as passenger lines, 'turning freight lines into passenger lines.'

The Osaka Soto-Kanjo Railway (East Osaka Line) is moving forward in making the Joto freight line in the Osaka city extension section into double track, electrified lines to turn it into a passenger line. By streamlining this line, each of the JR, private, and subway railway lines that radiate out of the city center in the eastern region of Osaka will form a network, which in turn should significantly reduce the amount of time it takes to travel to the Osaka city center, greatly improving the convenience of using these lines (Figure 2-1-21, Figure 2-1-22).

The railway line running from Kyuhoji to Hanaten was opened for operation in 2008, and currently there is construction work happening on the railway line running from Hanaten to Shinosaka to convert the line into a passenger line. The work is scheduled to be completed and the line opened for operation by spring of 2018[Note 29].

Figure 2-1-21 East Osaka Line Route Map

Source) Osaka Soto-Kanjo Railway Co.,Ltd

Figure 2-1-22 Impact of Streamlining

Route	Before streamling	After streamlining	Time reduced
Kyuhoji – Takaida-Chuo	36min	14 min	△22min
Kyuhoji – Awaji	40min	19min	△21min
Hanaten – Shin-Osaka	27min	11min	△16min

Source) MLIT

Installing Solar Panels on Public Facilities

Solar power is a power generation system that uses things like solar batteries to convert direct sunlight into electricity. Nationally, the amount of power generated by this method has increased rapidly, to approximately 80% more over the last 10 years. In recent years, in addition to solar power systems being used in residential homes, more and more industrial and public facilities are using solar power.

For example, New Kansai International Airport Company, Ltd. and SF Solar Power, Ltd.[Note 30] built Asia's largest airport solar power generation facility (KIX Mega Solar) within Kansai International Airport, which has been operational since February 2014 (Figure 2-1-23)

Figure 2-1-23 KIX Mega Solar

Source) Solar Frontier K.K.

SF Kansai Mega Solar leased land along the planned site for the south taxiway expansion for Runway B (approx. 96,700 square meters) and the rooftop area of the cargo shed (approx. 23,000 square meters) to install the KIX Mega

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[Note 29] This venture uses the two-tiered system, where a third sector company, Osaka Soto-Kanjo Railway Co., Ltd., was established through funding from the local government and JR West Japan to construct the passenger lines and maintain its facilities, while JR West Japan would run the passenger trains on these railway lines.

[Note 30] Joint investment company established by Solar Frontier K.K. and Development Bank of Japan Inc.

Solar. By utilizing the feed-in tariff of renewable energy to operate the power generation business, the expected annual amount of power output for the first year is approximately 12 million kWh, which equals to about 7% of the total amount of power used by Kansai International Airport.

In another case, sewage facilities in 41 locations nation-wide have installed solar power generators by utilizing the space above the facilities. For example, in April 2010, the Kasai Water Reclamation Center in Edogawa Ward, Tokyo, have installed a solar panel consisting of 3,836 panels pieced together, which has generated approximately 620,000 kWh (FY 2012) of power annually (Figure 2-1-24). This amounts to approximately 5% of the total energy consumed during daytime hours.

Figure 2-1-24 Kasai Water Reclamation Center's Solar Power Generation System

Source) City of Tokyo

Going forward, we expect that more such existing facilities will use their rooftop spaces to install solar panels.

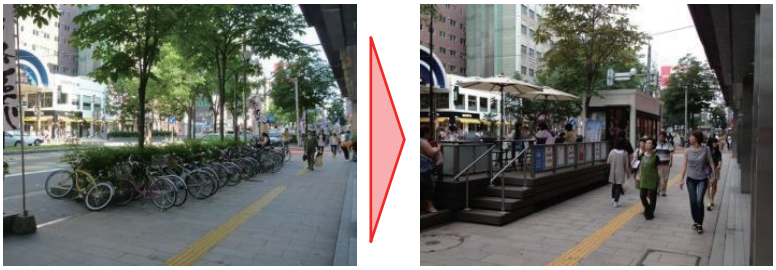
Opening Up Public Spaces

Some local governments are using road space and river space to offset the costs for things like road maintenance and management, and to help bring a little more lively to the city.

For road spaces, the space requirements[Note 31] were relaxed in areas specified by road administrators within the urban renewal development plan. For example, in the Odori district in Sapporo, Hokkaido, they used results from previous social experiments to start outdoor cafés and billboard businesses, and then passed on the profits from these businesses to be used for community development, such as road maintenance and regional events (Figure 2-1-25). The 'Keyaki Namiki' (Zelkova tree-lined Pathway), part of the Grand Front Osaka, which opened for business in Osaka in April 2013, is an 11 meter wide walkway decorated with natural stone pavement. Using the roadside space, an outdoor café was opened to bring in more foot traffic along the boulevard (Figure 2-1-26).

Figure 2-1-25 Example from Odori District in Sapporo, Hokkaido (August 2013, opening of an outdoor café)

<Before changes> <After opening the outdoor café>



Source) MLIT

Figure 2-1-26 Example from Grand Front Osaka (April 2013, opening of an outdoor café)

Source) Developed by MLIT from Grand Front Osaka website

Note 31 Requirement that the occupation of the space is unavoidable due to lack of space outside the premises of the road.

During FY2014, with the National Strategic Special Zones Act coming into effect, the space requirement standards for areas within the National Strategic Special Zones were relaxed, making it possible to set up outdoor cafés and billboard businesses in these zones, similar to the areas within the urban renewal development plan.

In regards to the river spaces, to create new possibilities for the use of waterside areas in Japan that have lost the liveliness of past eras, we are working to increase the society's interest in its waterside spaces, and to garner participation from various positions. Since FY2011, it has become possible for private businesses to set up things like events by the river and outdoor cafés within the areas specified by the river administrators. For example, places like the Horikawa River in Nagoya, Dotonbori River in Osaka, and Kyobashi River in Hiroshima have created more bustle and activity by the river by opening outdoor cafés and holding special events (Figure 2-1-27).

Figure 2-1-27 Examples of Creating Activity and Bustle by Using Riverside Spaces

Horikawa River, Nagoya | Dotonbori River, Osaka | Kyobashi River, Hiroshima

Source) MLIT

(2) Converting the Purpose of Infrastructures with Low Levels of Usage

Due to the changes in the socioeconomic conditions resulting from the shrinking population, there are several infrastructures that have seen a decrease in usage, and it is estimated that this situation will only increase in the future. For such infrastructures, we need to find ways of converting their purposes in order to find effective uses. Some typical examples of such changes would be reconstructing housing complexes to set up medical and welfare centers, or converting elementary schools that were shut down into elderly welfare facilities. However, in this section we will introduce examples of the usage of infrastructures like bridges and railway facilities being converted.

(Use as a Tourist Facility)

■ Amarube Viaduct's Lookout Facility, 'Station in the Sky'

The old Amarube iron bridge in Kami Town of Mitaka District, Hyogo Prefecture, was once the East's premier steel trestle bridge, built back in 1912, and has long been admired as Japan's leading iron bridge. However, a train fall accident in 1986 triggered the undertaking of switching to a concrete bridge, and in 2010 the new concrete bridge called the Amarube Viaduct was completed.

Meanwhile, in order to pass on the wonder of the civil engineering technology and the history of this iron bridge – the old Amarube iron bridge on which the San'in Main Line had run for nearly 100 years – to future generations, it was decided that a part of Amarube iron bridge (3 piers, 3 span) would be renovated into a lookout station. In May 2013, the Amarube iron bridge "Station in the Sky" was opened as a lookout facility (Figure 2-1-28).

Figure 2-1-28 Amarube Iron Bridge Lookout Facility, 'Station in the Sky'

Source) Kami Town website

The approach section and the apical part of the facility were left with the original rails and railroad ties and the restoration was designed to keep the railroad looking as close to how it was as much as possible, to restore the appearance

of a bygone era (Figure 2-1-29).

The lookout facility is adjacent to the platform of JR San'in Main Line's Amarube station, and you can view the Sea of Japan from a height of 40 meters above ground level. Also, right next to the Michi-no-Eki 'Amarube,' there is a park facility being installed in the area under the lookout point that is taking advantage of the historic structures for revitalizing the region.

Figure 2-1-29 Parts of the Old Amarube Iron Bridge Conserved in Actual Place (Sections in Red)

Source) Hyogo Prefecture website

Using the Defunct Railroad Track – Rail Mountain Bike 'Gattan Go!!'

In Kamioka Town, Hida City, Gifu Prefecture, the idea of a 'Rail Mountain Bike' was proposed when they were considering how the assets of the disused Kamioka railway lines could be used to benefit the region.

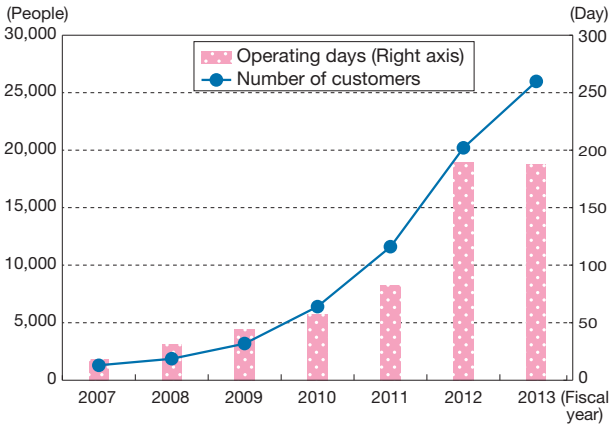
The rail mountain bike—the like of which cannot be found anywhere else in Japan[Note 32]—is a contraption with two mountain bikes fixed on either side of the railway track by a special frame so that two people can pedal the bicycles to go forward (Figure 2-1-30). Since the bicycles run on railway tracks, the cyclists can hear and experience the distinctive "click-clack" sound and vibration of wheels going over the seams of the train tracks. The tracks, tunnels, and overpasses along the bicycle course are just as they were before the railway line fell into disuse, so that cyclist can enjoy the same view they would have seen from the train.

Figure 2-1-30 Picture of Rail Mountain Bike

Source) NPO Kamioka Town Network

From its inception in FY2007 to FY2010, the rail mountain bikes only operated during holidays, as a sort of special event, but since 2011 the rail mountain bikes have been open seasonally (April to November), operating every Saturdays and Sundays during the season, and in 2012 open times on weekdays were also added. With the number of customers increasing to more than 20,000 people annually, not only has this attraction been in the black as a stand-alone business, it has drawn more holiday makers to the Hida region, having a great economic ripple effect on the region's tourism industry (Figure 2-1-31). At the beginning, this venture was run by the Tourism Association, but was then transferred to the non-profit organization Kamioka Town Network, which currently operates the business. Presently, only 15% of the length (2.9km) of the old Kamioka Railway is being used, but they are hoping to

Figure 2-1-31 Trend in Number of Customers



Source) Developed by MLIT from information from NPO Kamioka Town Network

Note 32 The standard ride is designed for 2 cyclists, but can be expanded by adding various types of jump seat attachments so that the ride can accommodate an increased number of adult cyclists and other cyclists at a wide range of ages.

extend the operation to cover the entire length of the railway line in the future (19.9km).

As an example of an undertaking that has become a new tourism resource, this idea—which originated from the sentiments of the local community which saw the old Kamioka railway line as a symbol of the train line that once supported this mining town—is now drawing a lot of attention from other local governments and organizations from rural regions all over the country that also have old railway tracks that have fallen to disuse.

(Effective Utilization from Relocation)

The Kasumi Bridge, which spans the Shinyamashita Canal in Yokohama, had some re-construction work done due to the aging of the structure, and re-opened for traffic in March 2013 as the new Kasumi Bridge. The structure used for the reconstructive work was the Pratt truss, which had originally been built in 1896 as a viaduct over Sumida River for the Joban Line to run on, then relocated in 1929 to the Egasaki overpass bridge in the Tsurumi district to be re-used[Note 33] (Figure 2-1-32).

In 1896, the year in which the bridge was constructed in 1896, it was the first double-track type Pratt truss in Japan, and had several foreign companies competing to design the bridge. In the end, they used the design by a company called Handyside, from the UK. At the time, it was the most advanced bridge, being the most large-scale, steel railway bridge, with a design that was very different from the style of that era.

In 1928, 32 years after the bridge was built, it had to be removed as it had not been built to withstand the increased load of a locomotive. It was transferred to be a bridge connecting the area divided by the opening of the Shintsurumi switchyard, and was completed as the old Egasaki overpass bridge in 1929. However, with the continued aging of the structure and the fact that the road width was quite narrow, it was decided in 2005 that a new bridge needed to be built, and so the original was finally dismantled in 2009.

Since the Pratt truss was of high historical value in terms of being a heritage of modern civil engineering—having been featured in selections such as, "Top 100 Bridges in Kanagawa," "Top 100 Iron Bridges," and "Modern Civil Engineering Heritage of Japan"—parts of the bridge that bore very little damage were put to another use, being re-used to construct the Kasumi Bridge, which was being re-constructed around the same time[Note 34].

Figure 2-1-32 Transition of the Truss Bridge

Source) Yokohama City

As evident from this example, even infrastructure that seems to be at the end of its service life can pass on valuable civil engineering heritage to future generations in this way, and be a way of re-using infrastructure.

We can expect that there will be more of these cases in the future, where the original purpose for an infrastructure maybe finished, but the structure itself has the potential to be re-used. Consideration for how easily something can be re-used or converted for another purpose will become more relevant in the future developments of social infrastructures.

Note 33 A truss is a structure comprised of 3 pieces of material linked together in the shape of a triangle. When these triangles are continuously linked together to make a bridge, this is called a truss bridge.

Note 34 The Kasumi Bridge won the 2013 Japan Society of Civil Engineers Tanaka Prize of workmanship.

(3) Innovation for Effective Utilizataion

One of the ways to make the operations of social infrastructures more efficient is innovation. Innovation has a strong connotation of meaning some new technology, but here the definition will not be limited to mean technological innovation, but rather used as a broader definition that includes new efforts that have economic and social impact[Note 35].

An innovation for effective use of an existing social infrastructure is the use of new technology such as IT and use of software technique. In reference to the former, implementing the use of new technology, it is possible to identify the cause of inefficiencies like congestion, and make operations more efficient. In reference to the latter, we can improve the operation of social infrastructure to be more efficient if we were to be creative in our use of software, instead of focusing merely on hardware development.

Below we will explore some concrete examples.

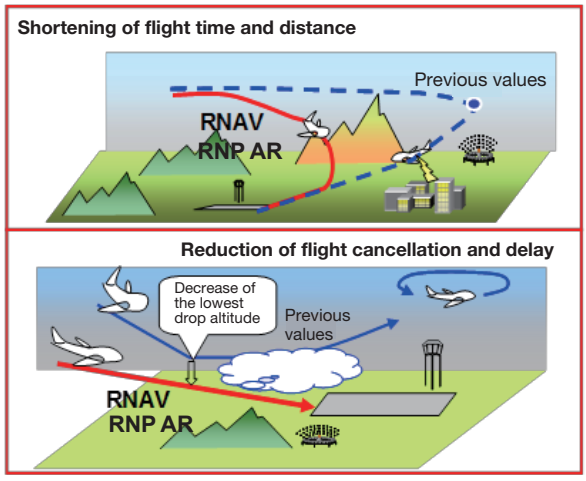
(Improving Efficiency with New Technology)

■ Installation of Area Navigation (RNAV, RNP AR)

Previously, the navigation method when operating an aircraft was to receive radio communications from a radio tower or other ground facilities, which was a more passive aviation method, making the flight route dependent on the location of ground facilities.

However, due to advances in navigation technology on the aircraft, flight course can now be flexibly reset based on signals from wireless facilities and other GPS systems, and flight routes are sequentially submitted (RNAV, RNP AR) (Figure 2-1-33). This technology allows an aircraft to find flight routes autonomously instead of being restricted by the location of ground facilities. This has resulted in several positive effects, such as improvement of service rate, shortening of flight path, reduction in fuel usage, and reduction in CO_2 emissions.

Figure 2-1-33 Installation of Area Navigation (RNAV, RNP, AR)



Source) MLIT

For example, the RNP AR approach procedure[Note 36] of the Odate Noshiro Airport in Akita has shortened the flight route by 50km compared to the previous method of navigation. In addition, if the required visual reference to continue approach to landing is not visible, there is a specified altitude (decision altitude) in the approach descent at which the aircraft is not allowed to land. With previous navigation methods the decision altitude was 944 feet (approx. 288m), while with RNAV and RNP AR the decision altitude is 300 feet (approx. 90m), making flights possible in more severe weather conditions.

Note 35 For example, Schumpeter divides innovation into 5 categories: 1. Creating new products, 2. Introducing new methods of production, 3. Developing new sales channels, 4. Developing new supply sources, 5. Introducing a new organization.

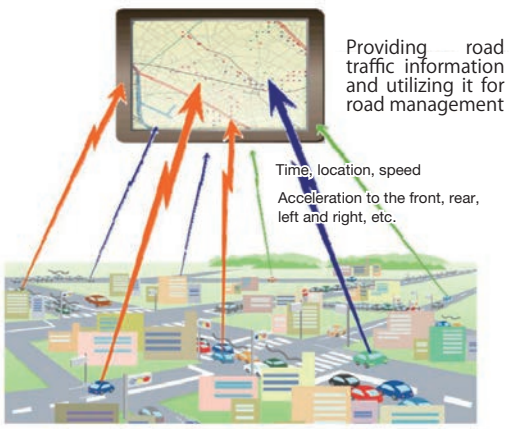
Note 36 As of December 2013, 11 airports use the RNP AR approach method.

Using Probe Information

Probe information is information gathered from a variety of data from each vehicle, such as its location, speed, and acceleration to the front, rear, left and right. Collecting probe information from each vehicle allows for better understanding and provision of more detailed traffic information to be used for traffic congestion countermeasures, traffic safety, and disaster response (Figure 2-1-34).

For example, the traffic jam starting around the Yokkaichi IC in Mie prefecture was previously thought to be due to the merging at the IC juncture. However, when they used probe information to identify the exact cause of the traffic congestion, they found that the main cause was the sag (the recessed section from downhill switching to uphill) before the IC branching off. From now on, we hope to use results from these analyses to fine-tune countermeasures to continually facilitate smooth traffic flow.

Figure 2-1-34 Collecting Probe Information



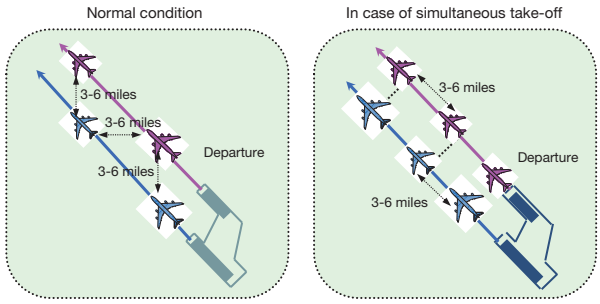
Source) MLIT

(The Soft Approach for Efficient Use)

Introducing the Simultaneous Take-Off and Landing Method at Narita Airport

To ensure safety for aircraft take-off and landing, each aircraft must maintain a certain distance from other aircrafts (the current international standard is 3-6 miles (5-11km) apart) (Figure 2-1-35). For this reason, previously at the Narita Airport, when there were multiple departures scheduled, the aircraft departing from Runway B had to wait until the aircraft departing from Runway A was a certain distance away before taking off, which was a very limiting way of operating. However, to keep up with the increase in the demand for air travel, they have been looking for a simultaneous take-off and landing method to allow for independent take-off and landing operations at the same time for both runways A and B.

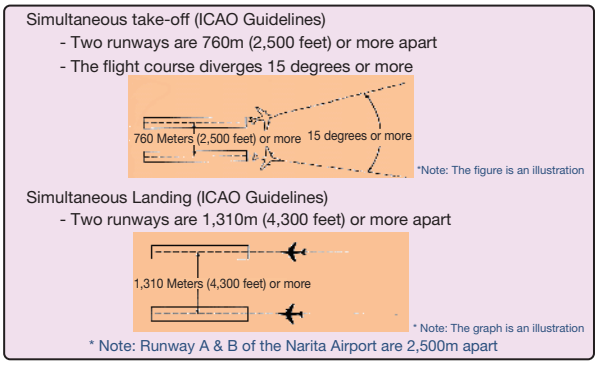
Figure 2-1-35 Illustration of Simultaneous Take-Off (Example of take-off with north wind)



Source) MLIT

There are established international rules (ICAO guidelines) for introducing the simultaneous take-off and landing method, and though Narita Airport fulfilled the requirements in the simultaneous landing guidelines[Note 37], it could not meet the requirement in the simultaneous take-off guidelines for the flight course to diverge by over 15 degrees after take-off, as branching out the flight route would expand the noise pollution impact area (Figure 2-1-36).

Figure 2-1-36 International Rules for Simultaneous Take-Off



Source) MLIT

These guidelines allow for the aviation authority of each country to determine exceptions after safety has been verified. Therefore, MLIT conducted safety verification and determined that as long as Narita Airport took some risk reduction measures (like setting up a control seat to monitor the route departure after take-off) that it would be possible to have simultaneous take-offs, which allowed Narita Airport to implement simultaneous take-off and landing in

Note 37 Runway A and B are 2,500m apart at Narita Airport, which fulfills the ICAO guideline stating that the runways must be at least 1,310m apart.

October 2011.

As a result of introducing the simultaneous take-off and landing system, the number of annual departure and arrival slots at Narita Airport has increased from 220,000 slots in October 2010 to 235,000 slots. As evident from this example, there are some cases where it is possible to make take-off and landing more efficient without making any improvements to the runways by reviewing the previous take-off and landing operations. Furthermore, with additional improvements to facilities, like new taxiways and tarmac expansion, the number of annual departure and arrival slots increased to 270,000 by March 2013.

As seen in the above example, by using new technology—starting with IT technology—it is possible to use the existing social infrastructures more efficiently. Also, even if there are no improvements made to the hard assets, an idea for how the existing social infrastructures can be used more efficiently may be found by reviewing current operations. The expectation going forward is that social infrastructure will proactively use innovations to use social infrastructure ever more wisely.

3 Efficiency through Integration

As mentioned above, Japan is facing a historically rare, rapid population decline and aging. In spite of this, we need to continue to grow and improve the people's quality of life. To do so, we must achieve sustainable growth by making advances in the way urban spaces are formed; a formation in which social infrastructures can be used more wisely. One of the concrete measures for this is an urban structure in a consolidated formation (compact city). Realizing compact city formations is expected to have the impacts of creating healthier, more comfortable lives, improve the financial and environmental sustainability of cities, and provide underlying support for the local economy. We will explore the concept, effects, and examples of compact cities in the following sections.

(1) The Concept of a Compact City

The definition of compact city varies depending on the context and the person advocating it, but in general the term indicates that the urban structure is characterized by the following: 1. high density in close proximity development pattern, 2. urban areas connected by public transportation, and 3. easy access to workplace and local services[Note 38]. In actuality there are several types of these compact cities. Some examples of the different formations are: 'Multipolar Network Type,' 'String of Beads Type,' and 'Hydrangea Type' (Figure 2-1-37).

Note 38 OECD (2012) "OECD Green Growth Study Compact City Scheme"

Figure 2-1-37 Types of Compact Cities

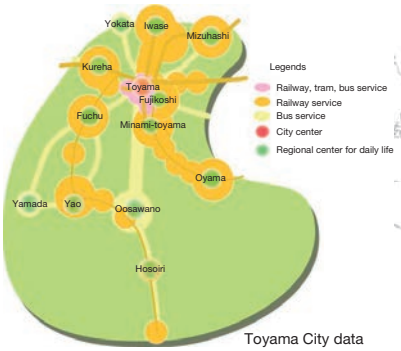
Multipolar Network Type

City development that links the regional bases, which are the former (prior to the merger) town and village centers, with the new city core through a network

The Master Plan for Shimane Prefecture City Planning

"String of Beads" Type

City development in which the public transportation of a certain service level (string) connects walkable distance areas (beads) like a piece of string through beads



Toyama City data

Hydrangea Type

City development in which many of the city's core functions are also a transport hub that links all the districts (the living space) of the city

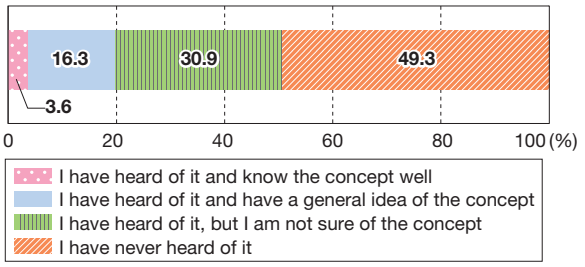
Kitakami City data

Source) MLIT

Thus far, various initiatives have been put forth by national and local goverments to develop compact cities. However, according to results from the 'Public Awareness Survey,' about half the people polled answered, "I have never heard of it," when asked if they knew about compact cities, so it is difficult to say that the concept is widely recognized (Figure 2-1-38). On the other hand though, there are many people who are sympathetic to the thinking behind compact cities, and about half the people thought that initiatives for compact cities are important (Figure 2-1-39). Therefore it may be construed that compact cities will be expected to contribute greatly to solving the problems of cities in the future.

Figure 2-1-38 Level of Familiarity with the Concept of Compact Cities

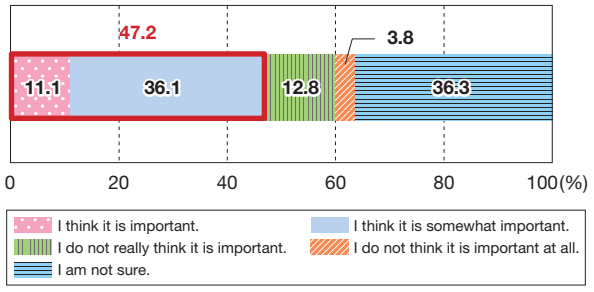
Are you familiar with the concept of 'Compact Cities,' in which a number of city centers where the commercial and public establishments are concentrated are connected by public transportation? Please select the best answer from the following. (n=3002)



Source) MLIT (Public Awareness Survey)

Figure 2-1-39 Importance of Compact Cities

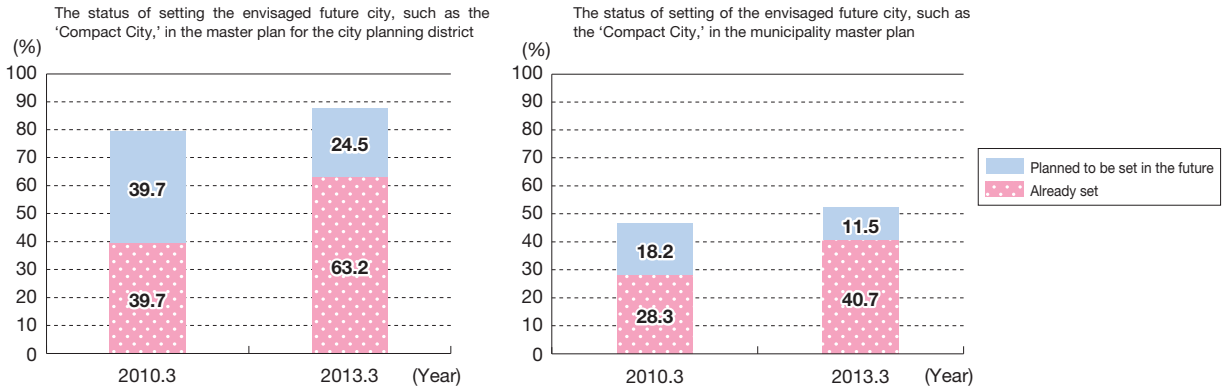
Do you think the initiative to develop 'Compact Cities' is important? Please select the best answer from the following.



Source) MLIT (Public Awareness Survey)

Interest in the compact city structure is also increasing among local governments. The number of organizations that have set—or are planning to set—the compact city as the future city model for the master plan of city planning are starting to increase (Figure 2-1-40).

Figure 2-1-40 Status Update of the Master Plan for Compact City



Source) MLIT

(2) The Impact of a Compact City

There is a wide range of advantages to be gained from the compact city formation. One such is the fact that having a certain concentration of population residing in a specific area helps improve the sustainability of welfare and commercial services that support daily life, while access to such services is made easier by either being within walking distance or accessible by public transportation. This also makes getting out of the house much easier, which helps promote healthy living; another positive result. There is also an impact on the financial front, in that public services like snow removal and home care provision can be made more efficient, as well as relocated, and consolidated, which will help reduce government spending. A third impact is that with people walking or using public transport more, the excessive dependence on automobiles is decreased, which results in a positive environmental impact through the reduction in carbon dioxide emissions. Finally, with the vitalization of the service industry and with people going out more in general, the overall consumption rate would go up, leading to a positive economic impact.

Figure 2-1-41 The Merits for Developing a Compact City

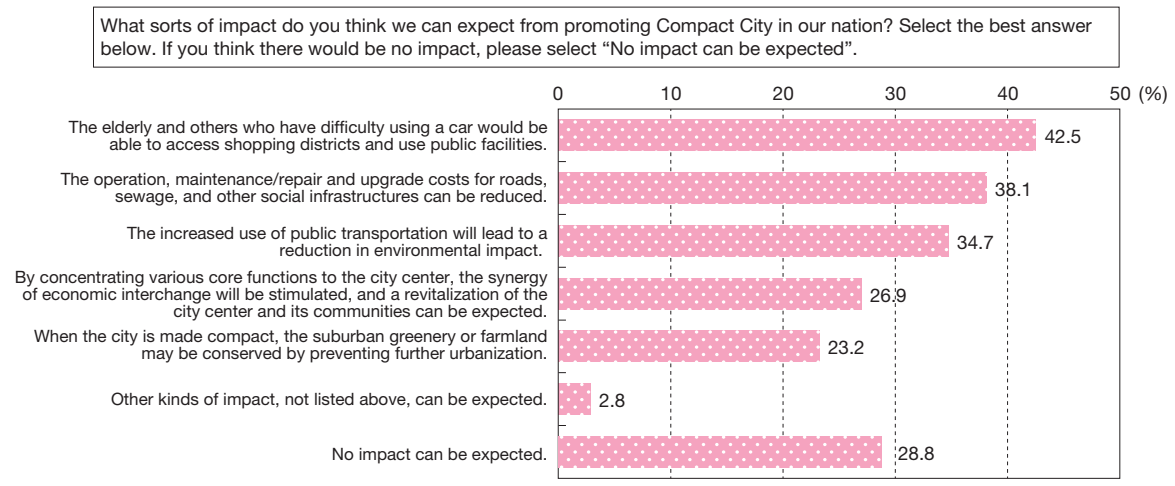
Characteristics of a compact city	Contributing to the possibility of sustaining the city		
	Environmental merit	Social merit	Economic merit
1. Shortening of travel distance within the city	– Reduction of CO_2 emissions – Reduced pollution caused by motor vehicle emission	– Increased accessibility due to cost reduction	– Increased productivity of workers due to shortened commuting time
2. Reduced dependence on automobiles	– Reduction of CO_2 emissions – Reduced pollution caused by motor vehicle emissions	– Decreased transportation fee – Greater mobility for people who have no access to cars – Improved health due to more cycling and walking	– Development of Green Job/ Technology
3. Increased energy usage and production at the regional level.	– Reduction of energy consumption and CO_2 emissions per person	–	– Development of Green Job/ Technology – Advancement of autonomous energy production
4. Optimal usage of land resource and increased opportunity to link cities and rural farming districts	– Preservation of agricultural land and natural biodiversity – Reduction of CO_2 emission through shortening food mileage	– Improvement of quality of life through increased recreational activity	– Agricultural economic development (city farming, renewable energy, etc.)
5. Optimization of public service provision	–	– Maintenance of public social welfare standard through improved efficiency	– Infrastructural investment and reduction of maintenance cost
6. Accessibility to the diverse regional services and to the workplace	–	– Improvement of quality of life with easier access for using regional services (shops, hospitals, etc.).	– Attraction of skilled workers with higher quality of life – Increased productivity through diversity, vitality, innovation, and creativity

Source) OECD (2012) "OECD Green Growth Study: Compact City Policies"

When we actually posed some questions regarding a compact city on the 'Public Awareness Survey,' several people answered, "No impact can be expected," but there were many that answered, "The elderly and others who have difficulty using a car would be able to access shopping districts and use public facilities" or "The operation, maintenance/repair and upgrade costs for roads, sewage, and other social infrastructures can be reduced," or "The increased use of public transportation will lead to a reduction in environmental impact." From this we can see that compact cities are recognized

as being well-balanced in terms of living, financial, and environmental impacts (Figure 2-1-42).

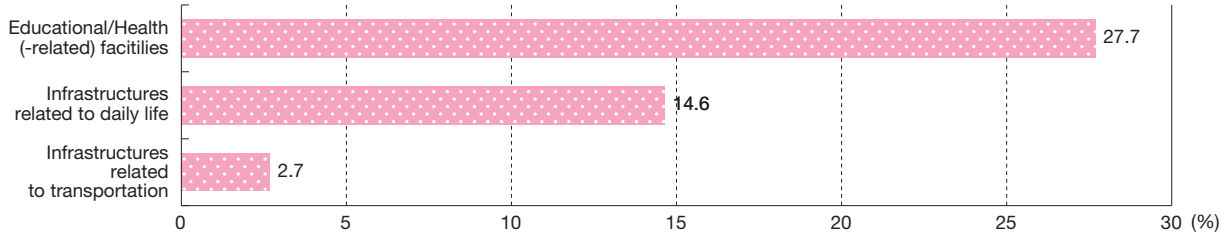
Figure 2-1-42 Impact of Compact City



Source) MLIT (Public Awareness Survey)

Related to maintenance, management and upgrading costs, staffing and operational costs for existing public facilities can also be expected to decrease, with collective residences and lifestyle supporting services being in a consolidated location. According to, 'Survey on Maintenance, Management and Upgrade of Social Capital' conducted by the Ministry of Internal Affairs and and Communications for local governments nation-wide, approximately 60% of local governments answered that they are interested in reassessing (abolishing, consolidating, etc.) their existing social infrastructures, particularly for social infrastructures that are community buildings like educational and health facilities that would benefit from reorganization (Figure 2-1-43). As introduced in Section 3, there are already initiatives in place for reviewing public facilities. However, going forward, in addition to reducing the size of the urban structure, we will be expected to advance the relocation and consolidation of community buildings and cut costs for maintenance, management and upgrade work.

Figure 2-1-43 Facilities for which Consolidation of Social Infrastructures is Advantageous



(Note) 1 Results from asking which social infrastructures would most benefit from consolidation to the 840 organizations (21 prefecture organizations, 819 municipality organizations) that answered that they were concerned with the increase in demand for maintenance, management and upgrade of social infrastructure and that things like consolidation of existing social infrastructures would be an effective response strategy.
2 Educational and health facilities: health-care facilities, social welfare facilities, public school facilities, social education facilities, physical education facilities
Societal living infrastructure: public housing, water supply, sewage, waste treatment facilities, city parks
Transportation related infrastructure: roads, ports and harbors, airports, railways and subways
Source) Developed by MLIT from "Survey on Maintenance, Management and Upgrade of Social Capital" by MIC

The analysis below will focus on the economic effect (improvement in labor productivity, efficiency in administrative costs) of having a compact city.

(Improving Labor Productivity through Accumulation)

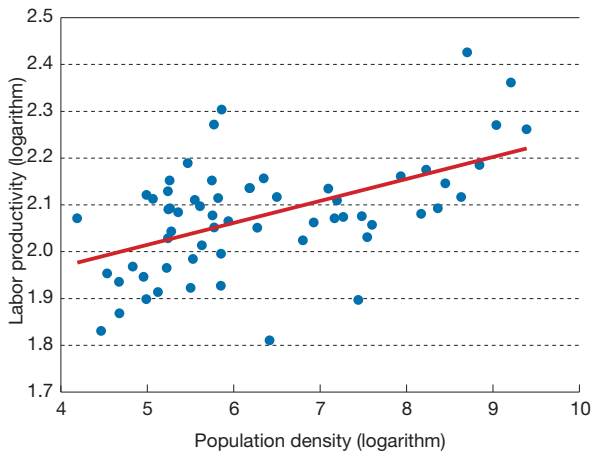
The accumulation of the population in cities will make formation of various industries easier, which in turn will lead to a variety of goods and services being provided. Also, with various industries being present, the economy of scale and economy of scope will work to increase the productivity of workers.

In fact, when we look at the relationship between population density and labor productivity by designated cities in each prefecture there is a positive correlation, with a tendency of areas with higher population density having higher labor productivity (Figure 2-1-44).

If the population accumulates to a city and the population density rises in said city, there seems to a marked effect,

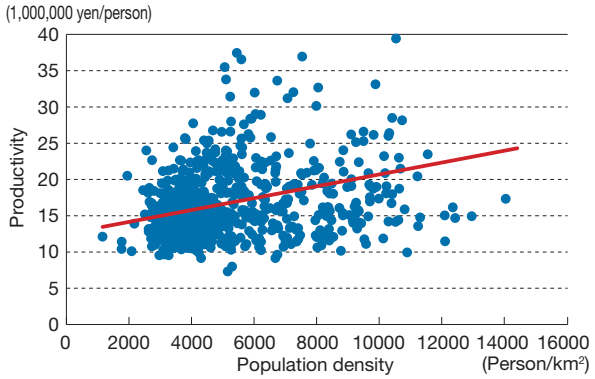
particularly in the service industry. Unlike businesses that deal with material goods, finding transportation and storage are major challenges for many services industries, which means that even if a business is able to secure a lot of employees, profit is dependent on the number of people coming in to the store. Accordingly, if a store locates itself in an area with high population density, where there is potential for large numbers of customers to come by, we can expect that labor productivity will increase. When we looked at actual relationships between the labor productivity of the service industry of municipalities in a DID district and the population density of a DID district, there was a positive correlation (Figure 2-1-45).

Figure 2-1-44 Relationship between Labor Productivity and Population Density



(Note) 1 Subjects are prefectures and some ordinance-designated cities (ordinance-designated cities that the gross product values can be aquired from the "Prefectural Accounts")
2 Labor productivity is calculated by dividing the prefecture's (city's) gross product value (net) by number of laborers.
3 The values for labor productivity were from FY2010 and values for population density were from 2010.
Source) Developed by MLIT from Cabinet Office "Prefectural Accounts", MIC "Regional Statistics Database"

Figure 2-1-45 Relationship between Labor Productivity of Service Industries and Population Density of DID Districts



(Note) 1 Labor productivity is calculated by dividing the revenue of each industry in municipalities that have DID districts by the number of workers in the industry.
2 Out of the major industry classifications, service industry refers to industries that are not categorized as any of the following: agriculture, forestry and fishery, mining, quarrying, gravel extraction, construction, or manufacturing
3 For industries that did not have revenues recorded for the 2012 economic census, the figures were calculated without the revenue and number of workers.
4 Municipalities that did not have revenues recorded for the 2012 economic census were not included.
Source) Developed by MLIT from Ministry of Economy, Trade and Industry "2012 Economic Census", MIC "2010 National Census"

From the above information, we can see that if the population accumulates in a city and a concentrated urban structure is realized, the labor productivity will rise, especially in the service industry.

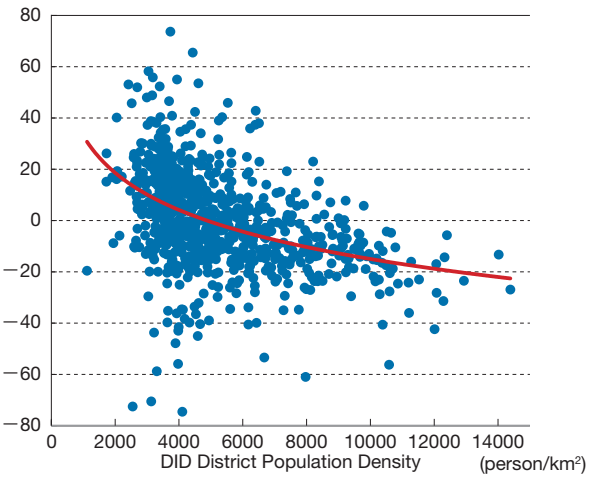
(Efficiency in Administrative Cost due to Accumulation)

If the urban structure is made more compact, the administrative cost will become more efficient. Here, we took the regression in the population and compactness of the city (population density in DID districts) and the expenditures of municipalities, and used those results to look at the relationship between the compactness of a city and its administrative cost. Looking at the relationship between the expenditure per person living in a municipality with a DID district, and the population density of said DID district, we can see that the higher the population density, the lower the administrative cost (Figure 2-1-46).

This result shows the possibility that when a city becomes more compact and has a higher population density, the administrative services are provided more efficiently, which reduces the expenditure per person.

As seen in the above analysis, a concentrated urban structure leads to making the administrative cost more efficient. Also, once it is evident how much cost can be reduced through efficiency, it would become possible to use that

Figure 2-1-46 Relationship between Expenditure Per Person and DID District's Population Density



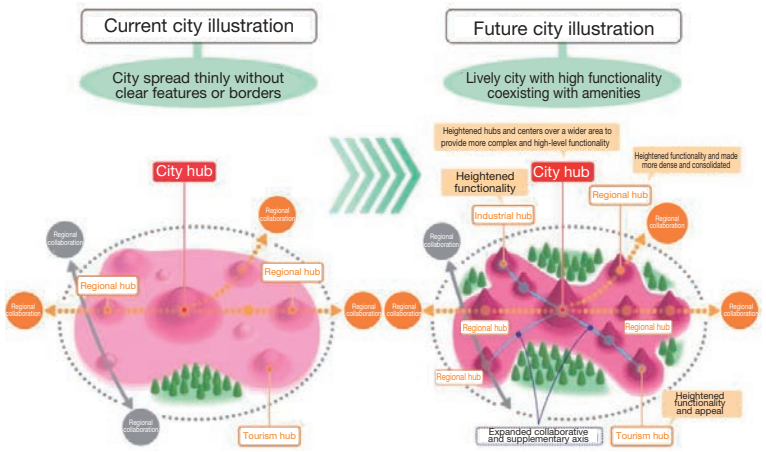
(Note) Regression calculated for annual expenditure per person, population (logarithm), population density of DID district (logarithm), for areas like municipalities, then using those results to calculate annual expenditure per person explained by factors other than DID district population density, then plotted the difference between the mean values on the vertical axis and plotted the DID district population density on the vertical axis. For more details regarding the analysis, see Annotaion 3.
Source) Developed by MLIT from MIC "Regional Statistics Database"

information as a base for moving forward in city planning.

There are now movements toward quantitatively analyzing these effects of becoming a compact city during city planning. One such example is the city of Utsunomiya in Tochigi prefecture.

The city of Utsunomiya is a central city with a population of about 500,000 people and, like other cities, is facing challenges like having an aging population, aging of its social infrastructures, and a decrease in the sense of vibrancy in the city center area. To solve some of these issues, the city of Utsunomiya has put in their '5th Utsunomiya City Comprehensive Plan,' the goal to work towards having the city become the 'Network Type Compact City (Collaborative and Concentrated City)' formation (Figure 2-1-47). For Utsunomiya City, the effect estimates for when they move forward with making the urban structure to be more compact is being done by Morimoto (2011)[Note 39]. The three scenarios being analyzed for becoming compact are Trend Type, Urban Residential Type, and Network Type.

Figure 2-1-47 The Image of a Network-Type Compact City

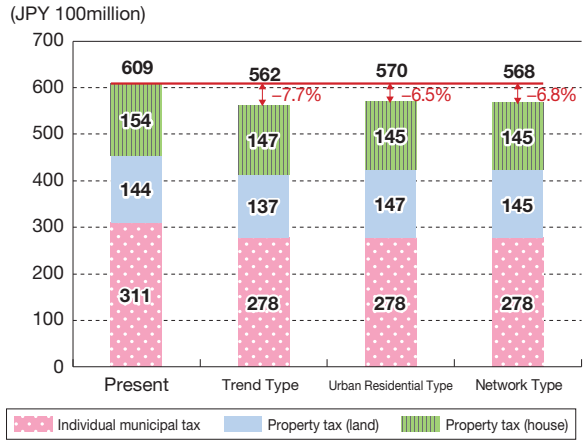


Source) Utsunomiya City "5th Utsunomiya City Comprehensive Plan"

The different scenarios are as follows: Trend Type is if the current city formation is maintained until the year 2035; the Urban Residential Type is if the population in the urbanization control area were to be aggregated to urban areas; and the Network Type is if the city center were to remain the core and a base set up in each region[Note 40].

The results for the estimated taxes and city facility maintenance and management cost by year 2035 for each scenario is on Figure 2-1-48 and Figure 2-1-49[Note 41]. The Network Type, which is the closest scenario to what the city of Utsunomiya is planning, is estimated to have lower taxes than the current tax amount while the decline is less than the Trend Type, and the decline in the city facility maintenance and management cost is also less than the Trend Type. This result shows that both in terms of taxes and city facility maintenance cost, the Network Type is a more desirable city formation than the Trend Type[Note 42].

Figure 2-1-48 Estimation of City Tax



Source) Akinori Morimoto "A Study on the Effect the Compactness of a City has on the Environment and Finance" Volume 46 of "City Planning Papers"

Note 39 Akinori Morimoto (2011) "A Study on the Effect the Compactness of a City has on the Environment and Finance" Refer to Volume 46 of 'City Planning Papers.'

Note 40 Aggregate bases selected on the basis of the conceptual diagram of the aggregate bases shown in '5th Utsunomiya City Comprehensive Plan.'

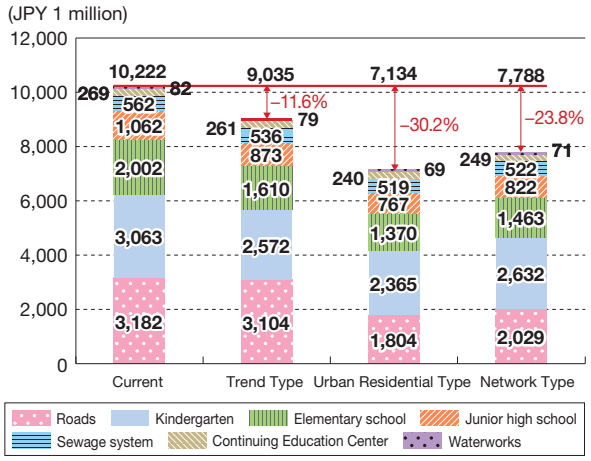
Note 41 The city facilities here refer to road bridges and sewage, as well as schools, day cares, and community centers.

Note 42 In the simulation results, the decline is less in the Urban Residential Type compared to the Network Type, but Utsunomiya City has chosen to work towards the Network Type and the sustainable development of each regional base, due to the consensus of the residents.

Currently, Utsunomiya City—while listening to the opinions of experts—is trying to fine-tune its estimation model by doing things like checking plan consistency, and quantitatively measuring the effects of the compact city advancing in Utsunomiya City.

There will probably be more initiatives towards compact city planning in each region in the future, but in order to increase the understanding of residents and the feasibility of a compact city, it is important to show the quantitative effects of compact city planning.

Figure 2-1-49 Estimates of City Facility Maintenance Cost



Source) Akinori Morimoto "A Study on the Effect the Compactness of a City has on the Environment and Finance" Volume 46 of "City Planning Papers"

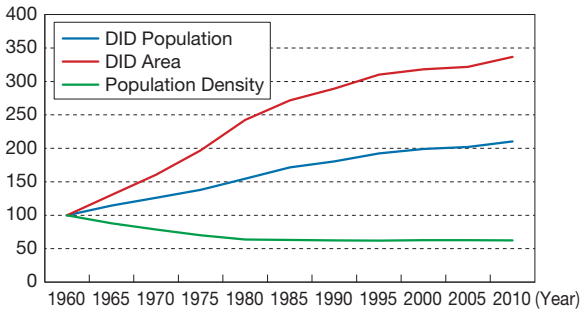
(3) Example of Compact City Initiative

■ Compact City in Kumamoto City

The city of Kumamoto is an ordinance-designated city with a population of 739,420 people as of March 2014.

During the high economic growth period the population grew steadily, but the same time the urban area expanded at an even higher level, making the population density in DID districts fall rapidly, resulting in a low-density urban spread. After the latter half of the 1980's, the population density in the DID district has remained flat with the regression of the population to the city center area due to construction of high-rise housing, a result of most of the land within the urban areas already being occupied (Figure 2-1-50). Given the population decline in the foreseeable future, there is a growing concern for the decline in the vitality of the city from the decrease in tax revenue and hollowing of the built up areas.

Figure 2-1-50 Shift of Population, Square Footage, and Population Density within Population Centers in Kumamoto City



(Note) Estimation when 1960=100
Source) Developed by MLIT from Kumamoto City website

As a response to these types of concerns, Kumamoto City is setting the polynuclear cooperative urban development as the direction for new city planning, having put forth the basic policy for this in the City Master Plan.

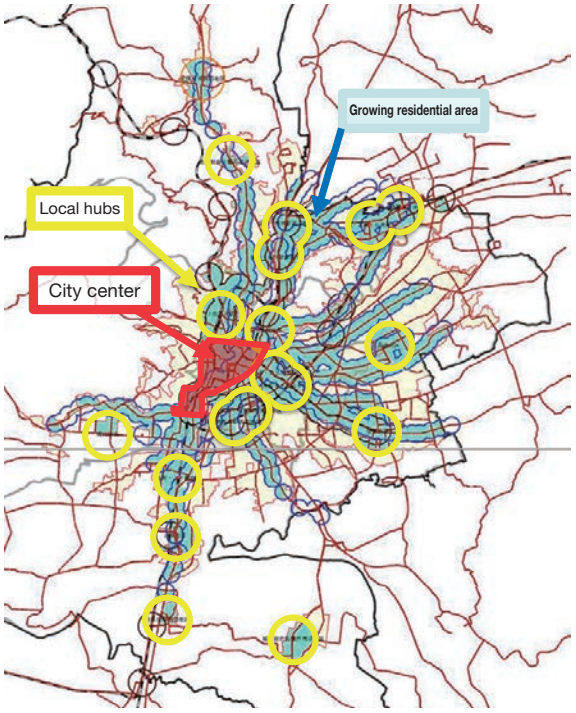
In this Master Plan, they have set the future vision as, 'A Vibrant Polynuclear Cooperative City with Lush Greenery and Water and Supported by Various City Services (Becoming a Compact City)' and will work actively towards becoming a city with: 1. Highly convenient public transportation for supporting residential functions, 2. Integrated city functions for city center areas and regional hubs, 3. Well-developed public transportation network (Figure 2-1-51).

In order to support residential functions, the area within a 500m radius from a railway station or city rail stop or within a 300m radius from a bus stop will be designated as the residence promoting area. The plan is to create an attractive city formation by having these areas receive support to help draw residency to these areas, as well as raising the standard of public transportation, and developing pedestrian and cyclist lanes.

In regards to integrated city functions, the initiatives will be divided into those within the approximately 415ha that constitutes the city center area, and the regional hubs[Note 43]. For the city center areas, the city is planning to develop complex facilities for bus terminals, businesses, housing, and MICE facilities. For regional hubs, the city is considering setting up a transit facility for core public transportation and feeder bus lines.

For the public transportation network, as part of enhancing functionality of the core public transportation axis, the city is considering the deployment of an express bus service going in to the city center area (Figure 2-1-52) and introducing ultra-low-floor vehicles to the city rail to enhance the transportation capacity. In addition, by cooperating with the bus operators to improve the competitive routes and promote efforts towards restructuring the bus route network, the city aims to have a well-developed public transportation network that connects the areas from the city center to the regional hubs.

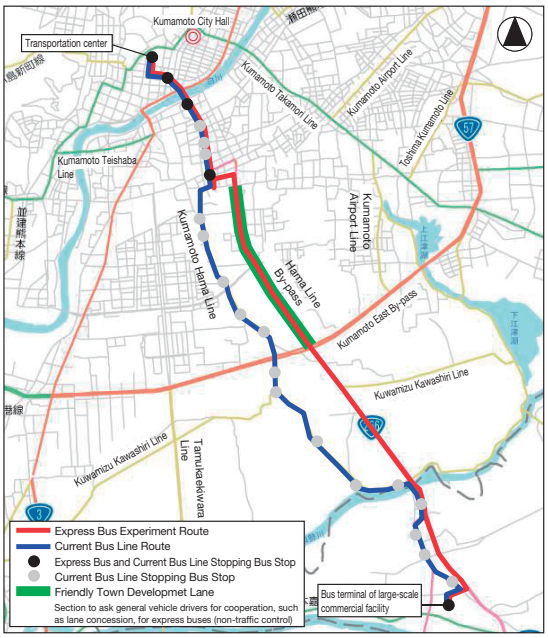
Figure 2-1-51 Image of the Polynuclear Cooperative City that the Kumamoto City is Aiming For



Source) Kumamoto City

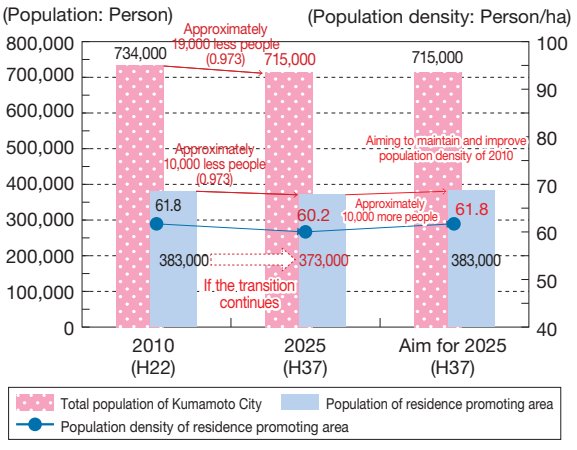
Kumamoto's goal is to prevent the decline of population density within the residency promoting area by 2025 through implementing the above initiatives (Figure 2-1-53).

Figure 2-1-52 Express-Bus-based Society Experiment



Source) Kumamoto City

Figure 2-1-53 The Aim of Compact City



Source) Kumamoto City "2nd Kumamoto City Master Plan (Region-specific concept)"

Note 43 Set as areas that many people will gather as a part of their daily lives, and within 800m from railway stations and bus stops, a strategic point for transportation.

Even after a master plan such as the above has been formulated, we must continue to collaborate with citizens, and schedule appropriate plan implementation, evaluation and improvements, while continually monitoring developments.

Section 2 Supported by Everyone

As seen in Chapter 1, the maintenance, management, and upgrade of social infrastructures cannot be left to public entities. Instead, various entities, including private sectors, must get involved in furthering the initiatives that are 'Supported by Everyone,' now more than ever before.

In this section, we will first discuss the utilization of the private sector's capital and know-how, namely PPP/PFI in terms of the maintenance, management, and upgrade of social infrastructures. Next we will introduce initiatives where regional residents—who are usually on the side that reap the benefits of social infrastructures—have gotten involved in maintaining and managing social infrastructures.

1 Using PPP/PFI for Maintenance and Management

PPP (Public Private Partnership) is the concept that captures a wide range of private sector participation in some form of public service provision. It is the method of using the private sector's capital and know-how to improve efficiency in developing public facilities and raise the standards of public services. Some of the primary methods are, the PFI method, the designated manager system, and the comprehensive work consignment to private sector (Figure 2-2-1). In this White Paper, we will discuss and analyse two of the PPP approaches, the PFI method (includes concession method) and the comprehensive work consignment to private sector.

Figure 2-2-1 Primary PPP Method

Method	Summary	Basis Laws	Facility ownership	Funding	Example of deployment field
PFI method	A method to construct, maintain, manage, and operate public facilities through utilization of private finance, management abilities and technical capabilities.	PFI Act (1999)	Government/ Private	Private	Publicly-owned residential and government buildings, etc.
Concession	Concession is a grant of rights to the private businesses to operate the public facilities that collect (usage) fees while the public entity continues to possess their ownership.	PFI Act Amendment (2011)	Government	Private	Airport, Road, sewage system, etc. (scheduled)
Designated administerator system	A system in which a designated administerator (corporations that local goverments designate) acts over the management and operation of public facilities. Due to a legal reform, the management (entity) of the public facilities is opened up extensively to private businesses, NPO organizations, etc.	Local Autonomy Act Amendment (2003)	Government	Government	Parks, harbors, etc.
Comprehensive Work Consignment to Private Sector	Regarding management and operation duties of public facilities and the like, by refraining from determining the details of the operation of business and according to the efficiency-ordering method in which the operation is outsourced to a group of private industries, one may provide effective services that capitalize on the creativity and ingenuity of the private sector.	—	Government	Government	Sewage, etc.

Source) MLIT

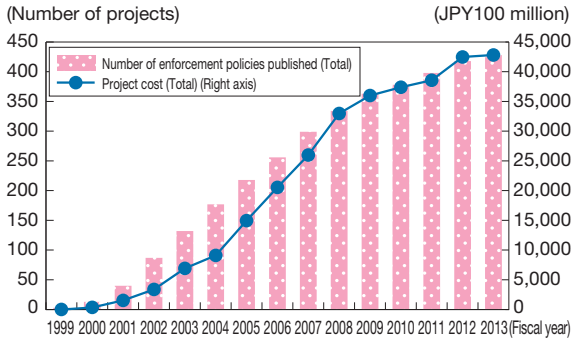
(1) Trend of PFI

PFI (Private Financial Initiative) is the method of developing and operating social infrastructures efficiently and effectively through utilization of private finance, management abilities and technical capabilities for the construction, maintenance, management, and operation of public facilities. The main characteristic of this method is that instead of the public entity, the private sector is responsible for funding the project. Since the establishment of 'Act on Promotion of Private Finance Initiatives (PFI Act)' in 1999, the number of PFI projects that published an enforcement policy as of September 2013 was 428 projects, with total project costs exceeding JPY4.2819 trillion (Figure 2-2-2).

Out of these projects, the number of PFI projects that have gone into effect that are related to MLIT are—as of January 2014—a cumulative total of 120 projects. The projects were mainly enterprises concerning government buildings and public housing. In terms of public housing, efforts to introduce the funds and initiative of the private sector had been

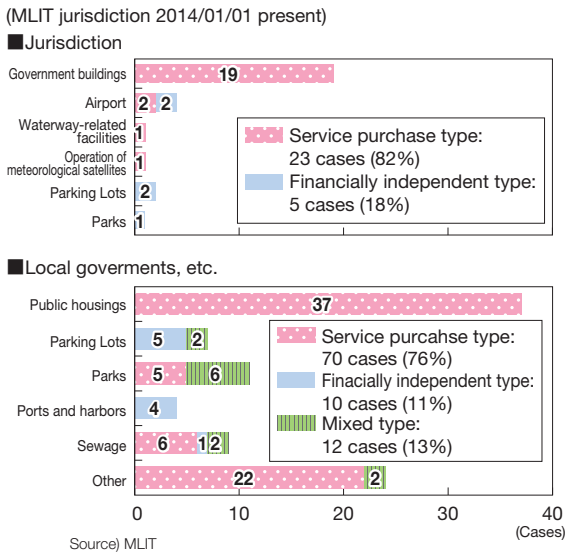
actively promoted even before the PFI Act was established, and projects for developing welfare facilities that come with the rebuilding of public housing have been ongoing. On the other hand, examples of using PFI for maintenance and management of infrastructure projects like roads and sewage have been relatively few. The most common scheme type for PFI is the 'Service Purchasing Type,' in which the public entity will pay the private operator for the cost of developing the public facility as a fee (service fee) (Figure 2-2-3).

Figure 2-2-2 Trends in Number of PFI Projects and Project Cost (Total)



(Note) 1 2013/09/30 to present.
2 The values for the number of projects are those known to the Cabinet Office by having an enforcement policy being published. Projects that were terminated or abolished during service provision period, and projects that were abandoned after the enforcement policy was published are not included.
3 Project cost is the the total amount known by Cabinet Office as the public obligation fee determined by the project's original contract amount when the operator was selected, by a project with a published enforcement policy. Values are rounded to the nearest JPY100 million.
Source) Developed by MLIT from Cabinet Office documents

Figure 2-2-3 Classification of MLIT-related PFI Projects (2014/01/01 present)



Source) MLIT

While working to reduce financial burden and stimulate private investment, in order to realize the maintenance, management, and upgrading of social infrastructures, we need to promote the PFI projects that are financially independent types that can recover the costs by an income of non-tax revenues (like collecting usage fees). Due to these circumstances, the initiatives have been working toward using the public facilities management rights system (Concession Method), which was introduced by the amended PFI Act established in May 2011. With the concession method, for public facilities that collect usage fees, the operation rights for the facility can be set (granted) to the private operator, while the public entity retains the ownership rights of the facility. The private operator can then set the service content and usage fee amount themselves, making it possible for the private operator to run the business with a high degree of freedom as a finacialy independent type of PFI. This method also decreases the financial burden on the public entity, as they will then be collecting the concession fee.

More specifically, the goal has been set to promote the scale of PPP/PFI projects to JPY12 trillion in the next 10 years (2013-2022), by expanding the number of projects for which concession method can be applied, according to the 'Action Plan for the Drastic Reform of PPP/PFI' established in June 2013, the 'Japan Re-emerging Strategy,' and the 'Basic Policy for Economic and Fiscal Management and Reform.' Based on all these policies set by the government, MLIT is working to support local governments and promote initiatives in each sector—airports, sewage, and toll road businesses of local highway public corporations—in which the concession method maybe implemented.

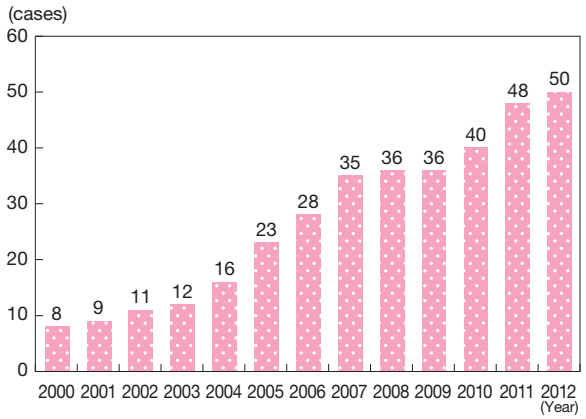
(PFI Market Potential)

As discussed above, while the movement to use PFI in Japan is becoming more active, due to future expansions in the market scale of PFI, we must make efforts to diversify the providers of funding for PFI projects when necessary, and continue to develop a market environment in which necessary funds can be supplied smoothly.

Overseas, the infrastructure fund—which invests in infrastructure projects—plays an important role, and is seen as an attractive investment prospect for investors. The infrastructure fund refers to a financial instrument that collects capital from investors and invests in social infrastructures like roads, railways, airports, ports, etc., and the profit from the enterprise is distributed to investors.There are both funds that are listed on the stock exchange and non-listed funds that raise funds from institutional investors. Of listed infrastructure funds overseas, there are about 50 issued, and the market

capitalization is upwards of JPY10.4 trillion (as of January 30, 2013) (Figure 2-2-4, Figure 2-2-5).

Figure 2-2-4 The Shift in the Number of Infrastructure Funds Listed Overseas



Source) Tokyo Stock Exchange "Report by the Study Group on the Listed Infrastructure Market"

Figure 2-2-5 The Listed Infrastructure Fund Exchange-specific Distribution Ratio

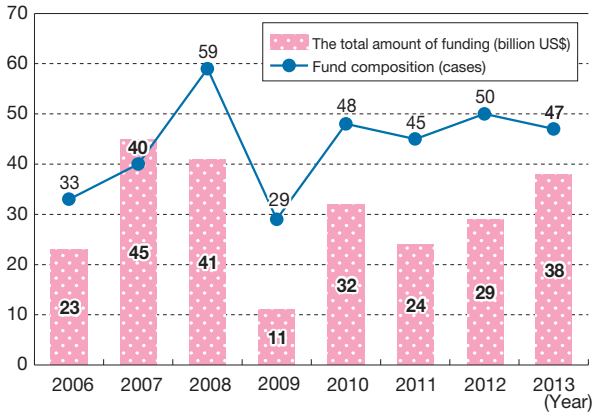
Listing exchange	Aggregate market price (100 million yen)	Distribution ratio
Australia Stock Exchange	37,051	35.5%
Toronto Stock Exchange	25,082	24.1%
New York Stock Exchange	19,993	19.2%
Singapore Stock Exchange	13,054	12.5%
London Stock Exchange	6,148	5.9%
Korea Stock Exchange	1,848	1.8%
New Zealand Stock Exchange	1,096	1.1%
Total	104,272	100%

(Note) Aggregate market price is the closing price of Jan 30th, 2013, which has been converted to yen using the exchange rate of that day.
Source) Developed by MLIT from Tokyo Stock Exchange "Report by the Study Group on the Listed Infrastructure Market"

In regards to non-listed infrastructure funds, each year there are about 40 cases of new composition, at a scale of about USD30 billion total (approximately JPY3 trillion: calculated as USD1=JPY100). The total amount from 2006 to 2013 had grown to a scale of USD243 billion total (approximately JPY24.3 trillion) (Figure 2-2-6).

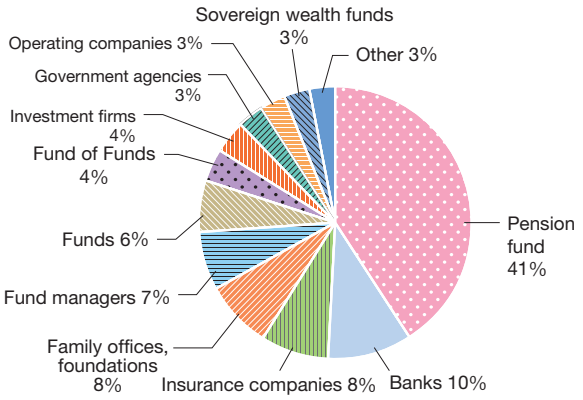
Next, if we look at the configuration of institutional investors that invest in infrastructure funds, pension funds accounted for about 40%. This is thought to be based on the fact that the characteristics of infrastructure funds—the fact that a steady cash flow can be expected over a long-term, that correlation to other invested assets (such as stocks and bonds) is low, and that they have a strong resistance to inflation—matches the operational stance of pension funds (Figure 2-2-7).

Figure 2-2-6 Trend of the Composition of Unlisted Infrastructure Funds



Source) Developed by MLIT from "2014 Preqin Global Infrastructure Report"

Figure 2-2-7 The Structure of Institutional Investors that Execute Infrastructural Investment



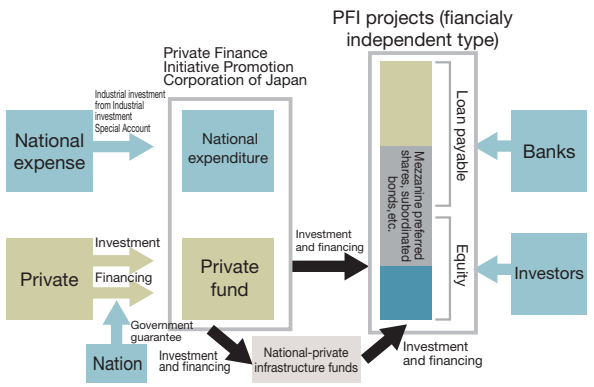
Source) Tokyo Stock Exchange "Report by the Study Group on the Listed Infrastructure Market"

As you can see, there is a growing trend overseas in the scale of investment in infrastructure funds, and there are various sources for providing funds, from individuals to institutional investors such as pension funds and banks.

Meanwhile, if we look at the national situation, there are no track records of full-fledged infrastructure fund compositions within Japan. This is due to the fact that many of Japan's PFI projects use the 'Service Purchasing Type,' which is related to the fact that the main funding method is borrowing from financial institutions. However, as more opportunities arise for promoting financialy independent type PFI as mentioned earlier, the efforts toward setting up an infrastructure fund market is moving forward.

In October 2013, the public-private fund, the Private Finance Initiative Promotion Corporation of Japan (PFI promotion organization) was established, with the goal to provide financial assistance to PFI projects, particularly for the concession method of financialy independent type projects (Figure 2-2-8). For finacialy independent type PFI projects—of which are still only a few examples—this corporation makes the private funding easier by risk money contribution to PFI projects (primarily by investing in preferred stock or subordinated loans), which serves the purpose of 'priming,' making it more conducive to developing the private infrastructure investment market.

Figure 2-2-8 Graph Showing Private Finance Initiative Promotion Corporation of Japan's Scheme

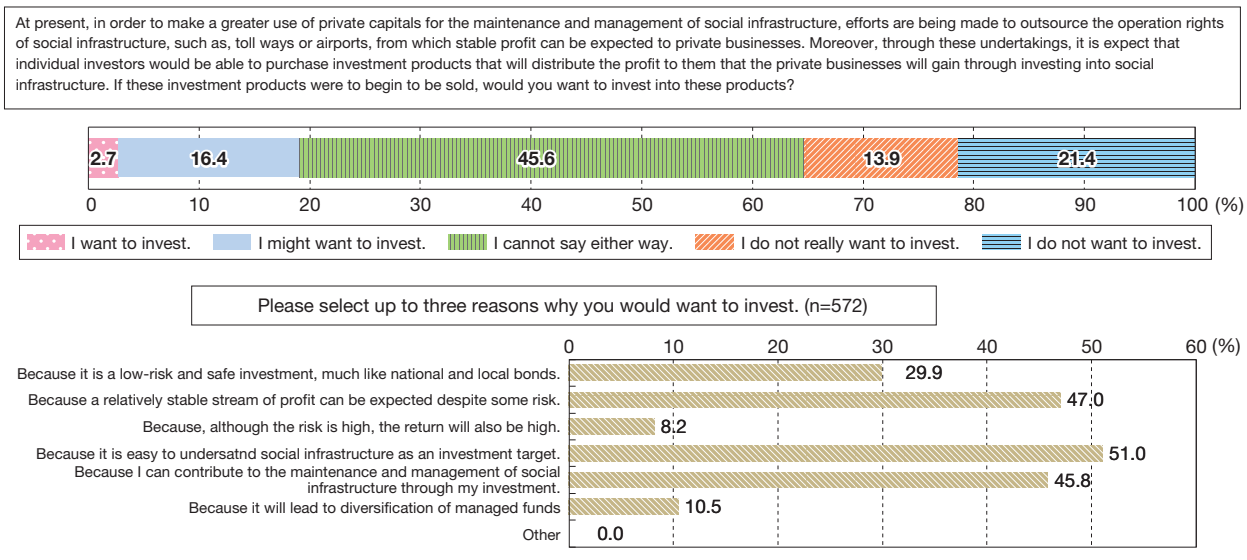


Source) Private Finance Initiative Promotion Corporation of Japan

The Japan Exchange Group's goal is to establish the listed infrastructure fund market during FY2014, and get the first issue projects listed by the end of 2015. If this market is successully established, it will be possible for individual investors to invest in infrastructure investments through the market, the same way they would invest in equity investments. As part of the effort to establish this market, the Financial Services Agency is in the process of reviewing institutional reforms, so that concession rights of public facilities and renewable energy power generation facilities can be added to specific assets that investment trusts and investment corporations can invest in as major investments. Meanwhile, the Japan Exchange Group is examining the details of listing system with the view to have a wide range of infrastructures available for investment in the future.

When asked regarding investment intentions for social infrastructure investment products in the 'Public Awareness Survey,' 19.1% replied either, 'I want to invest,' or 'I might want to invest,' while the majority, 45.6%, replied, 'I cannot say either way.' From these results, we can see that there is very low awareness of this investment product, keeping people from making this investment decision. On the other hand, reasons for wanting to invest were identified as stable profit and ease of understanding the investment, combined with an interest in contributing to the maintenance and management of infrastructure through investing. This shows that not only to will this meet a need for an investment product, but raise the participation awareness towards the maintenance and management of infrastructure (Figure 2-2-9).

Figure 2-2-9 Interest in Investing into the Financial Investment Product that Invests in Social Infrastructure

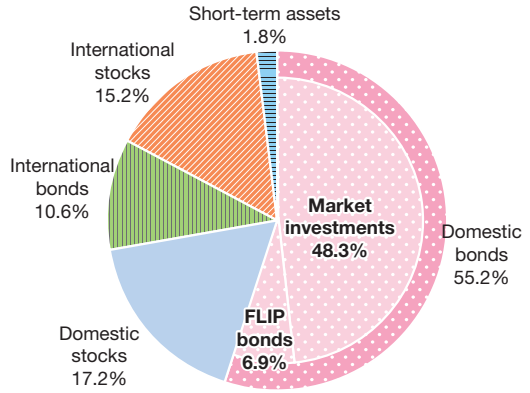


Source) MLIT 'Public Awareness Survey'

In addition to this, there has been a lot of debate about infrastructure investment with public pensions. While pension funds are the main source of infrastructure investment in other countries, in Japan, the world's largest pension fund, the Government Pension Investment Fund (GPIF), comprised of employees' pension and national pension—which operates a reserve of JPY129 trillion—currently invests 55% of the assets under management in domestic bonds. However, they have started looking into diversifying to other fund investment opportunities, including infrastructure investment (Figure 2-2-10).

From the above information, we expect that the types of funding providers for Japan's PFI projects will be expanding, and that the components for future expansion of the Private Finance Initiative (PFI) market have also been well-placed.

Figure 2-2-10 The Fund Composition of GPIF (the End of December 2013)



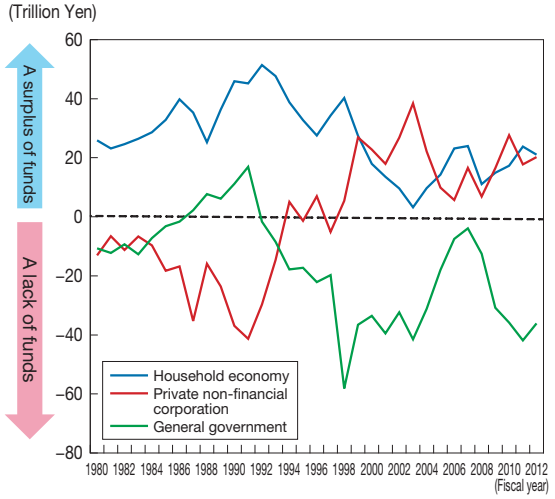
Source) Government Pension Investment Fund

(Impact of PFI)

Here we will pull together what will be the effects of the PFI market expansion. Some of the effects of using PFI are: economic revitalization, reducing financial burden, and raising service standards.

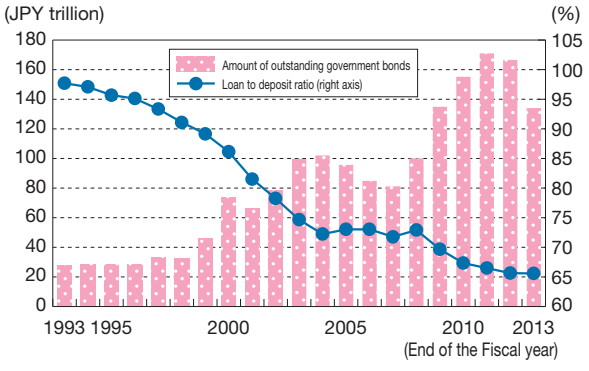
First, using PFI is expected to lead to economic revitalization by creating business opportunities for the private sector, and by prompting private investment. When we consider Japan's financial flow by looking at Bank of Japan's "Flow of Funds," the shift in the financial surplus or deficit of the major economic sectors (difference between saving and investment in one year) shows that since the latter half of the 1990's there has been a continual lack of funds in the government sector, which has been compensated for by surplus funds from the households sector and the private non-financial corporations (corporate) sector (Figure 2-2-11). Furthermore, if we look at the private financial institutions that mediate the funds, the loan-deposit ratio is falling, while the amount of outstanding Japanese Government Bonds is increasing (Figure 2-2-12). This means that while deposit is building up, the capital requirements of companies are stagnating. The social security costs have increased for the government, and the government must depend on government bonds as a financial resource, due to a decrease in tax revenue. This indicates that the investment of funds has shifted from lending to companies to holding government bonds.

Figure 2-2-11 Trend in the Financial Surplus or Deficit by Economic Sector



Source) Developed by MLIT via Bank of Japan "Statistics on Flow of Funds"

Figure 2-2-12 Trend in the Amount of Outstanding Government Bonds Held by Commercial Banks and Loan to Deposit Ratio



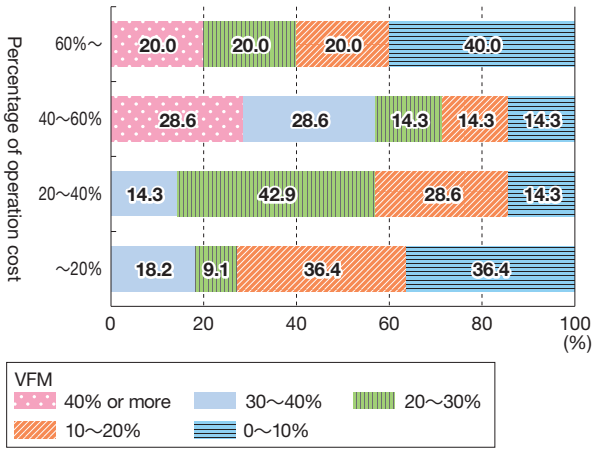
(Note) 1. Loan to deposit ratio is the ratio of the loan balance against the deposit balance of the financial institutions. In general, the situation in which the loan-deposit ratio is lower than 100% indicates a surplus of capital because the deposit balance exceeds the loan balance.
2. Calculate as Loan to deposit ratio = Loan/(deposit with banks + negotiable deposit + bonds)
Source) Developed by MLIT from "Assets and Debts of Commercial Banks", the Bank of Japan

For this reason, we believe that expanding the use of PFI would create business opportunities for the private sector and

increase the demand for investment.

Also, by using the private sector's capital and know-how, we expect to be able to reduce operational costs through the efficiency of operations, and contribute to reducing the financial burden. The VFM (Value For Money)[Note 44] can be used as indicator for evaluating whether having a business run by a private entity would lower costs as compared to the same business being run by a public entity. When we analyzed the VFM trend of PFI projects in the land, infrastructure, and transport sector by looking at the percentage of operation cost within the total projects expenses, the highest VFM distribution was for the operating cost ratio at 40-60% (Figure 2-2-13). It was assumed that PFI projects that were set up for maintaining and managing social infrastructures would account for a considerable percentage of the operating costs, making it likely that it would drive up the VFM. In addition, the analyses results show that the bigger the scale of the project, and the longer the project period, the higher the VFM, and from this it is reasoned that the bigger the scope for using the private sector know-how, the greater the cost reduction effect will be on operating costs.

Figure 2-2-13 VFM Distribution by the Percentage of Operation Cost (n=30)

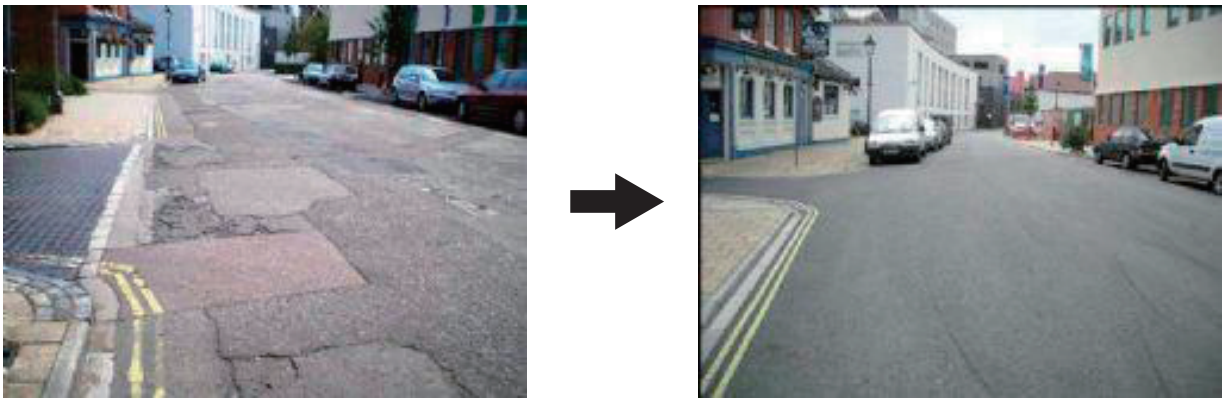


Source) MLIT

Furthermore, there is also the important aspect of raising the service standards by using the private sector know-how. The hope is that giving the operators enough freedom in business operations will allow the private sector know-how to demonstrate its full potential, creating a cycle where the number of users increase due to higher service standards, which will then lead to profitability for the operators.

Examples of service standards being improved by using PFI for a social infrastructure maintenance and management project can be found in other countries. For example, when a resident's satisfaction survey was conducted regarding a PFI projet being used for overall road management in Portsmouth, UK, the results showed that the level of satisfaction had gone up by 22% for road maintenance and management, and by 19% for street cleaning. In addition, the annual number of complaints regarding accidents went down from over 200 cases a year to 40 cases a year, showing that service standards have improved[Note 45] (Figure 2-2-14).

Figure 2-2-14 Road Construction and Improvement by Controlling Roads Management PFI Projects in the City of Portsmouth



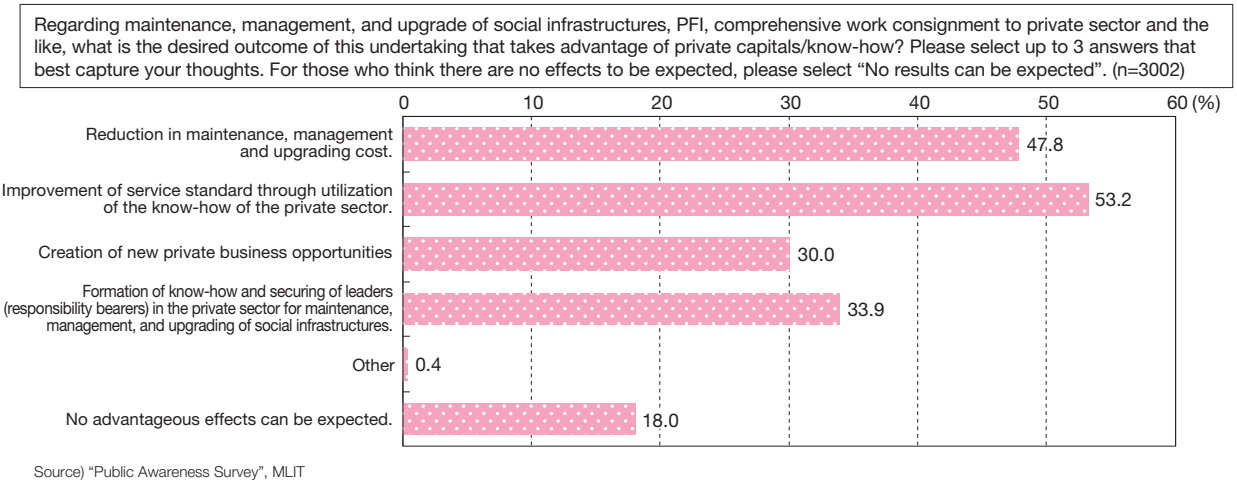
Source) http://www.streets-ahead.uk.com/home.asp

Note 44 Normally VFM is a concept comprised of both total project cost reduction and service standard improvement, but here we used the cost reduction values—where quantification is relatively simple—to attempt analysis.

Note 45 According to Japan Society of Civil Engineers Construction Management Committee "Research report on comprehensive road repair, maintenance, and management by PFI"

According to the 'Public Awareness Survey,' regarding maintenance, management and upgrading of social infrastructures, the percentages for people that expect PPP/PFI to be effective for "reduction in maintenance, management and upgrading costs" and "improvement in service standards by using private sector know-how" has increased, and the expectation is that using PPP/PFI will result in cost reduction and service standard improvement (Figure 2-2-15).

Figure 2-2-15 **Advantagious Effect Expected for PPP/PFI Concerning Maintenance, Management, and Upgrading of Social Infrastructures**



Source) "Public Awareness Survey", MLIT

It has been predicted that the financial situation for both national and local governments will become more and more challenging, increasing the necessity of using PPP/PFI in the future. Instead of merely shifting the public entity businesses to the private sector to reduce the financial burden, we need to use the private sectors' know-how to its maximum potential to create new value, like cost reduction and service standard improvement, that were not possible for public entities to accomplish on its own. In addition, creating mechanisms for new funds—such as infrastructure funds—to flow to the maintenance, management, and upgrading of social infrastructures will also play an important part in expanding the PFI market.

Column

PFI in Edo Period—Construction of Canals by a Wealthy Merchant—

The Takasegawa River—a river in Kyoto famous for being the setting of the novel "Takase Bune" written by the great novelist Ogai Mori—is a canal constructed during early Edo period by the wealthy merchant Ryōi Suminokura and his son Soan, using a method that could be called the Edo period PFI. Until this time, there had been examples of infrastructure development done by religious leaders, as in the case of Gyoki, but most of it was done by the current policymaker. However, during this period, against the backdrop of economic development of foreign trade, financiers called wealthy merchants began to play an active part, and a financier named Ryōi Suminokura stepped forward to become the new bearer of infrastructure development.

Ryōi was famous for conducting red-seal certificate trade (trading licensed by the shogunate), and is said to have sailed as far as An Nam (present day Vietnam) and made a huge profit. While accumulating capital in this way, Ryōi, instead of newly investing in horses and oxen for land transportation, set his sights on using ships on water, a cheap way to transport large cargo. The method of shipping cargo by water had existed since ancient times, but the Kamo River flowing through the city of Kyoto was a rampaging river that had flooded so many times that it had been named

as one of the three world economic deprivations[Note] by the Emperor Shirakawa, the personage who had ultimate ascendancy during the late Heian period. Like the Kamogawa River in this example, there were many rivers that were strategically placed traffic-wise, but were unsuitable for ship transport.

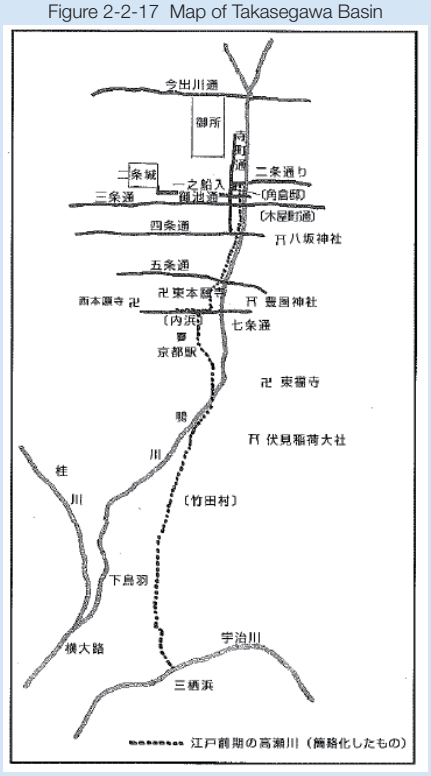
Ryōi voluntarily invested in the waterway and started opening shipping lines. The Takasegawa River was substituted for the Kamogawa River, as it was considered an unsuitable channel. Instead of using the Kamogawa River, a 10km long canal was dug to channel the water drawn from the Kamogawa River within Kyoto City in to the Ujigawa River in Fushimi. It is said that Ryōi not only bore the cost of acquiring land for the construction of the canal, he also paid for the land tax that the land acquired for the canal excavation had accrued previous to purchase. Ryōi died in the summer of 1614, but the project was passed to his son Soan, and completed in the autumn of that same year. The opening of the shipping line in this section connected the water route that ran from Osaka to Kyoto, forming a wide-area commercial distribution zone, and contributing to the promotion of local industry and the stabilization of the lives of local residents. Coincidentally, the year 2014, when this White Paper is to be published, will be exactly 400 years since the death of Ryōi.

(References)
Akira Miyata (2013) “The World of Ryōi Suminokura” Taisei Shuppan Co. Ltd
Takayoshi Ishida (2005) “Kyoto’s Takasegawa River-Heritage of Ryōi and Soan Suminokura” Shibunkaku Shuppan Co. Ltd

Figure 2-2-16 Takasegawa River during Edo Period

(Note) For upstream ship transportation on the river, boat pullers manually pulled and moved the boat along the river as shown in the figure.
Source) National Diet Library

Figure 2-2-17 Map of Takasegawa Basin



Source) Akira Miyata “The World of Ryōi Suminokura”

Note It was said that the Emperor Shirakawa listed three things he could not command: the flood damage caused by the Kamogawa River, the roll of the dice on a sugoroku board, and the armed priests, and despaired over these problems.

(2) Comprehensive Work Consignment to Private Sector

The basic idea behind comprehensive work consignment to private sector is that projects that had been consigned one year at a time would be consigned as a multi-year contract in a single, collective order for each individual business. In addition, once the required standards have been established, determining what the business operation content necessary for meeting the requirements would be left to the contractor to decide as part of the “Performance Specification Contract.”

The merits for the public entities—as the consignors—are that the public labor cost will be reduced due to the decreased amount of business, and that the cost for the consigned business fee will be reduced by having the ingenuity of the private sector put to work by the performance specification contract. Meanwhile, for the private businesses that are the contractors, the economies of scale will work in their favor by receiving several businesses in a collective order, making it easier to make profit. The multi-year contract also allows the contractors to forecast future business volume, making it easier to

figure out capital expenditures and staffing needs.

Until lately, comprehensive work consignment to private sector was mainly used for the maintenance and management of sewage plants. However, in recent years there has been a movement toward using the comprehensive work consignment to private sector for the maintenance and management of roads.

Fuchu City (Tokyo) has consigned the 'Area and Roads Surrounding the Keyaki Tree-lined Pathway Comprehensive Management Business,' a project which will target the road facilities in the city center and run for a 3 year period, from FY2014 to FY2016. The project was consigned to a joint venture that includes local contractors, which was selected by a publicly offered proposal method (Figure 2-2-18).

In order to get a grasp on contractors' opinion regarding the use of comprehensive work consignment to private sector for the road maintenance and management for Fuchu City, MLIT conducted a questionnaire survey (hereinafter referred to as 'Survey regarding Fuchu City's Social Infrastructure of Maintenance and Management Business for Contractors') on contractors that had been commissioned a road or park maintenance and management business by Fuchu City in FY2013[Note 46].

60% of the contractors that replied had a business scale of 5-20 employees, and 50% answered that a high percentage of orders are from public authorities. Furthermore, the main areas of activity were in Fuchi City and its surrounding towns.

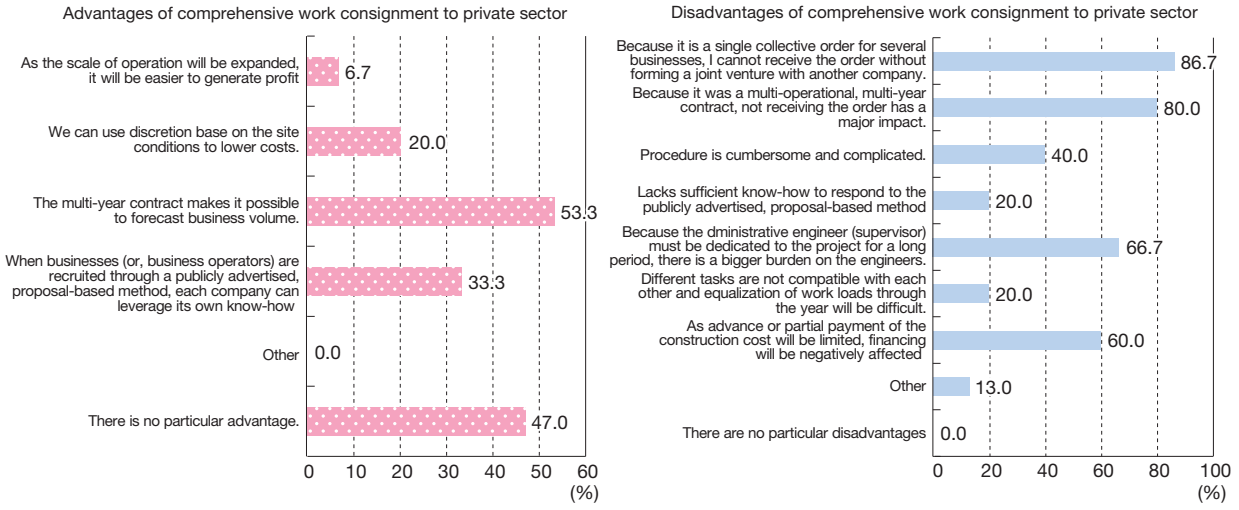
Figure 2-2-18 Consignee's Scope of Work

Work item		Work description
Patrol		Patrol plan creation
		Implementation of daily patrol
		Implementation of joint patrol with police officer
		Patrol diary creation
Maintenance	Cleaning	Street cleaning
		Cleaning of sludge in street inlets
		Cleaning of pedestrian decks in front of the Fuchu Station
	Planting management	Management of Babadaimon zelkova trees
		Pruning of street trees and weeding under trees
	Street lights management	Installation and management of street lights
Repair and renovation		Repair of damaged sites
Accident response		Documentation of accident handling
		Repair work regarding accident handling
		Collection of repair costs incurred from accident
Disaster response work		Implementation of emergency patrol
		Implementation of local handling work
Claims and requests handling work		Confirmation of local situation of claimed or requested locations
		Implementation of local handling work
Occupancy properties management work		Confirmation of illegally occupied properties local situation
		Confirmation of illegal waste disposal local situation
Nonlegal public properties management work		Nonlegal public properties maintenace and management

Source) Fuchu City "Required Level Regarding the Consignment of Comprehensive Management of Roads, etc., around Peripheral Districts of Zelkova Trees Street"

For the questions regarding 'Comprehensive Work Consignment to Private Sector' and of Fuchu City's efforts to use comprehensive management consignment for roads, 50% of companies replied, "I know." The response that the merit of this type of consignment was, "The multi-year contract makes it possible to forecast business volume," had the highest

Figure 2-2-19 Advantages and Disadvantages of Comprehensive Work Consignment to Private Sector (for business operators in the city of Fuchu)



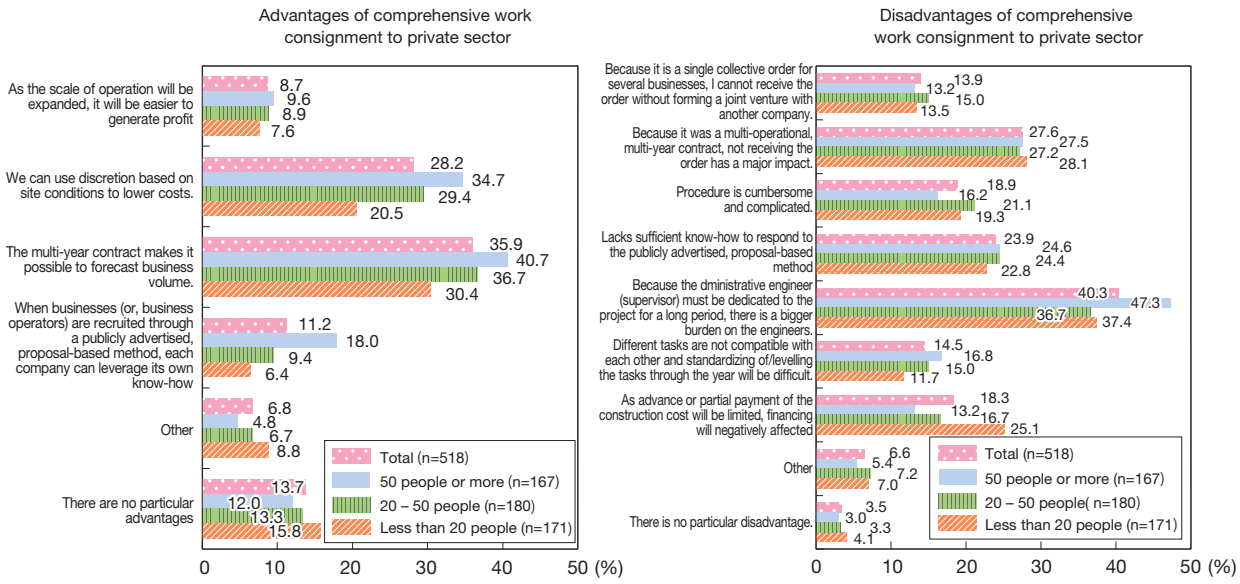
Source) MLIT "Questionnaire to business operators regarding the social infrastructure maintenance and management works in the City of Fuchu"

Note 46 The questionnaires list was sent to 41 companies that would be applicable as of March 2014, and was filled out and returned by 28 companies.

percentage, followed by those that replied, "There is no particular merit." In contrast, in terms of demerits, most of the contractors chose, "Because it is a single collective order for several businesses, I cannot receive the order without forming a joint venture with another company," or "Because it was a multi-operational, multi-year contract, not receiving the order has a major impact," showing that overall the percentage of answers that chose demerits is higher (Figure 2-2-19). In addition, for the question asking if we should continue to expand the comprehensive work consignment to private sector method of ordering, only 4 companies replied, "Yes I think so," while 8 companies replied, "No I don't think so."

When we asked the same questions regarding comprehensive work consignment to private sector to construction contractors in the 'Survey regarding Maintenance, Management, and Repair Businesses for Contractors,' most of them replied that the merit would be, "The multi-year contract makes it possible to forecast business volume," and "We can use discretion based on the site conditions to lower costs," while the number of replies that answered, "There is no particular merit," was fewer than the replies from the Fuchu City contractors' survey (Figure 2-2-20). Also, the bigger scale companies with more employees tended to have higher ratios of merit replies for each item. Meanwhile, most replies chose, "Because the administrative engineer (supervisor) must be dedicated to the project for a long period, there is a bigger burden on the engineers," as the demerit, while the percentages of replies that chose, "Because it is a single collective order for several businesses, I cannot receive the order without forming a joint venture with another company," or "Because it was a multi-operational, multi-year contract, not receiving the order has a major impact," were lower compared to the percentages from the Fuchu City contractors' survey[Note 47].

Figure 2-2-20 **Advantages and Disadvantages of Comprehensive Work Consignment to Private Sector (for construction companies by the number of employees)**



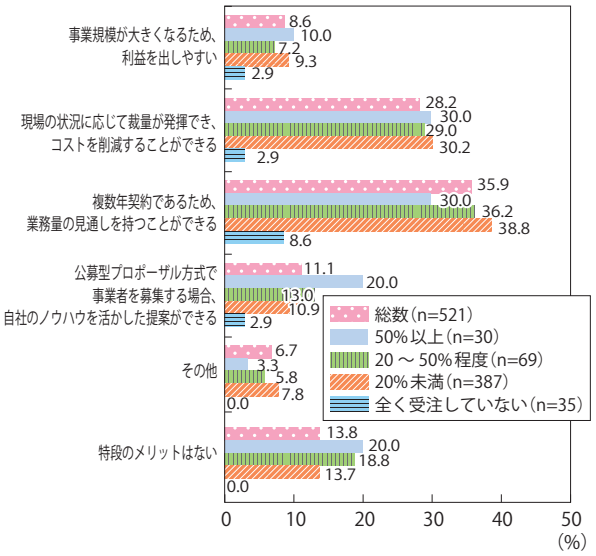
Source) MLIT "Questionnaire to Business Operators of Maintenance, Management and Repair Works"

Perceptions regarding comprehensive work consignment to private sector seems to vary according to regional trends, so it is difficult to come up with a categorical explanation. However, from the results of these surveys, there seems to be a trend that the bigger the scale of the company, the more likely they are to perceive merits, while the smaller scale businesses seem to strongly perceive demerits. In the case of Fuchu City, most of the contractors surveyed tended to be smaller scale businesses that specialized in doing one specific field of construction. Therefore, the marked trend in the survey results is thought to be due to the fact that comprehensive work consignment to private sector would not allow for the standalone orders, combined with a sense of unease over the comprehensive work consignment to private sector being used for the first time.

Note 47 For construction projects with an order volume over JPY25 million (JPY50 million for comprehensive building construction), there must be a full-time dedicated chief engineer or a supervising engineer on-site.

If we look at the merits of comprehensive work consignment to private sector by bill ratio, there were higher percentages of contractors who had a good track record of receiving orders replying, "The publicly offered proposal method for recruiting contractors allows us to create a proposal that makes the most of our company's know-how," from which we can infer that the more orders a contractor receives, the more likely they are to be able to experience the merits (Figure 2-2-21).

Figure 2-2-21 包括的民間委託のメリット（建設業者・公共機関からの受注割合別）



資料）国土交通省「維持管理・修繕業務における事業者アンケート」

The comprehensive work consignment to private sector is a way to contribute towards reducing the administrative costs of public entities. Further use of the comprehensive work consignment to private sector must be considered, as we work to make the maintenance and management of social infrastructures as effective and efficient as possible, despite the challenging financial situation. If we continue to commission smaller lots of maintenance, management, and repair work as we had previously, order dumping may occur, bringing down the quality of public works and giving rise to the possibility of impeding the maintenance and management of the region's social infrastructure, which makes it necessary to find ways of expanding the scale of project for comprehensive work consignment to private sector. Going forward, it will be important to gain understanding from stakeholders, which includes contractors—with special consideration for local, smaller scale businesses—the purpose and mechanism of comprehensive work consignment to private sector. We must build up examples of the results from these consignments and make sure they are widely known[Note 48]. Once that is accomplished, instead of limiting it to roads and sewage, we will be able to attempt the use of this method in other fields, and even combine several fields—for example road management and river management—and consign the maintenance and management of both fields as a comprehensive project.

Column Various Funding Methods for Maintenance and Management

In addition to those already discussed, there are several other methods of funding for the maintenance and management of social infrastructures.

'Naming Rights' is the right to confer the brand name of a sponsoring business' company name or product name to the name of a sports facility, or the like. Naming of facilities like stadiums—which have the ability to pull in large amounts of customers—are often very expensive trade deals. The use of naming rights has been spreading throughout social infrastructures, such as the naming of things like roads and pedestrian bridges.

The first time naming rights was traded for a public road was for the two new lines of municipal roads built in 2009, in Iwata City, Shizuoka. They were named, 'Sakura Kotsu Road' and 'LaLaport Road,' and resulted in about JPY1.5 million and JPY2.1 million of revenue over five years, which was allocated to the road maintenance and management costs.

In Osaka, in order to maintain a safe, secure road facility, for the first time in Japan, they traded the naming rights for the common-usage names of pedestrian bridges. The terms stated that revenue amounts must exceed JPY300,000 annually, for a 5 year period. Currently there are ten pedestrian bridges under such a contract.

Though these contracts result in relatively small revenue amounts compared to sports facilities, the trading of naming rights is one method of funding

Note 48 In the example of Fuchu City discussed, a briefing session was held for residents and contractors in the area at the start of the project to try to gain understanding regarding these new initiatives.

for the maintenance and management of social infrastructures. Reviewing the regional social infrastructure's 'value as an advertising medium' may lead to some more funding options.

Public offering of participatory market municipal bond (mini public offering bond) is a bond that is offered by the local government to individuals and corporations that live in the locality, starting in 2002. With the mini public offering bond, a detailed description of the project for which the funds raise will be appropriated must be submitted. There have been many offerings of bonds for the purpose of maintaining and managing social infrastructure.

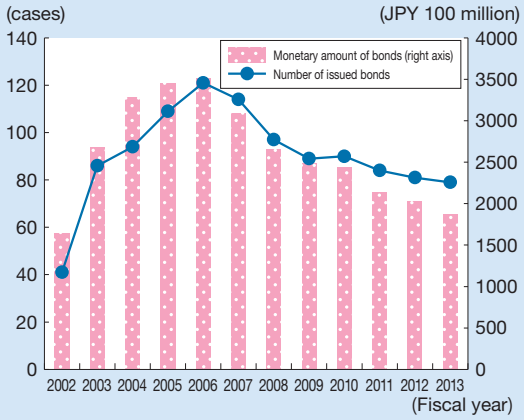
In recent years, with the decline in market interest rates, the number and amount of bond offerings have been stagnating. However, each fiscal year there is still JPY200 billion worth of bonds offered, as it is a well-established means of funding for local governments. One of the special features of this type of bond is that, in addition to the interest on bonds, there are often special benefits (purchasing premium) that take advantage of the region's characteristics awarded to the purchaser of the bonds. For example, bond purchasers maybe given a prize of a bag of rice from a lottery, or presented with free tickets to the local zoo. As the maintenance and management of social infrastructures goes forward in earnest, we hope the residents of the region will participate in the maintenance and management by purchasing mini public offering bonds.

As seen above, there are various methods being trialled to procure funds for the maintenance and management of social infrastructure. Going forward, using and contriving these sorts of ideas will be an important part of everyone supporting social infrastructure.

Figure 2-2-22 Naming Right Granted to Pedestrian Bridge (Osaka Prefecture)

Source) Osaka Prefecture

Figure 2-2-23 Number of Issued Miniature Public Offering Bonds and Trend in the Monetary Amount of the Bonds



Source) Developed by the MLIT from "Information material of Local Government Bond Association"

2 Residents Participating in the Maintenance and Management of Social Infrastructure

(1) Residents' Interest in Participating in the Maintenance and Management of Social Infrastructure

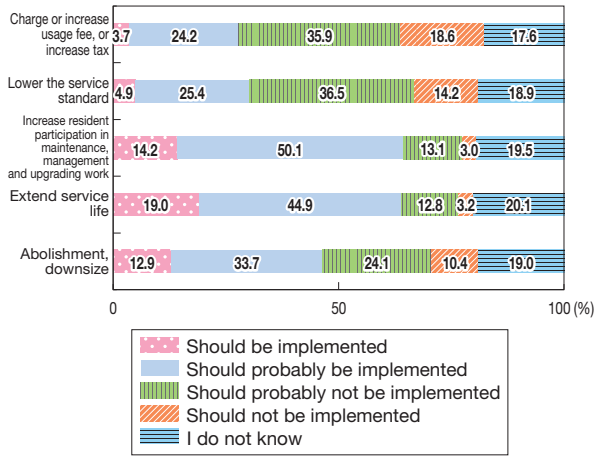
When the 'Public Awareness Survey' posed the question, "Should resident participation in maintenance, management, and upgrading be expanded?" regarding what measures should be taken when the current methods of maintenance, management, and upgrading of social infrastructures became unsustainable due to population decline and downturn of the financial situation, 64.3% responded, "Should be implemented," or "Should probably be implemented," which corresponds to the same majority response for the question regarding, "Making things longer-lasting" (Figure 2-2-24). As seen in Figure 1-3-4, due to the aging of social infrastructures, there are higher levels of awareness regarding problems with the maintenance, management and upgrading. We can infer that, as a result, the idea of residents participating to be part of the solution is starting to spread.

Regarding the content of what residents would like to participate in, the percentage of people who advocated increase taxes and usage charges were low, while a higher percentage responded that residents should participate by contributing

to maintenance, management, and upgrading works, or by helping with beautification, cleaning, inspection, and reporting. This shows that residents would rather participate in actual maintenance and management work rather than bear additional financial burden (Figure 2-2-25).

Figure 2-2-24 Policies That Should Be Implemented For The Maintenance, Management and Upgrading of Social Infrastructures

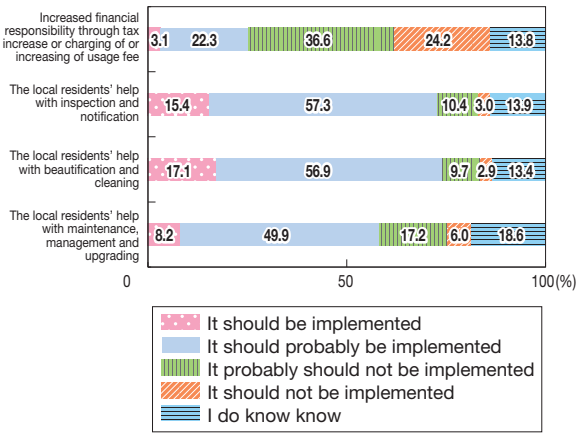
Which of the following measures do you think should be taken when the current state of maintenance, management, and upgrading of social infrastructures becomes unsustainable due to population decline, the financial downturn, etc.?



(Note) In "Public Awareness Survey", for each type of infrastructure, i.e., transportation infrastructure (roads, ports and harbors, airports, railways, subways), local (life) infrastructure (water and sewage system, municipal parks, public housing), culture and health-related infrastructure (cultural and sports facilities, schools, health and medical facilities, etc.), disaster prevention and land conservation-related infrastructure (soil and water conservation, coastal facilities), the number of people who answered, "It should be implemented", "It probably should be implemented", "It probably should not be implemented", "It should not be implemented", or "I do not know" is tallied separately according to each policy listed in the figure.
Source) MLIT "Public Awareness Survey"

Figure 2-2-25 The Residents" Awareness of Participating in the Maintenance, Management, and Upgrading of Social Infrastructures

What do you think of the following proposals in case the help of the local residents are sought in order to meet the cost of and to execute effectively the maintenance, management, and upgrading of social infrastructures because of the challenge posed by population decline and downturn of the financial situation.



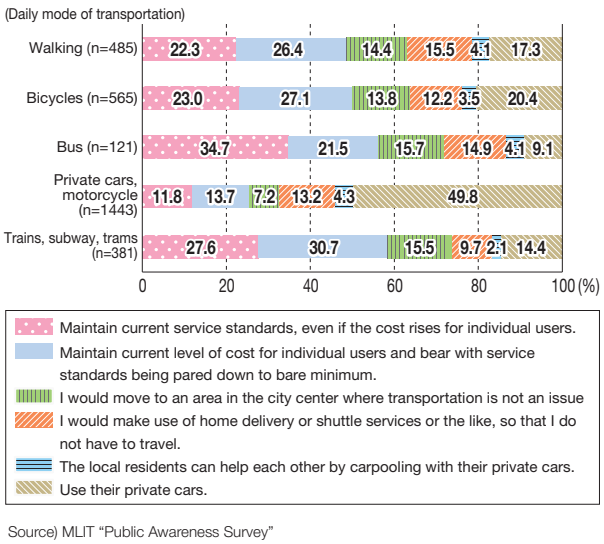
Source) MLIT "Public Awareness Survey"

From these results, we can see that before we increase financial burden for future maintenance and management of social infrastructures, it would be better to find ways of having residents participate by taking on a part of the maintenance and management work.

Next, the 'Public Awareness Survey' asked for opinions regarding alternative ways of living and finding transportation for when the current level of operations became unsustainable. If responses that put "private car or motorcycle" as the current mode of daily transportation are excluded from the count, a high percentage of responses chose either "Maintain current service standards, even if the cost rises for individual users," or "Maintain current level of cost for individual users and bear with service standards being pared down to bare minimum," followed by the percentage that chose "I would move to an area in the city center where transportation is not an issue." Compared to the previous survey regarding participation in the maintenance, management, and upgrade of social infrastructures, for things like public transportation—which has a direct bearing on daily life—there is a stronger tendency for people to consider the rise in financial burden for maintaining current service standards an unavoidable necessity. However, as this tendency is only seen in residents that use public transportation daily, we would

Figure 2-2-26 Residents' Awareness in Case the Operation of Public Transportation (System) Becomes Difficult

If the public transportation system of your residential area becomes difficult to sustain at the current level of operations, how would you think about your daily life and travels? Please select one response that best approximates your opinion.



Source) MLIT "Public Awareness Survey"

need an approach that would encourage residents who use private cars for daily transportation—which happens to be the majority—to also have an interest in voluntarily supporting the region's public transportation (Figure 2-2-26).

Resident participation in the maintenance and management work is very meaningful in that participating in the maintenance and management of social infrastructure that they themselves use, residents will gain a better understanding of the infrastructure's situation and share in the awareness of existing problems. Below, we will introduce some social infrastructures in which residents of the region participate in maintenance and management.

(2) Example of Resident Participation

(Residents' Participation in Maintenance and Management of Social Infrastructure)

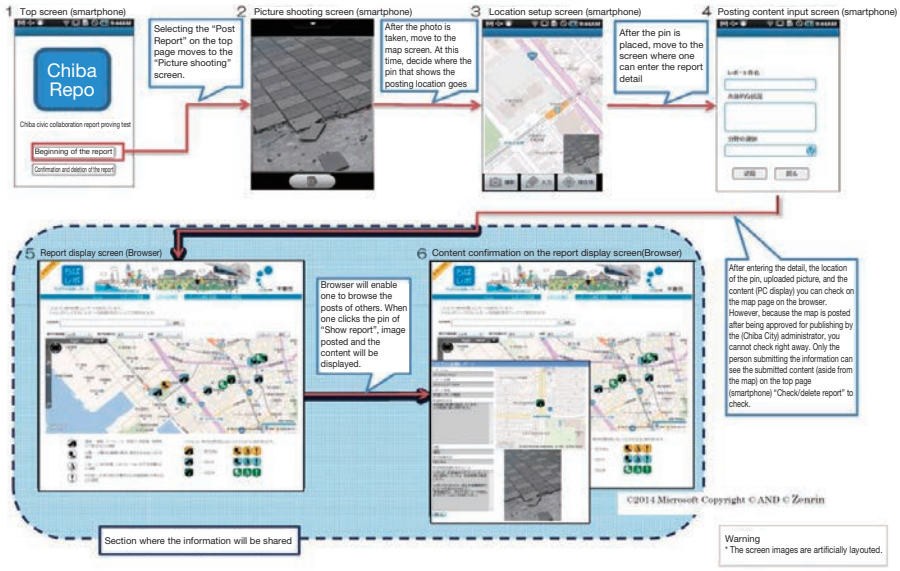
Various aspects of social infrastructure have started initiatives that help residents of the region feel a close affinity to the social infrastructure, and allows them to voluntarily participate in proactive maintenance and management.

■ Becoming a City Supported by its Citizens ~Collaboration Report Demonstration Experiment, 'Chiba Repo'~

To meet the needs of the residents as well as possible, resident participation is indispensable for the maintenance and management of social infrastructures. We therefore need to create a system that would allow for such participation. In Chiba City, Chiba prefecture, they are using smartphones and PCs as part of the mechanism for making residents' participation easier, conducting a demonstration experiment where citizens could submit various issues to a dedicated website called, 'Chiba Repo (Chiba Report)'[Note 49, Note 50].

When citizens find spots in the city area—such as parks and roads—that need work done, they can send a report via their smartphones or other devices, with the location information and a picture attachment to 'Chiba Repo,' the dedicated website for these reports. The submitted reports are then published on the website[Note 51]. Previously the reports were sent via landlines and emails, which meant that the information was only shared between the citizen submitting the report and the administrator that received the report. Now, by publishing the report on a website, the information regarding a regional issue is not only shared by the citizen submitting the report and the administrator, but is widely available to be shared (Figure 2-2-27). Furthermore, because the responses to the reports (issues) by the government are also posted online, citizens can check to see what has happened to an issue they had reported, making the whole procedure a transparent process.

Figure 2-2-27 Chiba civic collaboration report proving test (Chiba Repo) Posting and Content Review Flow

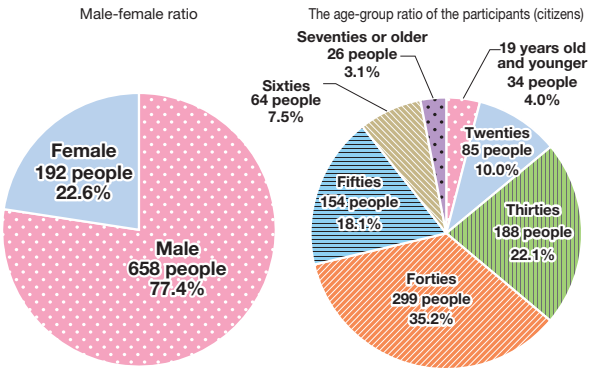


Source) Chiba City

Note 49 Conducted over a period of six months, from July 1 to December 27, 2013.
Note 50 A similar initiative is being conducted in Handa City, Aichi Prefecture.
Note 51 Information that fall under privacy and non-disclosure criterion are not disclosed.

850 citizens participated in this effort, along with 391 city officials, and the citizens who participated were mainly between 30 – 50 years old (Figure 2-2-28). Even before this initiative, the number of telephone queries regarding regional issues totalled around 16,000 calls annually (13,000 calls for roads, 3,000 calls for parks). Using ICT (Information and Communication Technology) made it possible to have the contact line open 24 hours. Introducing the 'Chibarepo' seems to have made it easier for citizens to participate, even for those who used to not make contact for reasons like, "I wanted to call in over the weekend but the city hall was closed," or "I hesitated to make a phone call even though I noticed a defect in the infrastructure." If we look at the breakdown of posts received during the experiment period by the time of day the post was submitted, there seems to be slightly more submissions in the morning. This is thought to be due to citizens finding issues with the infrastructure on their way to work or school (Figure 2-2-29).

Figure 2-2-28 Circumstances of Participants (Citizens)



Source) Ciba City

The number of effective reports submitted during the experiment period was 628 reports, and 85% of these reports were submitted via a smartphone device. If we look at the reports by category, road-related issues were the overwhelming majority with 72%, followed by park-related issues at 11%, garbage-related issues at 5%. 12% of issues reported were categorized as 'Other' (illegal parking, defects in facilities, weeds growing on city-owned land, vacant houses, faulty crime prevention lights)[Note 52].

Figure 2-2-29 Breakdown of posting (by day and time)

(Breakdown based on the day of the week) (Unit: cases)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
68	69	65	72	90	125	139	628
11%	11%	10%	12%	14%	20%	22%	100%

(Breakdown according to time) (Unit: cases)

0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-0	Total
34	74	118	111	94	79	90	28	628
5%	12%	19%	18%	15%	13%	14%	4%	100%

Source) Chiba City

In a quetionare survey conducted of people that participated in the demonstration experiment, 95% replied that, "It is a convenient system," and 69% replied that, "It changed my level of awareness when I look at the city." 'Chibarepo' has been rated very highly by citizens.

Chiba City is scheduled to launch 'Chiba Repo' as a full-scale operation in September 2014, and aims to have 5,000 users within two to three years.

Note 52 Analysis results were taken from the "Chiba Civic Collaboration Report Demonstration Experiment, 'Chiba Repo (Trial)' Evaluation Report (July – September 2013)"

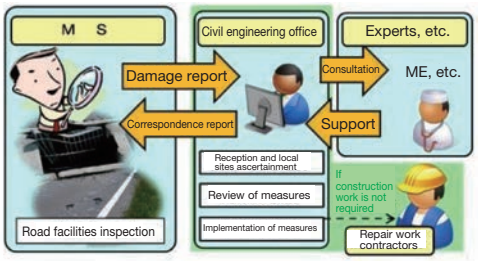
Organizational System for Resident Participation ~Gifu Social Infrastructure Maintenance Supporters Project~

'Chibarepo' is an effort to have residents contribute to early detection of deects in the infrastructure. Taking that one step further, there are now initiatives being put forward where residents can be responsible for doing some easy maintenance and inspections on infrastructures that they use everyday (like roads and bridges).

In Gifu, thanks to the citizens' participation in volunteer work, the 'Social Infrastructure Maintenance Supporters (hereinafter referred to as 'MS') project was launched in FY2009, a system where the region watches over the regional roads.

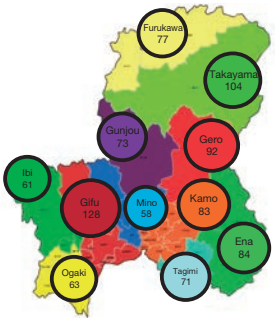
The people working as a part of MS are residents recruited through the public advertisement. The volunteers go through a training program in which they acquire the knowledge needed for inspecting road facilities, and receive a commission from the head of the civil engineering office. Since April 2014 to present, over 894 residents have been commissioned (Figure 2-2-31). Even minors can participate in this project with a guardian's consent. Currently the age range of commissioned volunteers is people in their 20's to 80's, which shows that a wide demographic is participating in the inspection of road facilities (Figure 2-2-32).

Figure 2-2-30 Overview of Social Infrastructure Maintenance Supporters System



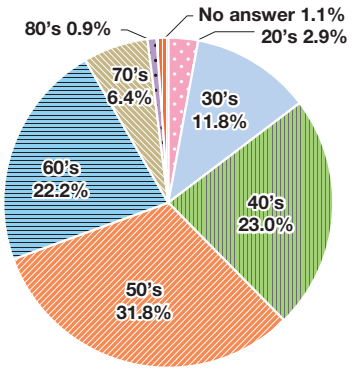
Source) Gifu Prefecture

Figure 2-2-31 Status of works commissioned to MS (as of April 1, 2014, Unit: person)



Source) Developed by MLIT from information material of Gifu Prefecture

Figure 2-2-32 Age structure of MS



Source) Gifu Prefecture

Figure 2-2-33 Examples of Measures Taken in Response to the Information Provided by the MS (Repair of Potholes in the Road)

[When reported]

[After repaired]

Source) Gifu Prefecture

Looking at the inspection result information by type, a lot of the reports received are regarding damage to a facility or deterioration in the pavement. The prefecture bases its repair work response on these inspection results.

Community Initiative for Maintenance and Repair Activities ~Tokushima River Environment Building Project~

There are also examples of infrastructure maintenance and repair being done through the efforts of a community group. In Tokushima, as part of an initiative called 'River Environment Building Project for the Region by its Residents,' they started the 'River Environment Building Project' in June 2011, which is had grown out of the previously adopted project[Note 53]. The 'River Environment Building Project'—with its philosophy of "build the enjoyable river environment we want by our own efforts"—has the residents of the region developing simple facilities and doing maintenance and management work themselves in the areas along the river which is managed by the Tokushima prefecture.

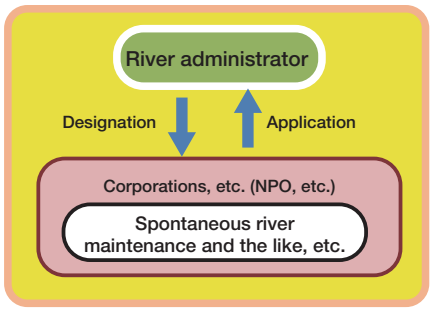
Figure 2-2-34 Hyōtanjima Bluestone Bank Protection Repair Work

Source) Tokushima Prefecture

Thanks to the efforts of this 'River Environment Building Project,' in July 2012, the specified non-profit corporation 'Protect the Shinmachi River Group' got the restoration work done from the Shinmachi Bridge to the area near the Jinshin Bridge, which was approximately 500 meters on the left bank. The 'River Environment Building Project' is the first project in which revetment mending is being done by local residents. They collected and washed blue stones that had fallen off, and approximately 100 stones have been put back in place. During the one month project period, there was a day where about 30 children and members of an NPO, the prefectural governor Kamon Iizumi, and around 20 prefectural government employees came and participated in placing 30 stones along a 50 meter section near the Shinmachi Bridge. If this kind of patching work was done as a construction project, it would cost around JPY1.1 million. However, the prefecture only had to pay for providing the materials such as mortar for setting the stones, reducing the total project cost to about JPY20,000[Note 54].

Furthermore, on January 24, 2014, the specified non-profit corporation 'Protect the Shinmachi River Group' became the first organization in the nation to be given the designation of being a 'River Alliance Organization,' based on the 'River Alliance Orgnization System' which was created according to the "Law to Amend a Part of the Flood Protection Laws and the River Laws" (2013 Law No.35) to support community group activities related to voluntary river maintenance and river environment conservation.

Figure 2-2-35 Breakdown of the River Cooperative Body System



Corporations, etc., recognized as having the capacity to act appropriately and reliably as River Cooperative Body are eligible to apply for the river administrator. River administrator will then select a cooperation as River Cooperative Body after due evaluation.

River Cooperative Body will execute operations like the following.
River conservation or maintenance work in cooperation with river administrator
Collection and provision of information and sources pertinent to river management
Conduct research and studies for river management
Diffusion of knowledge and education regarding river management
Ancillary activities associated with 1 to 4 above.

Source) MLIT

Note 53 An arrangement where local companies and residents regard public properties—such as roads and river banks in the region—as their adopted children, and periodically do clean up activities, such as collecting empty cans.

Note 54 Preliminary calculations by Tokushima Prefecture.

(Residents participation in the Maintenance of Public Transportation)

■ Ride and Protect the Local Railways ~Local Governments along the Kitakinki Tango Railway Line Upper Limit of JPY200 for Senior Citizens' One-way Train Ticket~

There is even a residents participation example for public transportation, where the public transportation has been able to continue to functioning as the region's legs, thanks to the residents' activities. There are many cases where railway lines have had to reduce the number of services, or even close a line altogether, due to the decrease in the number of users; a result of the population decline. However, in Kyotango City, the residents were determined to keep the 'legs' (transportation means) of the region alive by active use. As part of the effort, for a five-month period starting in June 2011, they conducted a social experiment in which 'the upper limit for a one-way ticket for senior citizens who purchase a ticket at a train station within city limits is JPY200' on Saturdays, Sundays, and public holidays[Note 55]. Due to this initiative, the number of senior citizens using the railway increased to 2.8 times more than the same period in the previous year. The effect of the initiative was not limited to the increase in senior citizen users. The initiative also had a wide range of effects, including an increase in the number of people connecting to another public transportation link, a reduction in the strain caused by private car transportation, and improvement in the health of senior citizens getting out and about more often. Due to the results listed, the initiative was extended to include weekdays from October 2012, and two other cities and two other towns (Kyotango City, Miyazu City, Ine town, and Yosano town) along the Kitakinki Tango Railway Line are starting the same initiative.

Figure 2-2-36 Residential Users of the 200 Yen Rail

Source) Kyotango City

Figure 2-2-37 Artwork inside the Station

Source) Utsu-shi KTR Iwakitaguchi Station (Nickname "The inlet entrance of Aso")

The Kitakinki Tango Railway and local governments along the line are also working towards the goal of making the railway line one that is "Cohesive to the region and is easy to use." To help realize this objective, students from the high school art club and residents from the community are working together on creating the 'Station Building Art' mural to be painted on the station building[Note 56]. They have also launched an initiative to 'Create a Flower Railway,' which involves making the interior of the train station a 'Flower Station,' making the area around the station a 'Popular Venue for Viewing Flowers,' and making the areas along side the railway a 'Flower Tunnel.' By having residents from the region—from nursery school children to senior citizens—participate in activities like planting flowers, the railway line is developing ways for the residents to feel an affinity for the railway.

The station building is used by the local community women's association to hold their monthly meetings called 'Hottosalon (Hot Salon)[Note 57],' and is also often part of strolls for nursery school children. Having the railway widens the community circle in the region, and they are continuing to look for ways of promoting utilization through such activities.

Note 55 Applicable to senior citizens aged 65 and over.
Note 56 Activities at the Iwatakiguchi Station (nicknamed "Asono Irie Station" (Miyazu City, Kyoto).
Note 57 Activities at the Iwatakiguchi Station (nicknamed "Asono Irie Station" (Miyazu City, Kyoto).

Keep it for our School Commute! Supported by the Student Councils of High Schools along the Railway Line ~Kashitetsu Bustitution (Substitute Buses)

There is an example of high school students who use substitute buses getting involved in activities to support the continuation and revitalization of buses that are running as substitute for railway lines that were closed. In Ibaraki, by the end of March 2007, the number of users of the 'Kashitetsu Substitute Buses' —which had started running after the closing of the Kashima Railway—had dropped to a fourth of the number of people who used to ride the railway, due to the fact that many people who had previously used the railway for commuting had switched to commuting by a private car. Realizing that if this trend keeps up, they would lose their public transportation means for commuting to school, the student councils from the high schools along the railway line set up the 'Kashitetsu (Kashima Railway) Bustitution (Substitute Buses) Supporting Group'[Note 58]. The group took over the activities from the 'Kashitets (Kashima Railway) Supporting Group,' which had been founded to support the continuation of the Kashima Railway, and hold regular 'Kashitetsu Substitute Buses Supporting Group Meetings' where they exchange ideas about how to support the continuation and revitalization of the substitute buses.

Figure 2-2-38 Kashitetsu Bus-kun

Source) Kashima Railway Substitute Buses Cheering Group

Figure 2-2-39 Bus Service by BRT

Source) Ishioka City website

The Kashitetsu Substitute Buses Supporting Group is very proactive in its endeavors, which include clean up work around bus stops, and various activities to tell as many citizens as possible about substitute bus services. Such activities include the creation of a group mascot character, 'Kashitetsu Bus-kun (Kashitetsu Bus Boy)' who appears on things like tissue packets handed out to passers to encourage other students and regular citizens to use the substitute buses, and asking kindergartens and elementary schools along the railway line to submit paintings to be exhibited on the gallery bus. In addition, the group also participates in the Regions along Katshitestu Railway Line's Public Transportation Strategy Meetings as a representative of the service users.

Currently the Kashitetsu Substitute Buses system is operating as the 'Kashitetsu Bus' service, running on BRT[Note 59], which utilizes the track that had been laid for the discontinued Kashima Railway Line. In addition to the above activities, the Kashitetsu Substitute Buses Supporting Group is also involved in other efforts for promoting the use of Kashitetsu Buses, such as creating coloring books of 'Kashitetsu Bus Boy' and collecting donations at regional events, planning the 'Kashitetsu Bus Boxed Lunches[Note 60]' project, creating the 'Let's Go by Kashitetsu Bus! A Foodie's Map[Note 61],' and selling 'Kashitetsu Bus Boy Candy' at local cultural festivals.

Public Bus Fostered by Residents, Reassess as They Go ~Uozu City, Toyama Uozu Public Bus~

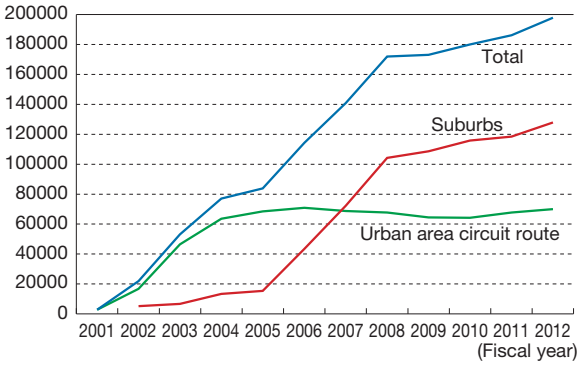
Following the closure of the private bus lines due to the decline in the number of users, in FY2001, Uozu City, Toyama conducted an experiment of running a public bus service, 'Every Other Day Service—Mon, Wed, Fri—Bus Fare JPY100,' in an effort to revitalize the city center's shopping district. However, in the beginning the results of the experiment were not very positive. Therefore, with the goal to protect the transportation means of vulnerable road users, as part of their

Note 58 Currently the membership includes six high schools.
Note 59 Bus Rapid Transit (High-speed bus transportation system)
Note 60 Kashitetsu Boxed Lunches are being sold for a limited time at JA in Ishioka City for JPY500.
Note 61 The Foodie's Map is available at the stores listed on the map, Ishioka City Hall, Ibaraki Airport, and on the Kashitetsu Buses.

'Strategy for Increasing Usage,' they reassessed the service to make it easier to use by doing things like re-thinking bus routes, and changing to services to every weekday rather than every other day. The changes extended to making it an all-year operation that included weekend services, and there was even demand for an extension in morning and afternoon service hours. The full-scale operation launched in FY2004.

With the launch of full-scale operations, the city conducted not only questionnaire-style surveys, but also conducted interview surveys with the public transportation users, as well as group interviews with residents. As a result of gaining a good understanding of the potential demand, despite having to run unprofitable bus routes due to the withdrawal of the private bus line, the number of public bus users continued to increase, and by October 2013, the total number of people riding the bus reached 1.5 million (Figure 2-2-40).

Figure 2-2-40 Transition of the Number of Public Bus Passengers (2001 Fiscal Year – 2002 Fiscal Year)



Source) Developed by MLIT from Uozu City information material

As part of bus user promotion efforts, the city has held a variety of events for revitalization of the shopping district and city center areas that require the use of public bus lines, has set up a bus waiting community plaza within the shopping district, and held school outing activities for local elementary schools. Also, city officials speaking on the local cable television channel have done PR broadcasting to raise awareness regarding the public bus lines, in addition to promoting the revitalization of the local community.

Moreover, the city established the 'Bus Supporters System[Note 62], started activities promoting 'Proactive Usage' and 'Public Bus PR in Familiar Places,' and made benches for bus stops. In addition, to foster awareness that, 'the public bus thrives and grows by regional residents' efforts,' the city has set up a cooperation system for the residents of the region, to create opportunities for the residents to participate in developing the environment.

Figure 2-2-41 Construction of a Bus Stop by Bus Supporters

Source) Uozu City

Figure 2-2-42 Events That Use Public Buses

Source) Uozu City

In FY2011, the city developed and implemented a bus location system, created through a joint development project with Hokuriku Polytechnic College, to further improve the convenience of the bus lines. For public bus users that do not have access to a PC or use a cell phone, the city has started a service where people can call the number posted at bus stops to reach the municipal office or tourist information center to ask for current bus location information.

With the goal to create a public transportation system that, 'makes more people want to use it,' 'is so safe and comfortable that people want to ride it more,' 'contributes to revitalizing the region,' and 'can be continued for longer,'

Note 62 There are 30 members registered as of March 2014.

Uozu City is currently conducting social experiments like making the the bus fares for buses run by the local railway company (Tozo Line and Kurosawa Line) the same level as the bus fares for the public buses, and adding another afternoon bus service time for the route that starts at the Uozu train station[Note 63].

As discussed above, having residents proactively participate in the maintenance and management of social infrastructures brings to attention aspects that would not be evident through government efforts alone, and has the potential to make the infrastructures of the region function in a more stable manner. These activities can also help to decrease the responsibility of the government. As evident from the results of the 'Public Awareness Survey,' more people prefer that the current standards of service for social infrastructures be maintained by having residents proactively participate in the maintenance and management of social infrastructures, rather than increasing the financial burden of residents by raising taxes and usage charges. Considering these results, going forward we will need to find ways of setting up systems and environments in which the residents of the region can proactively participate in the maintenance and management of social infrastructures.

In regards to the public transportation sector, we introduced an example of residents of the region cooperating and collaborating with the local government to keep public transportation going when it became too difficult to continue with the private business' efforts alone. This means that these ideas can apply to other infrastructure sectors that used to be primarily run by private businesses, and shows that we will need to create an environment where all parties involved can share and understand their future roles in their respective regions, so that the residents of the region, the governing bodies, and the operators can work together to create social infrastructures that are 'Supported by Everyone.'

Section 3 Taking a Far-sighted Vision

Developing social infrastructures is a project that takes a long time and requires a large expense. Therefore, once a social infrastructure has been put in place, it has a major impact on people's living and finances of current and future generations. In that sense, decisions made regarding infrastructure in the present will affect not only the current generation, but also impacts the prosperity, safety, and security of future generations. Thus, in this chapter we will analyze people's awareness regarding the future strain on social infrastructure, and discuss initiatives for social infrastructure that will help realize long-term future benefits by taking a far-sighted vision of the future.

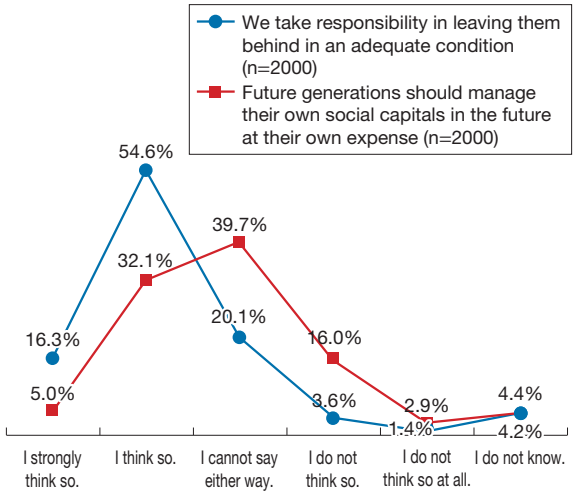
1 Perception of Burden on Future Generations

The idea that we must give consideration to future generations when we think about infrastructure is one that is widely shared. When Nomura Research Institute (NRI) conducted a survey in FY2008, about 70% of the people survey responded that the current generation is responsible for keeping social infrastructures in an adequate condition to pass on to future generations (Figure 2-3-1).

However, due to the population decline and the tight financial situation, there is a tendency to think very prudently in regards to upgrading social infrastructures. If we look at the results of the 'Public Awareness Survey,' we can see that while many people think that upgrades to existing social infrastructures should be prioritized and done in a planned manner, compared to the previous survey results, there is a slight but definite increase in the number of people who think that if it results in further strain, there is no need to upgrade all the facilities (Figure 2-3-2).

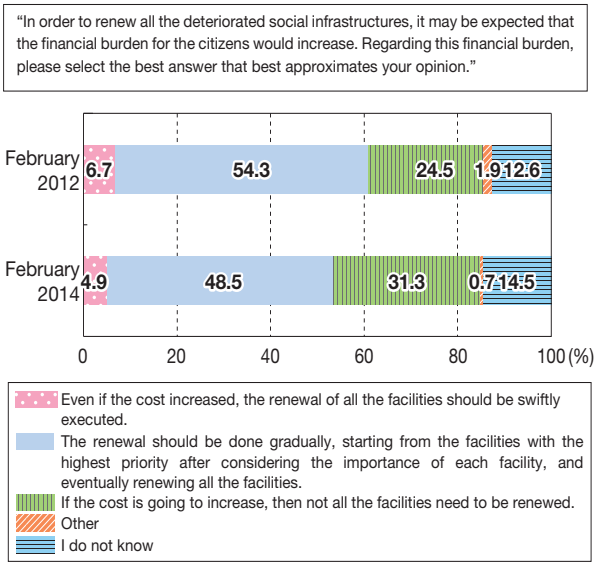
Note 63 Until September 30, 2014.

Figure 2-3-1 Opinions Regarding Social Infrastructures and the Responsibilities For Future Generations



(Note) Question: What do you think the future generation should do with regards to the social capital development? "Development" includes new constructions, renewal, maintenance and management of the existing social capitals.
Source) Nomura Research Institute (NRI) "Public Awareness Survey on the impact of dwindling population on the social infrastructures, 2008"

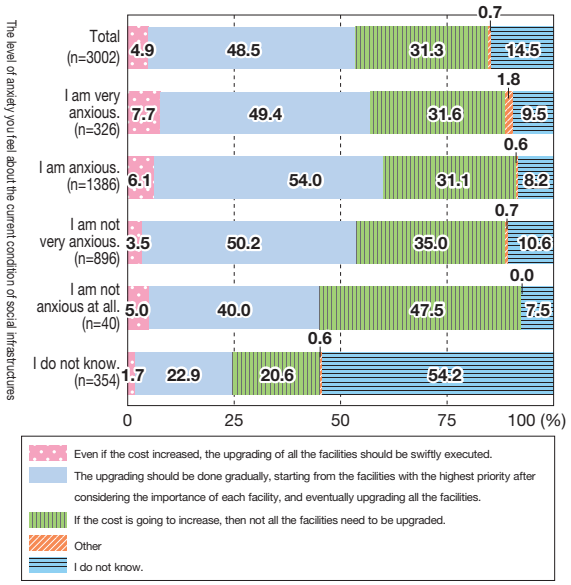
Figure 2-3-2 Attitudes Concerning Renewal of Infrastructure and the Associated Cost



Source) MLIT "Public Awareness Survey"

However, opinions regarding upgrades for social infrastructure is affected by how the current condition of social infrastructure is understood. If we look at the trends in results by how the person answered the question regarding their understanding of the current condition of social infrastructure, the more the concerned the person felt about the condition of social infrastructures, the more they thought it necessary to upgrade all social infrastructures, while those who were more optimistic about the condition of social infrastructures tended to not find it necessary to upgrade social infrastructures (Figure 2-3-3). From these results, we can see that, though more people think that it would be difficult to upgrade all social infrastructures, people who are very aware of problems that can result from aging social infrastructures understand the necessity for upgrading social infrastructures.

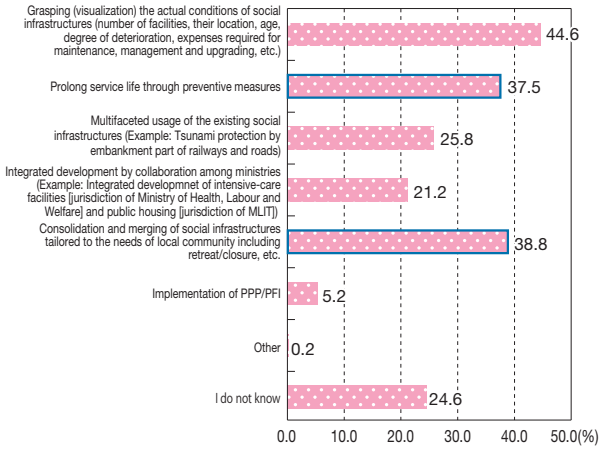
Figure 2-3-3 The Level of Anxiety Felt about the Current Condition of Social Infrastructures, and Inclination Towards the Upgrading of Social Infrastructures, Bearing in Mind the Future Strain



(Note) Cross tabulation of the answers to "At present, do you feel anxious about any of the social infrastructures that you use?" and to "In order to upgrade the deteriorated social infrastructures, it may be expected that the financial burden for the citizens would increase. Regarding this financial burden, please select the best answer that best approximates your opinion."
Source) MLIT "Public Awareness Survey"

This type of awareness is also reflected in the attitude toward policies and measures regarding the maintenance, management, and upgrading of social infrastructures. If we look at the responses for what people consider important in the maintenance, management, and upgrading of social infrastructures, most people chose 'Understanding the actual condition of social infrastructures,' followed by those who chose 'Consolidating and streamlining social infrastructures to fit the needs of the region, including withdrawal.' There were also many people who chose the answer, 'Extend service life through preventative measures' (Figure 2-3-4). For this reason, the ideal direction for future maintenance, management, and upgrading of social infrastructures would be to first get people to properly grasp the condition of the social infrastructure, then decide on the consolidation and streamlining of the social infrastructure according to the developments in socioeconomic circumstances, while at the same time moving forward with efforts for extending service life through preventative maintenance.

Figure 2-3-4 Initiatives Considered Important Regarding Maintenance, Management and Upgrading

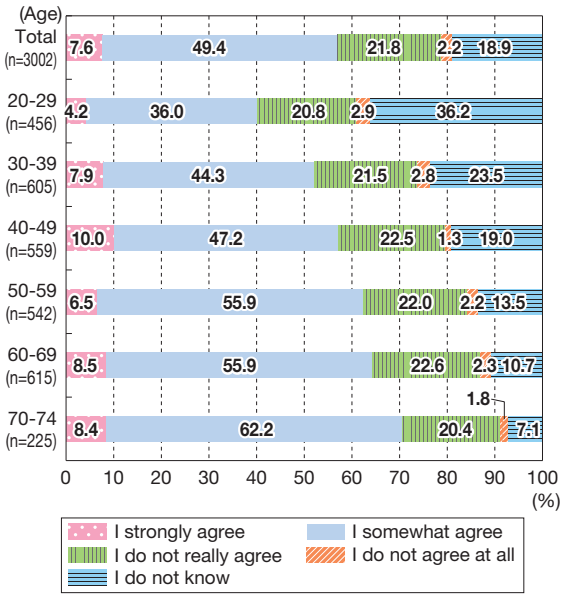


Source) MLIT "Public Awareness Survey"

(1) Awareness regarding Consolidating and Streamlining Social Infrastructures

Looking at the results of the 'Public Awareness Survey,' the majority of people surveyed agreed with the thinking that if maintenance, management, and upgrading is going to cause a major strain in the future, that we should move toward reducing and abolishing some social infrastructures in a planned manner, starting in the present. The percentage of people who were of this thinking tended to rise with the increase in the age of the surveyed person (Figure 2-3-5). In the decision-making for consolidating and streamlining social infrastructures in relevant regions, this kind of trend shows the possibility of making consensus formation easier to progress, considering the fact the opinions of the elderly will become more important than ever before, due to the population decline and increasingly aging population. On the other hand, the younger the age of the person surveyed, the more the percentage increased of those who chose 'I don't know' as the answer. This shows that, in regards to the younger generations, there is a need to promote efforts to facilitate a better understanding of the condition of social infrastructures.

Figure 2-3-5 Attitudes Towards Consolidation and Merging of Infrastructure With the Future Strain in Mind

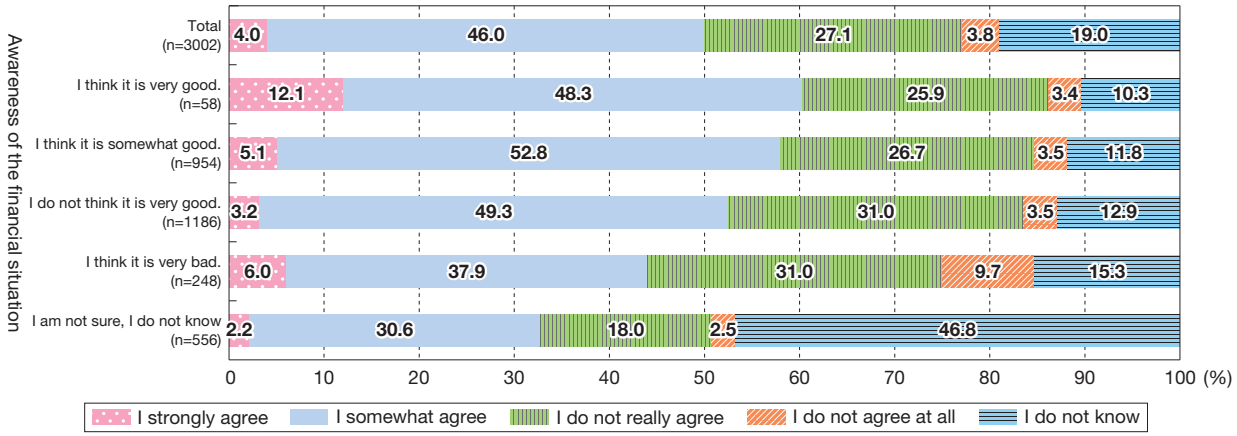


(Note) The number of those who agree with "if maintenance, management, and upgrading is going to cause a major strain in the future, we should move toward reducing and abolishing some social infrastructures in a planned manner, starting in the present" has been tabulated for each generation based on how strongly they felt about it.

Source) MLIT "Public Awareness Survey"

We also need to keep in mind that many people believe that if they are benefiting from the convenience of current social infrastructures in place, that we need to sustain those infrastructures as much as possible in the future. Looking at Figure 2-3-6, we can see that the more a person is concerned about the financial situation, the less they tend to answer that social infrastructures need to be kept. This shows that, though most people are of the opinion that they would like to pass on the convenience of current social infrastructures to future generations, there are many people who think that we cannot avoid having to forgo the upgrading of social infrastructures due to financial concerns.

Figure 2-3-6 Degree of Awareness of the Financial Situation and the Desire to Preserve as Much of Social Infrastructures

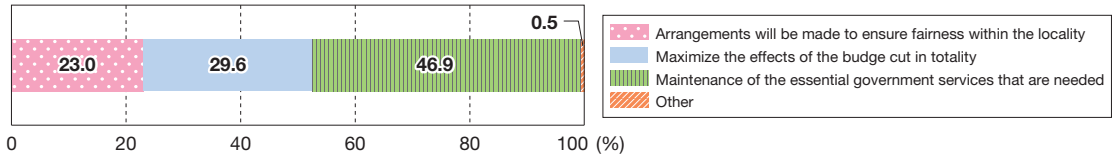


(Note) This inquired the degree of one's awareness of the financial situation of one's municipality and how strongly one agrees with the statement, "In order to pass on the convenience of current social infrastructures to future generations, the current service level of social infrastructures should be maintained as much as possible even if the burden for future generations may increase".
Source) MLIT "Public Awareness Survey"

Of course, even in cases where an infrastructure is necessarily reduced, we must move forward in a planned manner to make sure residents of the region at the very least benefit from necessary functions such as convenience in daily life, safety, and security; many people consider this a desirable direction in which to proceed (Figure 2-3-7). More specifically, not all social infrastructures are equally amenable to possible removal or reduction. Most notably, many people responded that it would be inappropriate to abolish or remove social infrastructures like disaster prevention and national land infrastructure that protect the lives of citizens (Figure 2-3-8). If we look at the results of a questionnaire survey conducted by Fuchu City, many people think that the 'Hakomono (secondary)' public facilities (ie. facilities for culture, education, and sports) are more suitable for implementing consolidation and streamlining, rather than civil engineering infrastructures (ie. roads, bridges, parks, sewage) (Figure 2-3-9). As evident, it will be very important—in terms of consolidating and streamlining social infrastructures—that we carefully consider how to implement changes in accordance with the purposes and category of the social infrastructures, so that, as much as possible, we avoid reducing the utility of the infrastructure for residents.

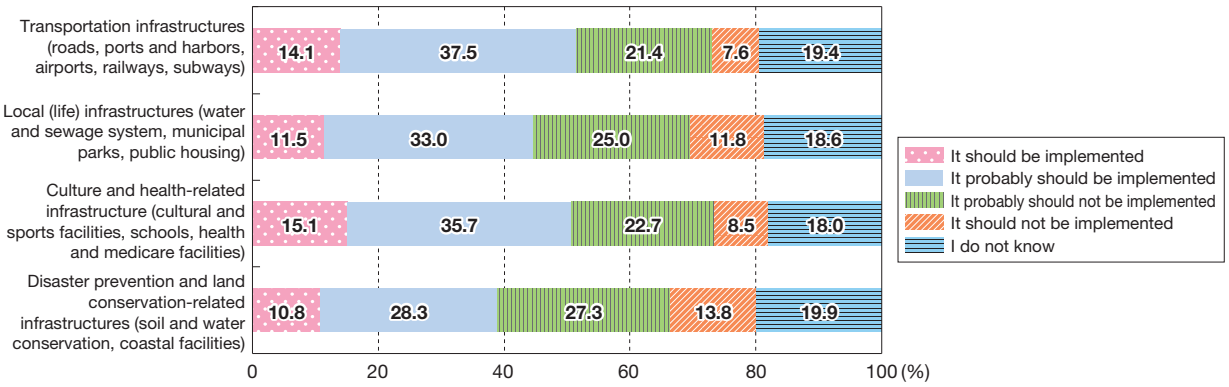
Figure 2-3-7 Things to Be Seriously Considered in Reassessing Public Facilities (As Consequence)

Due to declining population or downturn of the financial situation, if the local social infrastructures and other public facilities have to be reduced or reorganized, what would you consider to be the most important point? Please pick the best answer that approximates your thinking.



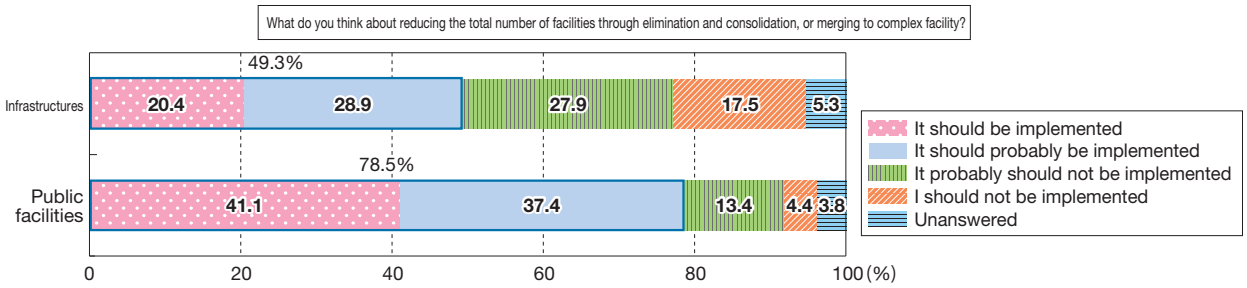
Source) MLIT "Public Awareness Survey"

Figure 2-3-8 In Case the Current Level of Maintenance, Management, and Upgrading of Social Infrastructures Becomes Difficult, the Degree to Which One Feels the Implementation of Abolishing, Reducing and Merging Ought to be Carried Out (Infrastructure-specific)



Source) MLIT "Public Awareness Survey"

Figure 2-3-9 Attitudes Concerning Reorganization and Reduction of Infrastructures and Public Facilities



(Note) Regarding infrastructures (roads, bridges, parks, sewerage, etc.) and public facilities, when the question (Q.15) was posed as to the policy in order to continue to provide safe public services that will be needed in the future. Of those answer results, the answers equivalent to "reduction of total amount of public facilities must be implemented" are extracted.
Source) Developed by MLIT from "Questionnaires to citizens on the public facilities in the city of Fuchu (implemented from September to November, 2013"

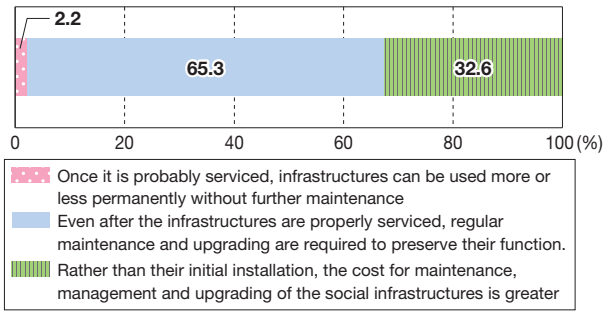
(2) Awareness regarding the Extending of Service Life

Amidst population decline, and as financial constraints becoming more obvious, in order to appropriately address the issue of aging social infrastructures we will need to work on reducing the total cost for maintenance, management, and upgrading by anticipating the future and initiating efforts in a well-planned manner. Especially as maintaining the existing infrastructures in a good condition is also important.

Up to this point, the mindset regarding the maintenance and management was centered around 'corrective maintenance,' a symptomatic way of repairing damage after it has progressed. We cannot expect to extend service life from this method of repair, as it would be enormously expensive if you include the cost of future upgrades. If we were to proactively implement the 'preventative maintenance' mindset instead, where repair work is done while the damage is still small, extending service life is made possible, and as a result, total future maintenance and management costs can be reduced.

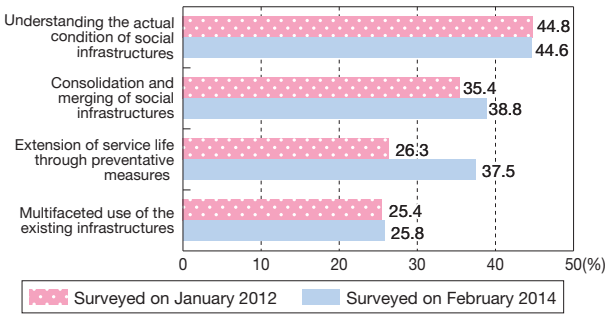
Due to the Sasago Tunnel accident and the subsequent development of aging countermeasures, the awareness that regular maintenance, management, and upgrades are necessary for social infrastructures is starting to spread (Figure 2-3-10). In regards to maintenance, management, and upgrading, the overwhelming majority are of the opinion that more countermeasures should be implemented to extend service life, rather than lowering service standards or collecting fees (Figure 2-2-24). Against the backdrop of these concerns, there is a growing percentage of people who cite extending of service life as the preferred policy option for maintenance, management, and upgrading (Figure 2-3-11).

Figure 2-3-10 Attitude Towards Maintenance, Management, and Upgrading of Social Infrastructures



Source) MLIT "Public Awareness Survey"

Figure 2-3-11 Going Forward, Things that Are Important in Maintenance, Management and Upgrading (Select Multiple Answers)



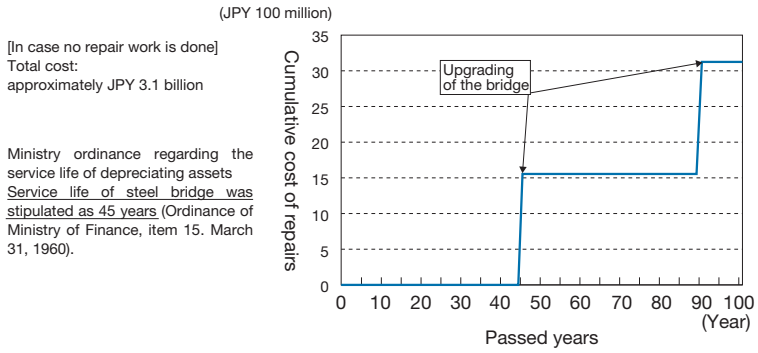
Source) MLIT "Public Awareness Survey"

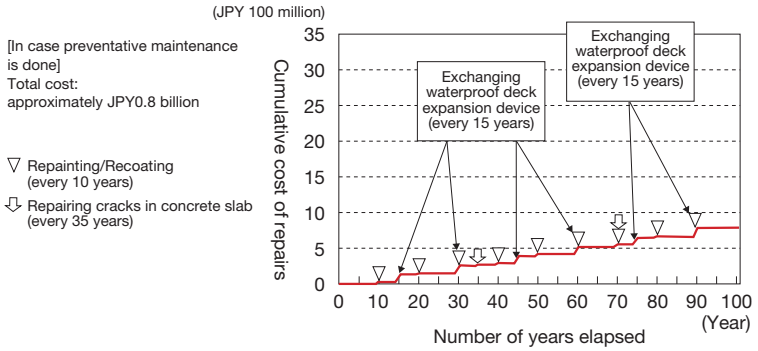
Some preliminary calculations have been done some examples of what the effect would be for switching from corrective maintenance to preventative maintenance.

For example, we compared the corrective maintenance and preventative maintenance illustrations of the cumulative repair costs for a continuous five-span bridge of 150m length[Note 64]. If the bridge is used for the length of the service life without doing any repairs then replaced, it would cost about JPY3.1 billion, while frequent replacement of pavement coating and getting cracks filled is estimated to cost about JPY800 million (Figure 2-3-12).

Figure 2-3-12 Image of Accumulated Repair Cost of Preventative Maintenance

○Image of repair and upgrading of a steel bridge (L=150m, 5 span girder bridge)





Source) MLIT "Study Group for the Maintenance and Management of the National Roads (National Management)

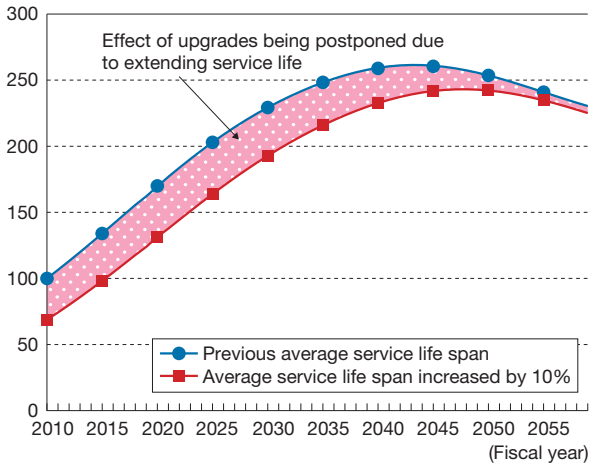
The impact of extending the service life of all social infrastructures is difficult to accurately grasp without an overall consideration of each facility's structural properties and surrounding environments, as well things like its status of utilization and technological progress. However, it is possible to use the data from the Cabinet Office's 'Social Capital of Japan 2012' to calculate the effects of extending service life at a macro level. The graph on Figure 2-3-13 shows retirement calculations for infrastructures of 15 sectors (roads, ports, aviation, public rental housing, sewage, waste disposal, water supply, city parks, educational facilities, flood control, forest conservation, coast, agriculture, forestry and fisheries, national forests, industrial water). The asset retirement calculation method that was used in 'Social Capital of Japan 2012' was used for calculating the rate of retirement for newly built infrastructures for each year, and for caluculating the current average numbers of service life years of each sector's infrastructures if they were to retire. When we caluculated in the amount of loss in stock, which occurs if the average number of service life years was uniformly increased by 10% through prolongation

Note 64 'Span' refers to the sections between the supporting points of a structure. The use here refers to a bridge structure comprised five deck slabs connected between piers and abutments in a row.

of service life, results still showed that if service life is extended, the infrastructure's loss is supressed. Results also showed that in comparison to 2009 levels, the amount of infrastructures that would need to be retired over a 50 year period—starting in 2010—is reduced by 12.4% as compared to if service life is not extended.

Of course, these estimates are based on abstractions of each facility's structural properties and status of utilization, and we need to give consideration to the maintenance and management cost incurred by the extending of service life. However, we can see that a reduction in mid- to long-term upgrades can be expected by extending service life through preventative maintenance work. As evident from these efforts, we need to work on reducing total costs and leveling budgets so that we can maintain the social infrastructures well for future generations, and ensure the provision of benefits.

Figure 2-3-13 Effect of Extending Service Life



(Note) The retirement cost which will occur in FY2010 is set at 100.
Source) Developed by MLIT from Cabinet Office "Social Capital of Japan 2012"

2 Planned Efforts with Future Strain in Mind

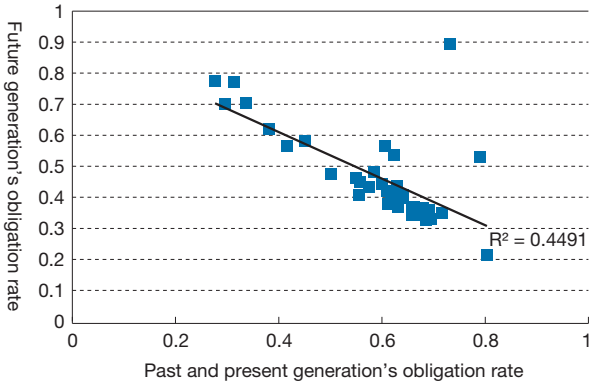
With the prospect of a decrease in the number of social infrastructure users—primarily of public facilities—due to progressive population decline and difficult financial situation, many local governments are working on planned efforts for the maintenance, management, and upgrading of existing social infrastructures, while keeping future forecasts in mind. Below, we will introduce and analyze the features of the most innovative examples of various efforts undertaken by local governments that are thinking about the future.

(1) Preparation and Publication of White Papers regarding Public Facilities, Reassessing Public Facilities

There has been, and continues to be, efforts made towards promoting the development of regional public accounting, and many local governments are working on preparing and publishing financial statements[Note 65]. The financial statements details information regarding assets and liabilities owned by the local government, such as public assets and municipal bonds, making it possible to use the data to calculate things like the proportions of inter-generational obligation for social capital formation (Figure 2-3-14). Publishing this kind of information not only reveals the financial situation of a local government, it also clarifies the condition of each social infrastructure in that local government. They are also working on efforts to show how the social infrastructures are being used, and their maintenance, management, and upgrading costs.

Figure 2-3-15 shows which local governments have prepared and published information about the condition of the public facilities and the future prospects regarding maintenance, management, and upgrading as white papers

Figure 2-3-14 Inter-generational Obligation Rate of Social Capital Formation for Each Prefecture

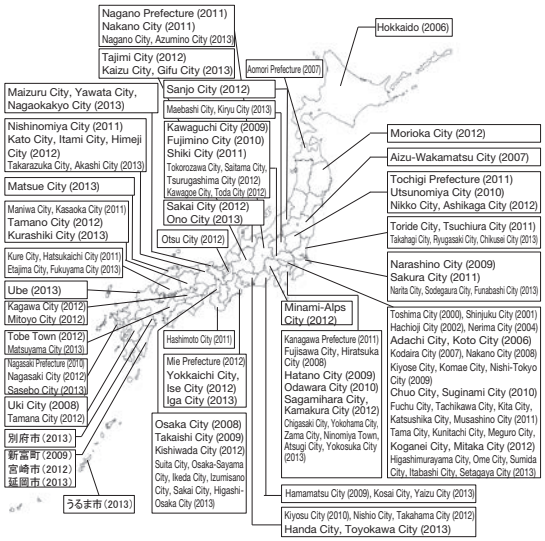


(Note) 1 Calculated based on published figures from FY2011 Financial Statements from each prefecture. Past and present generation's obligation rate = Net assets/Total public assets. Future generation's obligation rate = Total municipal bonds/Total public assets
2 For prefectures that published their financial statements in accordance with the MIC system revised model
Source) Developed by MLIT from each prefecture's Financial Statements

Note 65 According to the 'Report by Working Group for Creating Local Government Financial Statement Standards' (March 2014) by the MIC, 72% of all local governments (prefectures, municipalities, and special districts) have finished compiling the financial statements for the financial results of FY2011. Out of those who have finished, 89% are using the financial statements for things like comparing with other local governments.

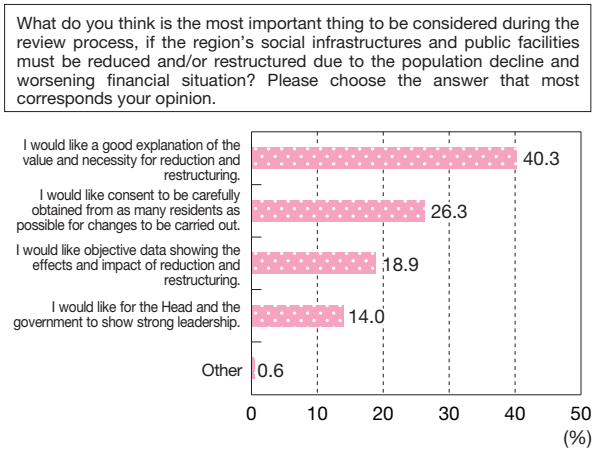
regarding public facilities. Eight prefectures and 128 municipalities have prepared and published white papers regarding public facilities (as of February 2014). Having an accurate perception of the current condition of public facilities, and having that information understood by local residents, is an indispensable part of working on reassessing the public facilities. Results from the 'Public Awareness Survey' also show that, when asked regarding working on reassessing public facilities, the answer "I would like a good explanation of the value and necessity for reduction and restructuring," was chosen the most, followed by, "I would like objective data showing the effects and impact of reduction and restructuring" (Figure 2-3-16).

Figure 2-3-15 Local Governments that have Prepared/ Published a Public Facilities White Paper



Source) Developed by MLIT from NPO Japan PFI/PPP Association documents

Figure 2-3-16 Items to Prioritize upon Review of Public Facilities (regarding the process)

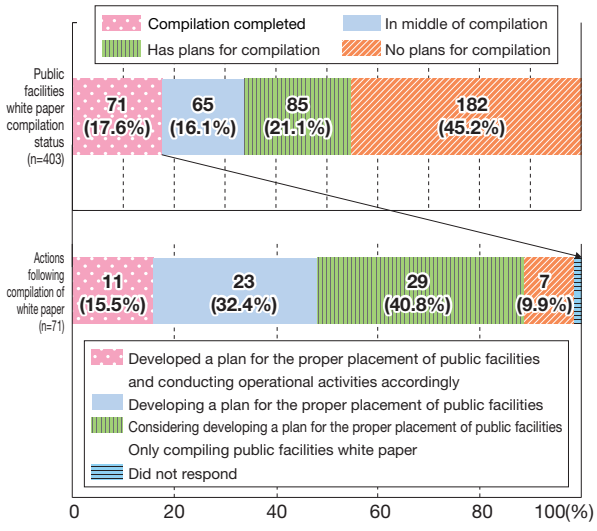


Source) MLIT "Public Awareness Survey"

However, this is difficult to putt it into practice for actual implementation of specific initiatives. According the the questionnaire survey conducted by Japan PFI/PPP Association, out of all the local governments that prepared white papers regarding their public facilities, only 15.5% have actually been able to develop a plan for the proper placement of public facilities and conduct operational activities accordingly. Even in conjunction with other local governments that are still in the process of developing a plan, the percentage is still less than 50% (Figure 2-3-17). Figure 2-3-7 shows that when reassessing the public facilities, 29.6% of people surveyed would stress the importance of 'Maximizing the total financial savings,' while a bigger percentage would stress 'Minimum levels of necessary administrative services being maintained' (46.9%), and there are also many who would stress 'Consideration being given to equality within the region.' For this reason, in order to put the reassessment of public facilities into action, we will need to give consideration to the standards of the service allowed and inter-regional balance, while gaining the consensus of the residents.

Therefore, we will look at the examples of local governments that have prepared and published their white

Figure 2-3-17 Public Facilities White Paper Compilation Status and the Actions Following



(Note) This survey was conducted on local governments nation-wide (664 member public entities, 1,018 non-member public entities) in January 2014 by NPO Japan PFI/PPP Association.
Source) Developed by MLIT from NPO Japan PFI/PPP Assowciation "3rd Challenges Related to Public Facilities Upgrading Survey"

paper regarding public facilities, and are putting things in action.

(Example of Setting a Reduction Target for a Public Facility and Working on Promoting Understanding of Residents)

One of the local governments that are proactively working on a public facility's problem with upgrading is Hadano City, Kanagawa.

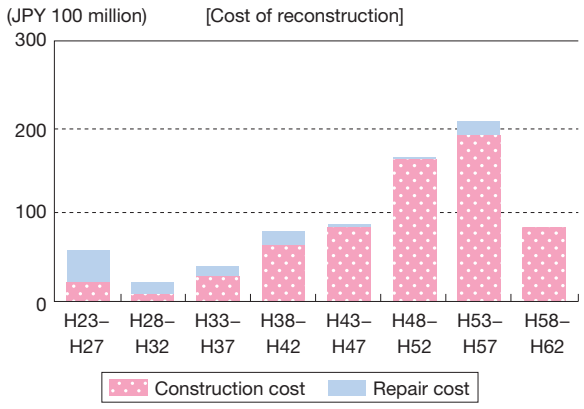
Hadano City (population 169,326 as of January 2014) is located in the western part of mid-Kanagawa, and as the commuter town of the metropolitan area, there was a rapid population growth during the period of high economic growth. The many public facilities that were developed during this time will all age at the same time in the near future.

According to the calculations of Hadano City, the cost of things like upgrading of buildings would amount to a total of JPY7.58 billion by the year 2050, even if they were to shrink the size of schools to match the decline in the number of children. If they try to issue bonds to make up for any deficiency, the municipal bond balance would double from the current amount, bringing the city close to financial collapse.

In order to deal with these upgrading problems for public facilities, in April 2008 Hadano City created the 'Public Facilities Relocation Planner,' an organization dedicated to relocating public facilities, to conduct drastic review on the roles of public facilities across all departments.

Once the dedicated organization was set up, the first thing they did was to compile a 'Public Facilities White Pater.' The aim of this white paper was to share information with the residents, and cultivate a common awareness in the administrative offices. The paper not only included the research, analysis results, and evaluation of the current condition of the city's public facilities—divided into three perspectives of 'Stock,' 'Cost,' and 'Service'—it also clarified the challenges facing the management and operation of these facilities. The paper was prepared internally, by the city officials themselves, rather than being outsourced.

Figure 2-3-18 Transition in Hadano City's Building Repair and Upgrading Costs over the Next 40 Years



Source) Hadano City "Public Facilities White Paper—FY2012 Revised Version—"

After the Public Facilities White Paper was published in October 2009, the city established the "Policy regarding Relocation of Public Facilities"(plans for 2011 - 2050) in October 2010. Based on this policy, in March 2011 they created the "1st Basic Plan for Public Facilities Relocation Project" (plans for 2011 – 2020), and the "Previous Fiscal Year Implementation Plan" (plans for 2011 – 2015), and have been moving forward with the plans since FY2011.

The Previous Fiscal Year Implementation Plan hopes to appeal to the citizens that the initiatives to relocate the public facilities will not result in the categorical decrease of service standards, but rather allow for higher levels of service to be provided with a smaller tax load. The initiatives are divided into four symbol businesses (Figure 2-3-19).

Figure 2-3-19 Symbol projects overview

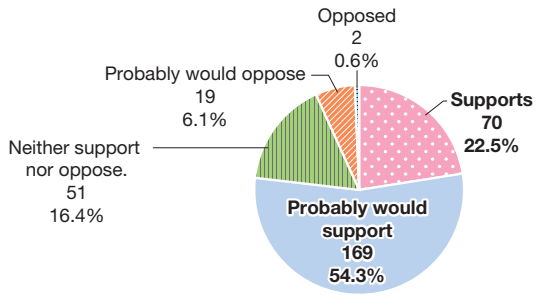
Symbol project 1	Symbol project 2	Symbol project 3	Symbol project 4
Composite compound of compulsory education facilities and local facilities	Use of public institutions' network	Release and transfer small-scale local facilities	Service enhancement through citizens' cooperation
Combining the middle school gymnasium and neighboring community center into a composite compound with the help and wisdom of the citizens, to promote the efficient use of floor space, while expanding service	Move the post office into the child care and welfare center, and outsource certificate issuing work	Transfer small-scale local facilities like children's houses and rest homes for the elderly to the region, while asking that their hall is opened to things like club activities, so that the functions of public facilities can be supplemented in a more familiar place	Privatize facilities for the mentally disabled and some kindergartens, to expand services with minimum investment

Source) Developed by MLIT from Hadano City documents

Hadano City plans to create further plans and put those to action, depending on the results of the Previous Fiscal Year Implementation Plan. Their goal is to reduce the amount of secondary public facilities by 31.3% by the year 2050.

Implementing such bold initiatives cannot be done without the consensus of the residents. According to the survey conducted by Hadano City in December 2012, the percentage of people who support the 'Relocation of Public Facilities' is 76.8% (Figure 2-3-20). Behind such understanding from the local residents were the active PR efforts, starting with the publication of the Public Facilities White Paper. Showing the necessity of the initiatives through actual numbers also had a big influence on cultivating the consent of the residents.

Figure 2-3-20 Ratio of People in Support of Hadano City's Initiatives



(Note) Results from a survey conducted by Hadano City in December 2012
Source) Hadano City "Public Facilities White Paper—FY2012 Revised Version—"

(Example of Management Efforts that Include Social Infrastructures like Roads and Sewage)

As mentioned earlier, there is an increasing number of local governments compiling white papers regarding public facilities. The majority of these address buildings (secondary public facilities), so there are still very few examples of management efforts that include infrastructures like roads and sewage.

However, in October 2012, Fuchu City created a 'Fuchu City Infrastructure Management White Paper,' which addressed social infrastructures like 'roads, bridges, parks, and sewage.' Fuchu City had already previously created a 'Fuchu City Public Facilities Management White Paper' in March 2011, which addressed the secondary public facilities. The preface for creating the Infrastructure Management White Paper was that, while creating the Public Facilities Management White Paper, they decided that instead of focusing solely on the secondary public facilities, that it would be better to establish a policy to initiate an integral property management which would include social infrastructures.

The Infrastructure Management White Paper contained a forecast of future expenses for the next 40 years, which showed what the 'maintenance and management cost' and 'repair and upgrading cost' would be if they continued managing the facilities with the same management methods as before, with the current number and management standards of public facilities for future continuation. The results of these forecasts calculated that the future cost, including sewage, would be an annual total of JPY8.07 billion (the current annual budget amount is JPY5.464 billion); not including sewage the future cost would be JPY2.454 billion (current budget amount is JPY1.878 billion). Showing that current budget amounts would result in a deficiency later (Figure 2-3-21).

Figure 2-3-21 Estimation of Future Overall Cost of Infrastructures

Facility items	Expected cost over 40 years (30 years for sewage)	Annual cost when averaged over 40 years (30 years for sewage)	Current implementation cost (FY 2010)
Overall	(Sewage not included (40 years)) JPY98.206 billion (Sewage (30 years)) JPY168.463 billion	(Sewage not included) JPY2.454 billion/year (Including sewage) JPY8.070 billion/year	(Sewage not included) JPY1.878 billion/year (Including sewage) JPY5.464 billion
Roadways	JPY46.716 billion	JPY1.167 billion/year	JPY0.857 billion/year (approximately 73% of expected cost)
Pedestrian walkways Tree planting			
Bridges			
Roadside trees	JPY8.802 billion	JPY0.220 billion /year	JPY0.134 billion (approximately 61% of expected cost)
Information signs	JPY0.080 billion	JPY0.002 billion/year	JPY0.002 billion (approximately 100% of expected cost)
Street lights	JPY6.080 billion	JPY0.152 billion/year	JPY0.152 billion (approximately 100% of expected cost)
Parks	JPY36.528 billion	JPY0.913 billion/year	JPY0.733 billion/year (approximately 80% of expected cost)
Sewage (30 years)	JPY168.463 billion	JPY5.616 billion/year	JPY3.586 billion/year (approximately 64% of expected cost)

*For sewage projects, we are creating a 'Sewage Master Plan' which covers 30 years up to year 2040.
*For sewage projects, the development of pipes and drains and the renovation of old pipes due to construction and expansion of new roads are allocated to "construction cost," and routine cleaning and partial repairs are allocated to "maintenance and management cost".

Source) Fuchu City Infrastructure Management White Paper

Based on the white paper, in January 2013 the 'Fuchu City Infrastructure Management Plan' was created, which included the long-term infrastructure management policy. The plan was divided into 'Overall Infrastructure Operations,'

'Cost of Maintenance and Management,' and 'Cost of Repairs and Upgrades,' and outlines the cost reduction and revenue securing measures to counter the deficiency calculated for future costs in the white paper. One of the specified action plans is the comprehensive private sector consignment of the road maintenance and management business, which we discussed in Chapter 2, Section 2.

In addition, as part of showing the results of the plan, for those 'maintenance and management' and 'repairs and upgrades' costs that can be calculated, they have published the estimated total cost savings. If all the measures in the plan are implemented, an annual saving of JPY300 million and a 12% reduction is forecast compared to the expense forecast (not including sewage) in the white paper. However, despite this cost saving effect, there is still a deficiency calculated for the budget amount. Therefore, in addition to the estimated measures, they are promoting further initiatives for issues that cannot be reflected in the plan's estimate calculations (Figure 2-3-22).

Figure 2-3-22 Effect of Cost Reduction from Infrastructure Management Plan

Types of infrastructure		Estimated cost of 'Plan' (JPY billion/year)	(1) Estimated cost of status quo (JPY billion/year)	(2) Cost difference between status quo and 'Plan' (JPY 100 million/year)	Percentage of difference (2)/(1)	Executive amount of FY2010 (JPY100 million/year)
Roads	Roadways, pedestrian walkways, tree planting, bridges	8.92	11.67	-2.75	-23.58%	8.57
	Roadside trees	2.24	2.20	0.04	1.62%	1.34
	Information signs	0.04	0.02	0.02	75.88%	0.02
	Street lights	2.10	1.52	0.58	38.43%	1.52
	Road subtotal	13.29	15.41	-2.12	-13.74%	11.45
Parks		8.25	9.13	-0.88	-9.67%	7.33
Sewage		56.16	—	—	—	35.86
Total (JPY100 million/year)	Not including sewage (1 year)	21.54	24.54	-3.00	-12.23%	18.78
	Including sewage (1 year)	77.70	—	—	—	54.64

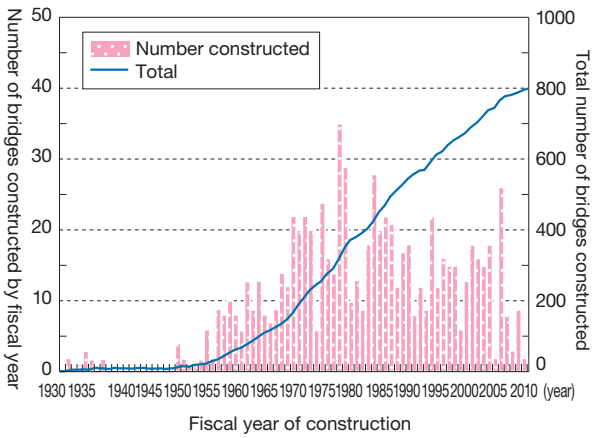
Source) Fuchu City Infrastructure Management Plan

(2) Initiative to Reduce Lifecycle Cost

Aomori prefecture has implemented a special dedicated system for efficient management of their bridges. They are doing a simulation repair plan that would extend the lifecycle of bridges to their maximum, and to get a uniform grasp of the state of all the bridges.

In Aomori, the many bridges that had been built after 1970 is approaching the time when upgrades are necessary (Figure 2-3-23). In addition, they were in a difficult financial situation, with the 'Fiscal Reform Plan' which had been established in 2003 pressing for further budget cuts. Within such circumstances, in order to maintain and manage bridges in a well-planned, cost efficient way, they set up a bridges asset management team in 2004 as an effort to have a long-term plan to efficiently and effectively manage the bridges and minimize and level the repair and upgrading costs.

Figure 2-3-23 Distribution of Year of Bridge Construction (Bridge Length 15m or more)



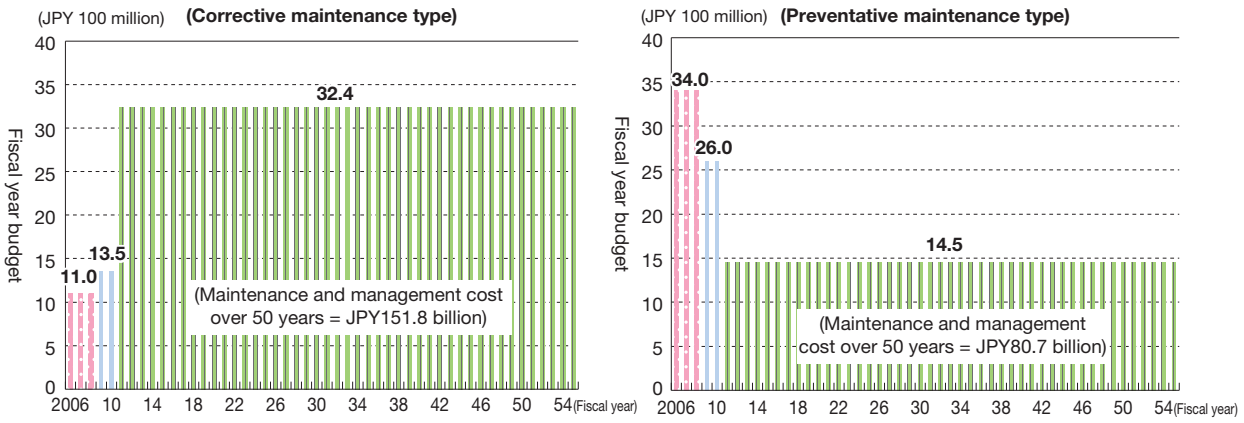
Source) Aomori Prefecture "Aomori Prefecture Bridge Service Life Extension Repair Plan"

To incorporate the principle of preventative maintenance, the soundness of the bridge must be recovered at the start of operations, and this incurs initial cost. They conducted a budget simulation for system operations by using the newly developed bridge management system (BMS)[Note 66]. Though the repair cost at the start of operations was estimated to cost approximately three times more than the previous

Note 66 A system to consistently support all operational tasks related to the maintenance and management of bridges, including inspection, deterioration prediction, LCC calculation, maintenance scenario selection, budget simulation, budget planning for extending service life, repair planfor extending service life, project progress management for extending service life, and ex-post evaluation.

year, by investing heavily in the first five years, then continuing maintenance and management by the preventative maintenance method, the total cost would be reduced by JPY1.1 billion, compared to the previous maintenance and management method of corrective maintenance. By doing this type of budget simulation, they were able to gain understanding and to secure the budget for bridge asset management, despite the difficult financial situation (Figure 2-3-24).

Figure 2-3-24 Results of Budget Simulation using BMS



Source) Developed by MLIT from Aomori Prefecture website

In the 'Aomori Bridge Service Life Extension Improvement Plan' of 2008, the preventative maintenance method maintenance and management cost from 2008 to the next 50 years was estimated as JPY74.5 billion. When the plan was reviewed in May 2012, the preventative maintenance method maintenance and management cost from 2012 to the next 50 years was estimated as JPY66.9 billion, with the expected effect of the decrease in maintenance and management cost from using BMS.

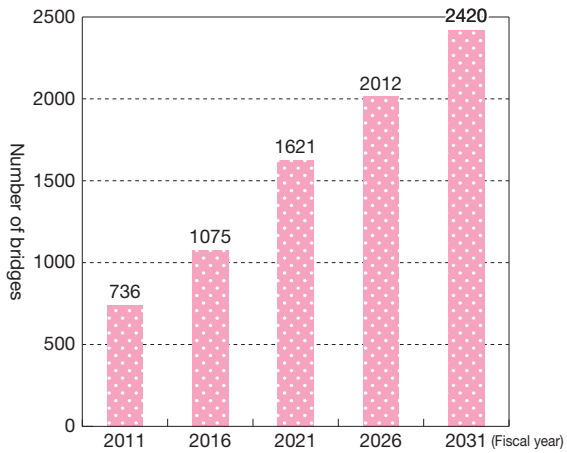
In fact, aside from the cost reduction from using BMS, Aomori's bridge asset management system has 1. Developed various manuals for things like maintenance and management inspections, repairs, and reinforcement and 2. Developed human resources by training administrative officers and construction-related operators with their three-pillared total management system: 'Things (IT system),' 'Mechanisms (Manual)' and 'People (Human Resourse Development).'

(3) Prioritization in Maintenance, Management, and Upgrading

It is important to consider the reduction of lifecycle cost by moving forward with preventative maintenance measures, but despite such efforts, there may be cases where, due to the difficult financial situation, we need to sift through the various social infrastructures to decide which ones need it the most. In such instances, to decide which social infrastructures need to be prioritized, we may need to look at the said social infrastructures and consider their usage situation and necessity to make decisions in view of the circumstances.

In Gifu, to be able to continue providing a road that is safe and secure for the road users, they have incorporated the 'preventative maintenance' principle in repairing damaged areas while they are still small, and implementing appropriate maintenance and management of facilities.

Figure 2-3-25 Number of Bridges Constructed over 50 Years Ago



Source) Gifu Prefecture "Social Capital Maintenance Plan Action Guidelines"

However, many such road facilities are those that were built after the high-growth period, and as these facilities start to age in the near future, there is a concern that there will be a sharp increase in the number of aging facilities. Furthermore, there is also the issue of a decreasing road budge, and it has been predicted that it may become difficult to

maintain and manage all these facilities. There are some concerns that the existing preventative maintenance principle alone may result in some damages occurring, even on important road facilities.

As a result, in September 2012, the 'Social Capital Maintenance Plan' was developed to understand the effect of damaged facilities on the road users, and prevent the occurrence of major damages.

This plan, in addition to the previous preventative maintenance method for maintenance and management, is distinctive in that it will consider the road sections and degree of social impact of these facilities have to proceed with repair work as efficiently as possible. The three facilities this plan addresses are 'pavements,' 'bridges,' and 'hazardous slopes (inclines with the danger of falling rocks). To allow roads under prefectural management to continue to be used (ensure availability), we first clarify which roads have the biggest social impact, then do an evaluation with consideration for how road users will be affected, and then establish the facility management method and the order in which repairs are done (Figure 2-3-26).

To find the probability of problems occurring for these three types of facilities, the differences in structural features is considered, then the deterioration condition is assessed from the facility's inspection results. This is then combined with the degree of social impact to calculate the risk for the entire facility. After that, we find the total risk for the facility within a specific section of the road, and begin the repair work on the facility in the section with the biggest risk total (Figure 2-3-27).

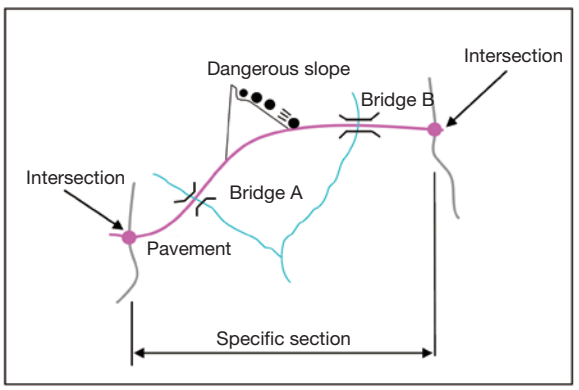
For the calculations for the section's risk, the roads managed by the prefecture are divided into general routes and important routes that need to have concentrated management according to policy. Paving on unfinished sections and bridges that are under 15m long on general routes are not considered in the section risk calculations[Note 67] due to the fact the social impact and the restoration cost are small when compared to important routes (Figure 2-3-28).

Figure 2-3-26 Problems by Facility Type and Degree of Social Impact Content

Road facilities	Problem regarded as risk	Degree of social impact type	Specific content
Pavement	Occurrence of potholes	① Road accidents	① Loss of human life and material goods caused by road accidents
		② Emergency services access time	② Loss of human life caused by longer transportation time for getting critical patients to a medical facility
Bridges	Damage to partial sections	③ Tourism and industrial activities	③ Loss of time caused by delays in transporting people and goods for tourism and industry related activities
		④ Isolated settlements	④ Causes isolation of settlements, leading to challenges in movement of people and distribution of goods, resulting in anxiety that daily life for residents will become challenging or unsustainable
Dangerous slope	Occurrence of falling rocks	⑤ Traffic regulation section	⑤ Loss of time and material goods caused by traffic regulation during mulitple rainfalls
		⑥ Information provision	⑥ Loss of time for road users caused by information provision
		⑦ Post-occurence countermeasure works	⑦ Construction cost caused by need for post-occurrence countermeasure works
		⑧ Traffic congestion/detour caused by post-occurence countermeasure works	⑧ Traffic congestion/detours caused by need for post-occurrence countermeasure works
		⑨ Negative effect on roadside environment from vibrations	⑨ Loss caused by decrease in land value due to negative effect on roadside environment from vibration caused by road surface deterioration

Source) Gifu Prefecture "Social Capital Maintenance Plan Action Guidelines"

Figure 2-3-27 Specific Sections of the Road and Image of Facilities



Source) Gifu Prefecture "Social Capital Maintenance Plan Action Guidelines"

Figure 2-3-28 Management Guidelines Chart

Section	Work type	Facility type		Assessment based on risk calculations of section
Important routes 1,674km	Pavement repair	Completed improvements section	1,472km	○
		Unfinished improvements section	202km	○
	Bridge repair	Bridge length 15m and over	817 bridges	○
		Bridges under 15m	1,066 bridges	○
	Dangerous slope		458 areas 32 remaining areas	○
General routes 2,542km	Pavement repair	Completed improvements section	1,380km	○
		Unfinished improvements section	1,162km	×
	Bridge repair	Bridge length 15m and over	799 bridges	○
		Bridges under 15m	1,637 bridges	×
	Dangerous slopes		1,139 areas 485 remaining areas	○

Source) Gifu Prefecture "Social Capital Maintenance Plan Action Guidelines"

Note 67 Though these facilities are not considered in section risk calculations, they are maintained and managed appropriately.

However, since the risk calculations are done using predicted deterioration, there may be some discrepancies between the repair plans based on risk assessments and the actual situation. Because of this, when using the results of risk assessments, a road management official must go to the site of the place to be repaired to check the actual condition of that section. The section to be repaired is selected once the necessity of repair has been given a final decision.

Though there is a need to improve the accuracy of the social impact assessment method, the process of incorporating social impact and prioritizing repair work in the order of sections of highest risk will be an effective practice for local governments with limited budgets.

From the examples above, we must first regularly clarify the actual situation of the region's social infrastructures, the usage situation, and the cost of maintenance, management, and upgrading to deepen the residents' understanding. It is important to figure out what measures need to be initiated based on their understanding. Additionally, when actually going forward with the maintenance, management, and upgrading of social infrastructures, we must think in the long-term to find ways of minimizing costs—while clarifying the rules used so that residents can also understand regarding maintenance, management, and upgrading—and promote the selection of and concentration on such efforts.

3 Using New Technology and Training Leaders for Maintenance, Management, and Upgrading

(1) Using New Technology to Make Maintenance, Management, and Upgrading More Efficient

Amidst the difficult financial situation and lack of engineers, in order to adequately deal with the future aging of social infrastructures, we need to develop and use new technology that makes it possible to maintain and manage infrastructure efficiently. Therefore, below we will introduce initiatives that are developing and using new technology—within the inspection and diagnostic technology and monitoring technology sectors—to make maintenance and management more effective and efficient.

(Advanced Inspection and Diagnostic Technology)

As a countermeasure for the declining labor force and with the aim to improve productivity, the use of robots is spreading in various aspects of industry and daily life, giving rise to an expectation of a rapid growth in the robotics industry. The use of robots is expected for infrastructure inspections and diagnostics as well. For example, the East Nippon Expressway Company is considering the utilization of the UAV (Unmanned Air Vehicle) system for things like bridge inspections.

For example—with the current methods of inspection—lane restriction must be provided for bridge inspection vehicles in order to conduct a close proximity visual inspection in high altitude places without inspection paths (Figure 2-3-29). Things like the concrete surfaces and attachments of tall piers, steep slopes that are difficult to walk on, and inspecting the river sections of bridges, are all very difficult. Using a UAV would be the substitute for those operations, and based on the images taken, we would be able to narrow down the sections that need a hammering test. This is expected to make inspections much more efficient, while allowing inspection engineers to focus on places that require a more advanced gauge.

Figure 2-3-29 Bridge Inspection Vehicle being used for Inspections

Source) East Nippon Expressway Company

The UAV system being used for consideration is the one developed by the Canadian company, Aeryon Labs Inc, and can be operated by merely entering the flight route, altitude, and photographing points into a specialized operator tablet. Once the machine takes off, it will fly itself to the destination, and take video and still images required automatically.

In addition, since it is able to save flight routes once it has been inputted, it can fly the same route it had flown previously, even if a different operator is steering. For inspection operations, being able to secure reproducibility that is not affected by a dependency is a major advantage. Furthermore, the fact that no specialized skills are required for conducting flights as the operations are simple, is also a feature of the UAV system (Figure 2-3-30).

In FY2013, in Shibukawa City, Gunma, they are considering the use of an existing cameras, with the aim to check things like the exploration range and access distance to the bottom surface of plate decks and the underside of beams on the Kanetsu Expressway and Tonegawa River. They plan to continue with their deliberations with the goal to start earlier than expected on actual operations.

At the moment, their main concern is utilization for the inspection of bridges, but as they are hoping in the future to be able to use the cameras for other things like during heavy traffic times and for disaster investigations, they are planning to take the trials further.

In another sector, in recent years, another technology that is being developed and used as an advanced inspection technology for infrastructure, is the non-destructive inspection technology. Previously, in order to find out the deterioration condition of the internal structure, we had to damage parts of the structure every time we had to do an inspection. For example, we had to use a drill to collect samples of concrete structures, or to investigate for fractures in reinforcement bars that were underneath the concrete surface, we would need to chip parts away[Note 68] to expose the reinforcement bar for inspection. In addition, there were difficulties in actual inspection operations, like having to restrict traffic for inspections, or having places that were difficult for people to reach for inspections. Non-destructive inspection technology refers to the use of infrared, lasers, or electromagnetic waves to do inspections and diagnostics of a structure's surface or internal condition. By using this kind of technology, we can expect to improve the efficiency and quality of inspections and diagnostics.

Figure 2-3-30 UAV System Equipment Configuration

Source) East Nippon Expressway Company

Figure 2-3-31 UAV System being used for Bridge Inspections

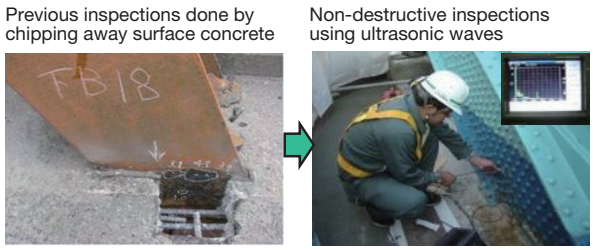
Source) East Nippon Expressway Company

Figure 2-3-32 Images Captured by the UAV System

Source) East Nippon Expressway Company

Note 68 Refers to removing the surface concrete to conduct inspections.

Figure 2-3-33 Example of Inspections and Diagnostics for Parts Embedded in Concrete



Source) MLIT

Figure 2-3-34 Location of Hanedani Bridge and the Inspection Vehicle

Source) MLIT Gifu National Highway Office

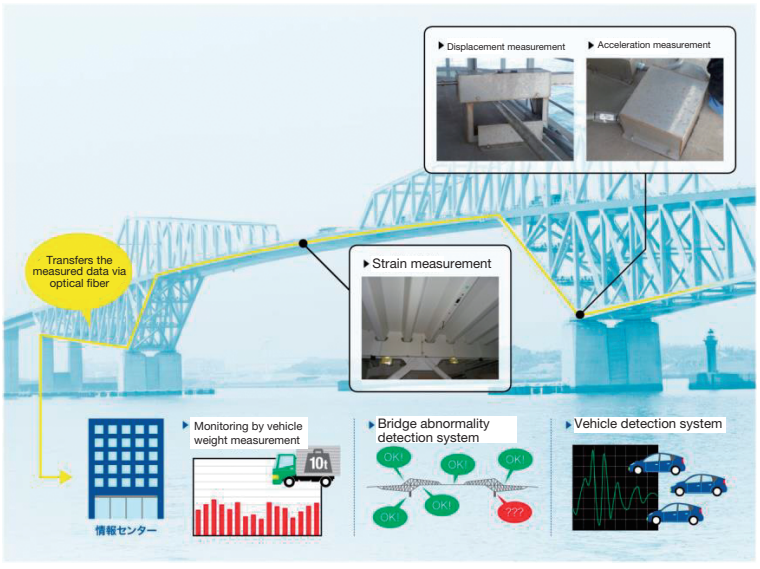
As a verification example of the non-destructive inspection, in June 2013, the Ministry of Land, Infrastructure and Transport Gifu National Highway Office, in cooperation with the Gifu University social capital asset management technology research center, conducted a non-destructive inspection by examining the damaged sections of a bridge. The vehicle loaded with research equipment travelled at about 50km per hour on the national highway No.258, the 'Hanedani Bridge' to collect deck damage data. Not only can this inspection be done without causing any restrictions to traffic, because it can pick up on small amounts of damage early on, we are able to discover damaged sections before it becomes a serious issue. Also, because it clarifies what sections need repair before the start of construction, it allows for the construction to go smoothly, shortening the traffic restriction time that results from construction work.

As you can see, with its potential to improve both the quality and efficiency of inspections, the use of non-destructive inspection technology is expected to become more widespread in the near future.

(Monitoring Technology)

Monitoring technology—which makes it possible to have a constant observational capability for detecting any abnormality or displacement in an infrastructure before it is noticed by an engineer during inspections—is also being developed and becoming widespread.

Figure 2-3-35 Bridge Monitoring System



Source) "METI Journal, June and July Edition", 2013, Ministry of Economy, Trade and Industry

On the Tokyo Gate Bridge, which opened for operation in the Tokyo Bay in February 2012, a 'Bridge Monitoring System' was brought in with the goal to save labor on maintenance and management, reduce lifecycle cost, and analyze deterioration mechanisms. The Tokyo Gate Bridge has many sensors that detect things like the expansion and contraction displacement of the bridge swinging left and right, any strain to the center, and displacement of the seismic isolation system. The data measured by the sensors is sent through the system to appear on a computer screen in the monitoring room, in pretty much real time. And any time there is an abnormality, it is reported by sounding an alarm.

The bridge monitoring system not only gives real time information regarding the condition of the structure, it can be used to analyze deterioration mechanisms as it accumulates data, including all data since the bridge opened for operations. For example, fatigue degredation from heavy cargo is a serious issue for bridges, but on the Tokyo Gate Bridge, because of the sensors installed in the floor framing, we can measure and analyze vehicle weight. With this mechanism, we can

detect deterioration early on, and undertake preventative maintenance. We also hope to gain clarification on the mechanism of deterioration for the overall lifecycle of the bridge through future data accumulation.

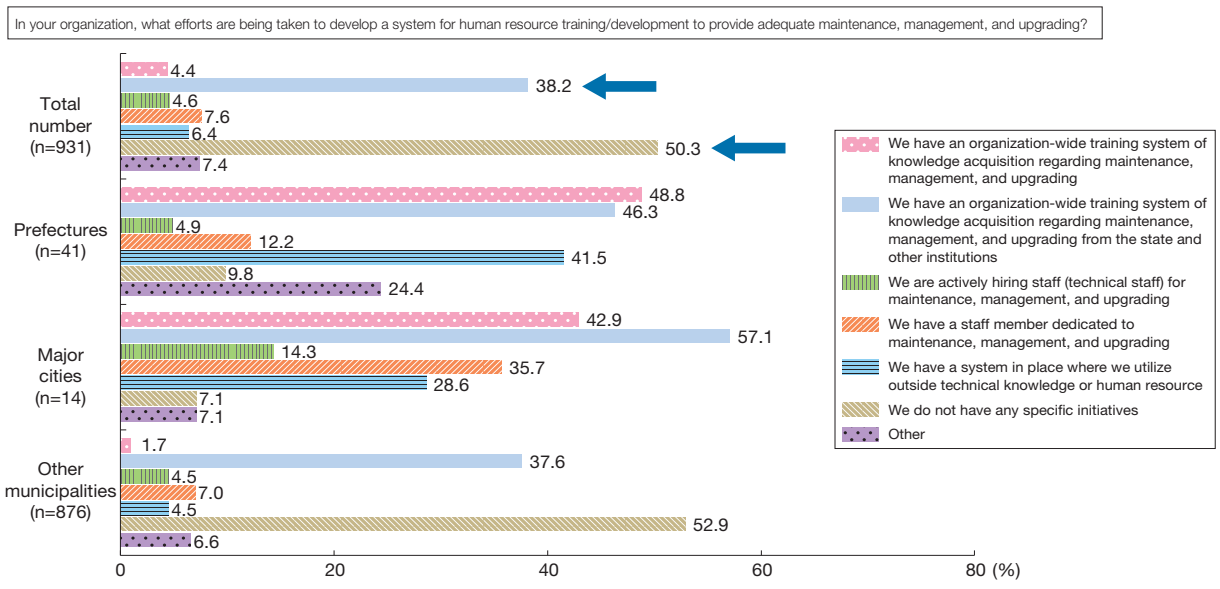
As evident from above, by using new technology that seems to progress daily in the infrastructure sector, we can work towards the efficiency and advancement of maintenance and management.

(2) Securing and Developing Leaders for Maintenance, Management, and Upgrading

(Securing and Developing Leaders in the Local Governments)

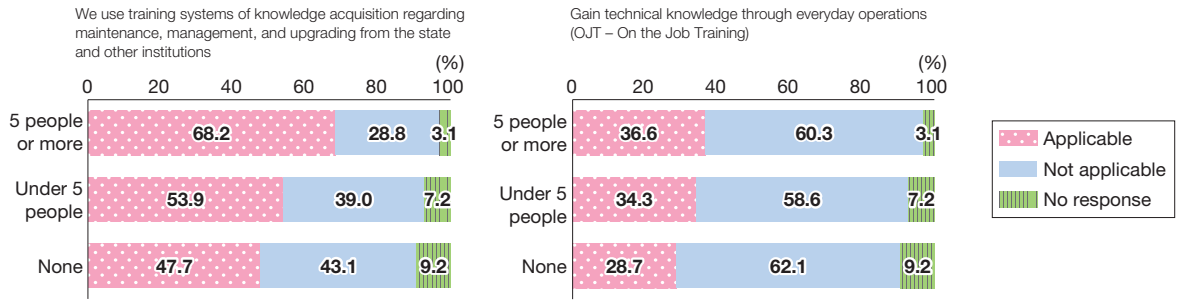
According to the survey MLIT conducted of local governments, regarding efforts for setting up a system for training and developing human resources for maintenance, management, and upgrading, a relatively large ratio of about a fourth of those surveyed responded that, "We have an organization-wide training system of knowledge acquisition regarding maintenance, management, and upgrading from the state and other institutions," while the majority responded, "We do not have any specific initiatives" (Figure 2-3-36). The ratio of local governments that responded, "We do not have any specific initiatives" were higher in the other municipalities category, which may be due to the fact that the smaller the scale of the local government, the fewer engineer staff they have to be in charge of maintenance, management, and upgrading, making it difficult to develop human resources. For example, if we look at the state of human resource development efforts by the number of engineer staff in the roads sector, for both responses choices "Use training system" and "Gain technical knowledge through everyday operations" the fewer the (or lack of) staff members, the lower the implementation rates (Figure 2-3-37).

Figure 2-3-36 Human Resource Training/Development System by Local Governments



Source) Panel on Infrastructure Development and Transportation Policy Council "Report on the Nature of Maintenance, Management and Updating of Social Capital in the Future"

Figure 2-3-37 Initiatives Status of Creating a Human Resource Training and Development System by Number of Technical Staff



Source) Developed by MLIT from "Results from Survey Conducted for Local Governments (December 2012)"

The percentage of those who responded, "We are proactively hiring staff (technical staff) for maintenance, management, and upgrading," or "We have a staff member dedicated to maintenance, management, and upgrading," regarding the development of a promotion system were generally low, and this trend was particularly noticeable in other municipalities. As seen on Figure 1-3-23, as the overall number of civil engineer staff members decrease in local governments, the situation is getting more difficult for the local government establishments to add staff members who would be responsible for maintenance, management, and upgrading.

As evident, we cannot say that local governments are putting enough effort into developing human resource development or promotion systems for maintenance, management, and upgrading. Despite limitations with staff members, as the managers of infrastructures, the local governments have the responsibility of making sure appropriate maintenance, management, and upgrading is done, and therefore must seek means to that end. On top of that, as seen in Figure 1-3-19, the smaller scale of the local government, the more they seem to be behind in getting a clear understanding on the aging condition of their infrastructures. Small and mid-sized municipalities in particular—when faced with circumstances where their efforts alone are not enough—will need the national and larger-scale local governments to supplement their own know-how, technology, and human resources, in addition to using the private sector, as seen in chapter 2.

National Government's Technological Support of Local Governments

When local governments have major damage to a bridge within its jurisdiction area, depending on what their needs and requests are, the MLIT seconds staff members, and provides advice on how to establish a system to develop emergency inspections and emergency response policies to provide technical support for maintenance, management, and upgrading of social infrastructures.

In April 2012, Hamamatsu City, Shizuoka discovered damage on the Harada Bridge—which is under their jurisdiction—and had to entirely close the bridge to all traffic, resulting in a two and a half hour detour. Because this traffic closure had such an enormous effect on the daily life of the local residents, an urgent countermeasure was required, so Hamamatsu City requested support of the Chubu Regional Development Bureau. When the Chubu Regional Development Bureau received the request, they set up a countermeasures support headquarter, and in addition to seconding staff members, they sent bridge experts from the Policy Research Institute and Public Works Research Institute to the actual site of damage to give technical advice on investigation and recovery methods. Since then, the experts have verified the usuability of the bridge, and proposed some repair methods, and based on these proposals, the city has began the repair work. By

Figure 2-3-38 Site Inspection of Harada Bridge

Source) MLIT

June of the same year, the bridge was re-opened for service.

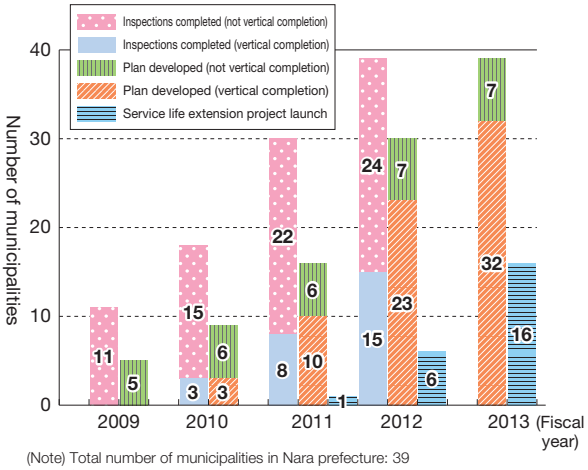
In addition to the seconding of staff, other support methods are being promoted to improve maintenance technology, such as conducting workshops and on-site training sessions for local government staff members regarding bridge maintenance.

■ Prefectures Supporting Municipalities

In Nara Prefecture, they have implemented 'Vertical Completion' since FY2010, where municipalities outsource the inspections and development of repair plans for extending service life for bridges under their jurisdiction to the prefecture. This is an initiative to support municipalities that lack civil engineer staff, or have difficulty developing their own repair plan for extending service life. Specifically, the bridge inspections are done by the prefecture's jurisdiction civil engineering office for municipalities that have requested prefectural support, and the prefecture's road management division develop the repair plans for extending service life for each municipality, based on the prefecture's own principles. This initiative makes it possible for municipalities to implement the preventative maintenance method to maintain, manage, and upgrade based on the plan, and also has the merit of resulting in greater cost reduction than if the municipalities had developed their own plans.

With the implementation of this vertical completion method, the bridge inspections for all municipalities within Nara prefecture was completed by the end of FY2012, and all plan developments for bridge service life extension were completed by FY2013 (Figure 2-3-39). Going forward, Nara prefecture is considering providing additional support to the municipalities when the municipalities begin in earnest with the repair work that is required based on the repair plan for extending service life. Nara prefecture has already been entrusted with one such repair work as a test case. For repair work, Nara is also considering having municipalities send one of their staff members to the prefectural office so that human resource development can happen at the same time, by going through the practice of quantity surveying and site management with the municipality staff as the construction work happens.

Figure 2-3-39 Progress on Bridge Service Life Extension Work in Municipalities of Nara Prefecture



(Note) Total number of municipalities in Nara prefecture: 39
Source) Nara Prefecture

Meanwhile, in FY2013, following the same principle as the bridges, the full check inspection for tunnels—as part of road stock—was also entrusted to the prefecture through vertical completion. The inspection work for 9 municipalities and 15 tunnels were done by the prefecture, showing that this initiative is spreading.

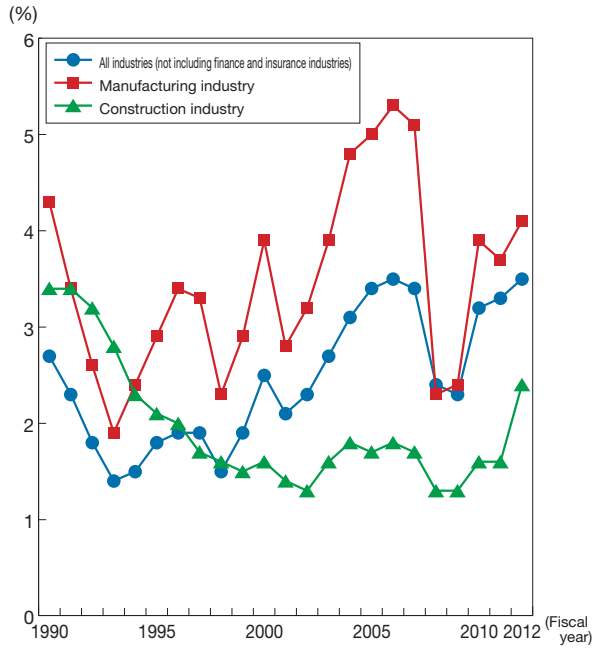
As evident from these initiatives, if entities with advanced technology and know-how provide and share these skills with other entities that are in need of help, this can result in those who manage infrastructures become interconnected, which can contribute to the improvement of standards for maintenance, management, and upgrading of social infrastructures throughout the whole nation.

(Securing and Training Leaders in the Construction Industry)

As seen in chapter one, the number of people employed as engineers are continuing to decrease, which gives rise to the concern that there will be a lack of human resources that can take on the maintenance, management, and upgrading of social infrastructures. One of the reasons for this may be the significant reduction in construction investment, which has resulted in wage reduction for skilled workers. If we look at the trend in the recurring profit margin of the construction industry, we can see that in the first half of the 1990's the profitability of the construction industry was higher than the average of all industries combined. However, since the economic bubble burst, the declining trend has continued, and since the 2000's has remained at a low level in the 1% range. Since FY2011, it has started to recover due to the reconstruction demand, but still remains below the profit rate of the manufacturing industry and of all the industries combined (Figure 2-3-40).

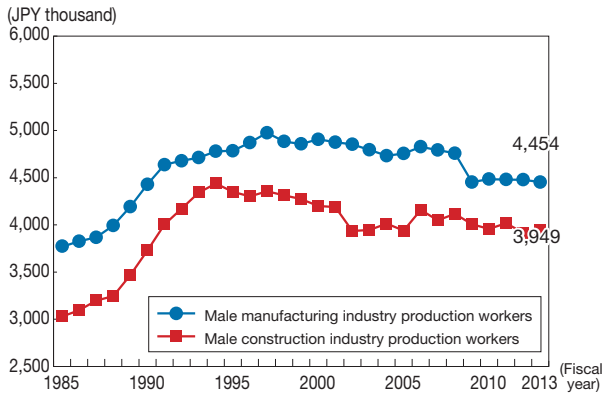
In regards to the wage of skilled workers, if we look at the trend in the total annual wage amount paid to male production workers in the construction industry, there is a large increase continuing into the first half of the 1990's, and the difference between their wage and that of male production workers in the manufacturing industry shrak significantly. However, since then the wage of the construction industry started to decrease, and because the reduction rate was so large, the difference has again widened. In recent years, the wage level has been flat for the most part, though when compared with the manufacturing industry, the construction industry low wage level continues (Figure 2-3-41).

Figure 2-3-40 Trends in the Recurring Profit Margins of the Construction Industry



Source) Developed by MLIT from Ministry of Finance "Corporate Annual Report of Statistics"

Figure 2-3-41 Trends in Total Annual Wages



(Note) 1 Annual wages = set amount of cash salary x 12 + annual bonuses and other special salary
Set amount of cash salary = amount of cash salary paid for June (amount before deducting income tax, social insurance fees, etc.), and includes base salary, duty allowance, perfect attendance allowance, travel allowance, family allowance, overtime, etc.
Annual bonuses and other special salary = any bonus paid out between January and December of the year previous to survey year, special salary like year-end allowance, etc.
2 Production worker refers to workers engaged in the production of goods being carried out mainly at work sites (construction site, etc.)
3 Survey conducted on private establishments that employ over 10 permanent workers.
Source) Developed by MLIT from Ministry of Health, Labour, and Welfare "Basic Survey on Wage Structure"

When looking at the responses received regarding the profitability of maintenance, management, and repair work in the 'Maintenance, Management, and Repair Work related Contractor Survey' by outsourcer categories—national, prefectural, and municipal—the percentage of those who responded, "Profitability is low" is higher in every category. In particular, the percentage from municipalities was very high, at 62.9%. When asked why the profitability is low, about 90% of the contractors chose the response, "The cumulative unit price and labor rate is estimated lower in quotes, compared to the actual amount of time and cost" and regarding the maintenance, management, and repair work commissioned by the national government, the response chosen most often was, "The price competition between suppliers is tough," while for work commissioned by prefectures and municipalities, the response chosen most often—second to the previous response—was, "The scale of work being commissioned is too small" (Figure 2-3-42).

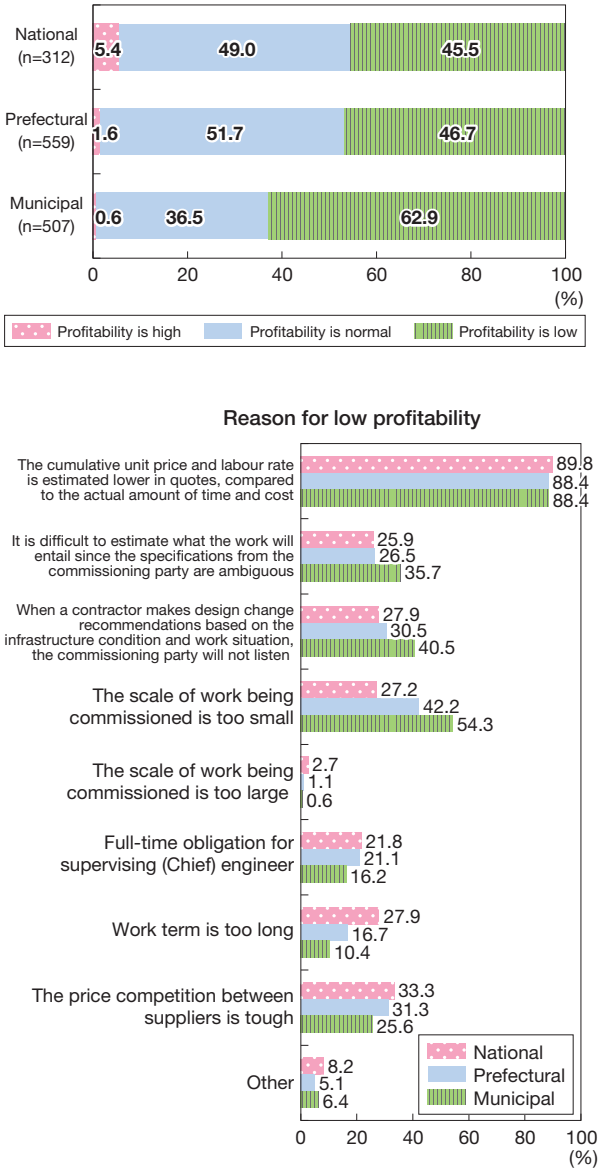
When we look at the perception of cumulative unit price from the commissioning party's standpoint, according to the survey conducted by MLIT for local governments, when asked what the cause was for the discrepancy between the quoted price of maintenance repair work and actual cost, the majority responded, "Did not perceive any discrepancies" (Figure 2-3-43).

In contrast, as evident from the previous survey done for the contractors, if we look at the reason for low profitability for maintenance, management, and repair work commissioned by local governments, as before, the percentage of those who responded, "The cumulative unit price and labor rate is estimated lower in quotes, compared to the actual amount of time and cost" is high. We need to continue to look at whether this is a problem limited to construction, or a problem with things like the inspection operations, but it is clear that there is a possible gap between the perceptions of the local governments and that of the contractors (Figure 2-3-44).

For this reason, in order to secure leaders for maintenance and management work, in addition to trying new ideas for commission scale and construction period contracted, we will need to conduct reviews as appropriate regarding the cumulative unit price by looking into actual situations, so that the construction industry can secure a certain level of

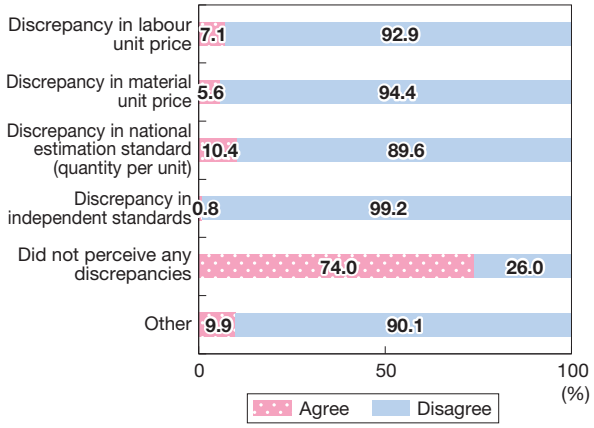
profitability, in hopes that this will promote an environment that fosters capital investment and human resource development for the future. Due to these considerations, in FY2013, we newly established bridges repair work rates, revised the maintenance and repair work rates, and reviewed the indirect construction cost rates.

Figure 2-3-42 Profitability of Maintenance, Management and Repair Work (by Commissioning Organizations)



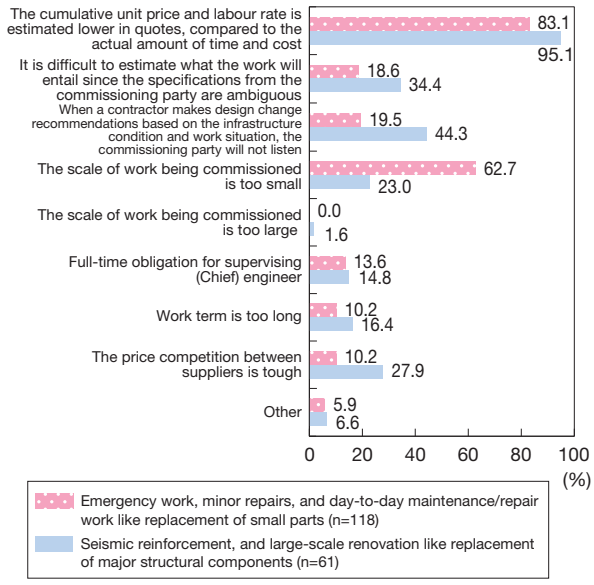
Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

Figure 2-3-43 Reasons for Discrepancies between Predetermined Price and Actual Cost of Maintenance and Repair Work



Source) Developed by MLIT from "Results from Survey Conducted for Local Governments (December 2012)"

Figure 2-3-44 Reasons for Profitability being Low (Local Government, Construction-related Work)



Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

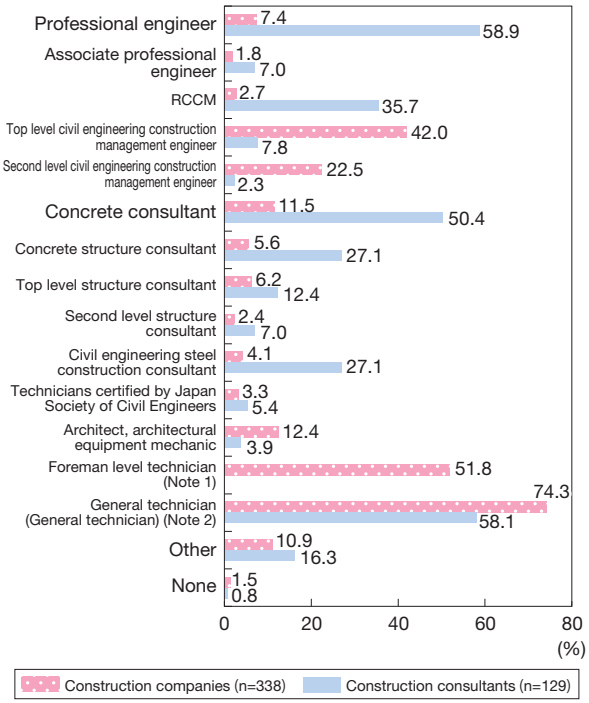
If we look at the results from the 'Maintenance, Management, and Repair Work related Contractor Survey' by category, regarding the question of which type of human resources (technicians, engineers) is the most difficult to secure for maintenance, management, and repair work sites, construction companies mostly responded, "General technicians," or "Foreman level technicians," while construction consultants mostly responded, "General engineers." We can see from all responses that it is becoming difficult to secure human resources to do the on-site operations[Note 69].

Meanwhile, engineer human resources operating are mainly 'top level civil engineering construction management engineers' in construction companies, while at construction consultants there are more 'professional engineers,'

Note 69 'General engineers' as defined by construction consultants refers to engineers that do not have the qualifications of a professional engineer or RCCM, and instead carries out work in response to instructions given by a higher level engineer.

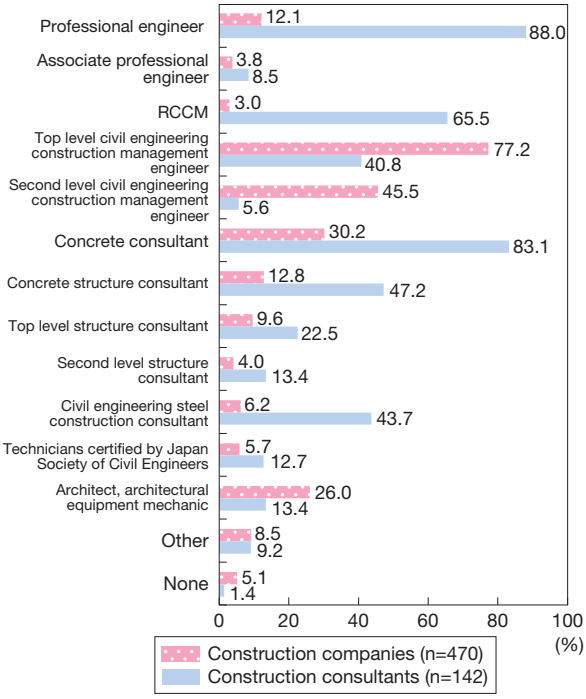
'RCCMs[Note 70],' and 'concrete consultants.' 'First class civil engineering construction management engineers' are people who have the qualifications to be a supervising engineer to carry out on-site supervision of construction work, while 'professional engineers' and 'RCCMs' are usually requested by the contractors at the time of work being commissioned to be the engineer required to be on-site. This results in a lack of engineers with the qualifications that are most often needed at the time of receiving a work project (Figure 2-3-45).

Figure 2-3-45 Human Resources that are Difficult to Secure for Maintenance, Management, and Repair Work



(Note) 1 This option was not available on the construction consultant survey.
2 The option was 'General technician' on the construction consultant survey.
Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

Figure 2-3-46 Qualification Useful for Employees to Have in the Future



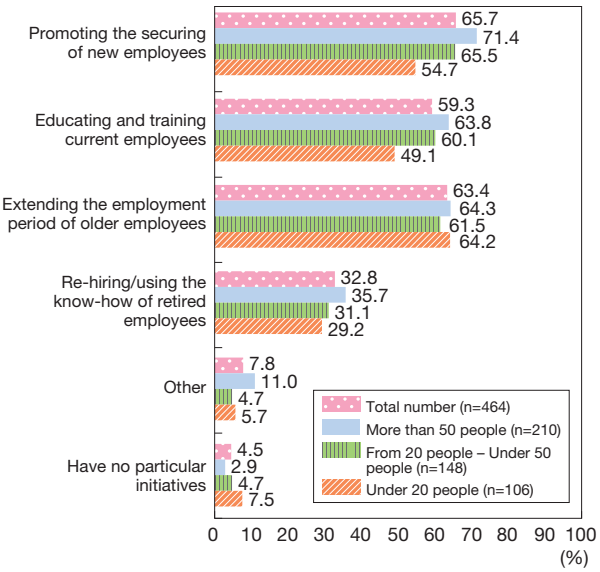
Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

Regarding what qualification would be usefull for their company's workers to have in the future, in addition to engineers—which was sited as the type of worker lacking in the above responses—the 'concrete consultants' was also sited often as the type of qualification desired by construction companies. This shows that though there are sufficient numbers of concrete consultants qualified at the moment, looking ahead there may be greater need for workers with this type of qualification in the future (Figure 2-3-46).

Note70 Registered Civil Engineering Consulting Manager, refers to a person with the qualifications to be a management technician or verification engineer for construction consultant businesses.

According to the 'Maintenance, Management, and Repair Work related Contractor Survey,' the types of initiatives being implemented by contractors the most to secure and develop human resources are, "Securing new employees," "Education and training for current employees," and "Extending the employment period of older employees." If we separate out the responses by business scale—determined by number of employees—the overall trend seems to be that the bigger the business scale the higher the percentage of companies putting effort into securing and developing human resources. However, there were no significant differences due to business scale for the percentages of companies that are "Extending the employment period of older employees," showing that this is an initiative that can be easily implemented by smaller scale companies as well (Figure 2-3-47). In addition to continuing with the initiative to employ older employees for a longer period, considering the long-term, it will become necessary to increase the number of new employees from the young adult segment.

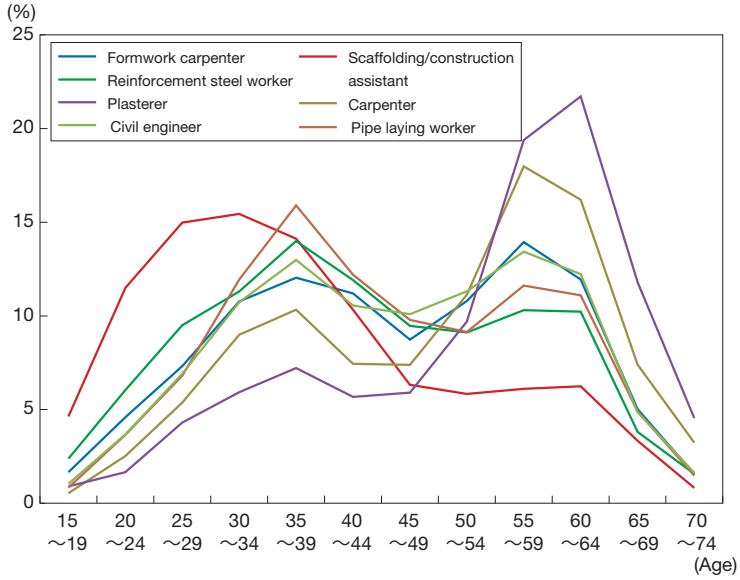
Figure 2-3-47 Human Resources Securing/Development Status (by business scale according to number of employees)



Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

In terms of securing technicians, according to the national population census, if we look at the breakdown of the age structure of technicians, there are differences in the age structure depending on the job category. The number of employed persons between late 30's and early 60's creates a mountain, but the size of that mountain differs by job category. In particular, the percentage of people employed as carpenters and plasterers spikes for people in their late 50's to 60's, skewing the age structure to the elderly skilled workers. For this reason, when securing human resources in the future, we will need to look ahead for these trends in the age structure by job category, and be strategic in our initiatives (Figure 2-3-48).

Figure 2-3-48 Age Structure of Technicians by Occupation



(Note) Extracted from Occupation (minor category) J Construction/Mining Workers
Source) Developed by MLIT from MIC "National Census"

When The Dai-ichi Life Insurance Company, Ltd conducted a survey for pre-school, kindergarten, and elementary school children, asking, "What do you want to be when you grow up?" the percentage of children who answered 'Carpenter' has remained level; even in terms of ranking, 'Carpenter' remains in the top ten (Figure 2-3-49).

Figure 2-3-49 Future Dream Occupation Survey (Boys)

(%)

	1992		1997		2002		2007		2012	
1	Professional baseball player	(13.4)	Professional baseball player	(10.6)	Scholar/PhD doctor	(9.6)	Professional baseball player	(11.8)	Professional soccer player	(11.7)
2	Professional soccer player	(6.9)	Professional soccer player	(9.0)	Professional soccer player	(9.1)	Scholar/PhD doctor	(8.5)	Scholar/PhD doctor	(6.1)
3	Police Officer/ Detective	(6.5)	Police Officer/ Detective	(5.5)	Professional baseball player	(8.5)	Professional soccer player	(6.0)	Police Officer/ Detective	(6.1)
4	Toy store owner	(4.4)	Restaurant owner	(5.5)	Restaurant owner	(7.7)	Medical doctor	(5.5)	Professional baseball player	(5.8)
5	Airline pilot	(4.0)	Toy store owner	(4.7)	Carpenter	(7.2)	Carpenter	(5.2)	TV/cartoon character	(4.0)
6	Carpenter	(3.5)	Medical doctor	(3.9)	Medical doctor	(4.3)	Airline pilot	(4.1)	Astronaut	(3.7)
7	Medical doctor	(2.9)	Fire fighter	(3.5)	Police Officer/ Detective	(2.9)	Police Officer/ Detective	(3.3)	Restaurant owner	(3.7)
8	Candy store owner	(1.8)	Cook	(3.5)	Fire fighter/ emergency services	(2.9)	Restaurant owner	(3.0)	Train or bus driver	(3.7)
9	Fire fighter	(1.8)	Scholar/PhD doctor	(3.1)	Astronaut	(2.7)	Chef	(3.0)	Medical doctor	(3.4)
10	Teacher	(1.7)	Carpenter	(2.7)	Train or bus driver	(2.7)	Fire fighter/ emergency services	(2.7)	Carpenter	(3.2)
			Teacher	(2.7)					Fire fighter/ emergency services	(3.2)

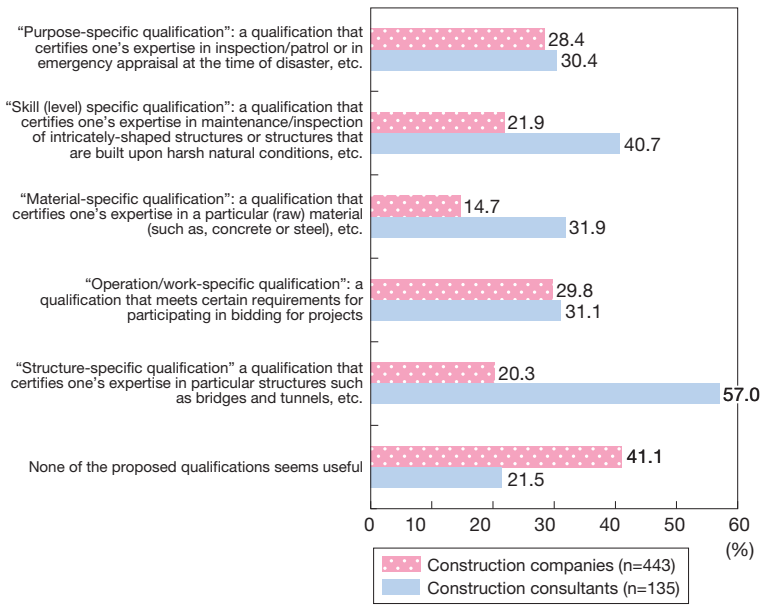
(Note) The survey was conducted on young children nation-wide (pre-school, kindergarten, and grades 1-6 in elementary school).
Source) Developed by MLIT from The Dai-ichi Life Insurance Company, Ltd "Children's Summer Vacation Short Essay Competition 'What I Want to be When I Grow Up'"

For children in elementary school or younger, construction work is regarded as an attractive occupation. Transmitting that appeal to middle schoolers so that they will continue to be interested in a construction profession could become a factor in increasing the number of young people entering this profession. For this reason, we need to continue to work on forming young people's motivation for occupation choice, and promote the occupation by having skilled workers conduct visiting lectures for students that tells them about the fun and joy in creating things, by holding construction site tours, and by giving on-site training, as well as improving working conditions by things like fair wage amounts.

Furthermore, currently, deliberations regarding the acceptance of foreign workers are being carried out throughout the entire government. For the construction industry—as a temporary measure until FY2020—the hiring of foreign technician interns after they have completed their internship is being allowed, to see if that will be a viable plan. Also, the hiring pool expansion effort is also being extended to female technicians. Giving consideration to the results and effects of these initiatives, going forward we will need to figure out what initiatives need to be implemented to secure technician human resources for the construction industry.

In terms of securing engineers, making use of the qualification system may be an effective method. In the 'Maintenance, Management, and Repair Work related Contractor Survey,' when asked what qualifications would be useful to have newly established in the future, there seemed to be a trend of construction consultant companies wanting 'Structure-specific qualification' for things like bridges and tunnels, and 'Skill level-specific qualification' for maintaining and inspecting structures, while construction companies wanted 'Operation/work-specific qualification' for meeting requirements to participate in bidding for projects, and 'Purpose-specific qualification' for inspection patrols and emergency inspections at the time of disaster (Figure 2-3-50). The differences in their responses can be attributed to the differences in the specific content of their respective maintenance,

Figure 2-3-50 Qualifications That Would Prove To Be Useful If Established in the Future



Source) MLIT "Maintenance, Management, and Repair Work related Contractor Survey"

management, and repair works. However, if we are able to prove that these types of qualifications will be useful in work operations, and that having these qualifications will lead to social valuation, there may be an increase in the number of young people interested in acquiring these qualifications and interested in finding a job related to the maintenance and management of social infrastructures.

In addition to the initiatives discussed above for securing human resources, it is imperative that each person works on improving each of their skills to achieve even better performance, and that the entire construction industry works towards building an ever more efficient production system.

Column

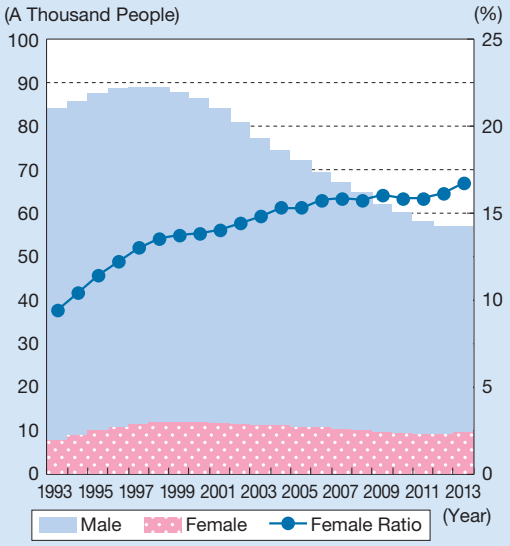
"Dobojo (play on word to mean engineer woman)" ~Women Who Work in the World of Civil Engineering[Note 1]~

Have you ever heard of the word "Dobojo," the nickname used in work and studies related to civil engineering to refer to 'girls who love engineering'?

Ever since an article called "The Emergence of a Female Civil Engineer" was featured in the Japan Society of Civil Engineers Journal in 1982, the foray of women into civil engineering has expanded. If we look at the "Basic Survey of Schools" by the Ministry of Education, we can see that the percentage of women studying in the departments of civil engineering and civil/construction engineering at a university was 9.4% in 1993. Given that the number of male students has seen a sharp decline while there have been no significant variations in the number of female students, by 2013 that percentage had increased to 16.7%. In addition, the percentage of women who got a job as a construction, civil, or surveying engineer after graduating university is slowly rising.

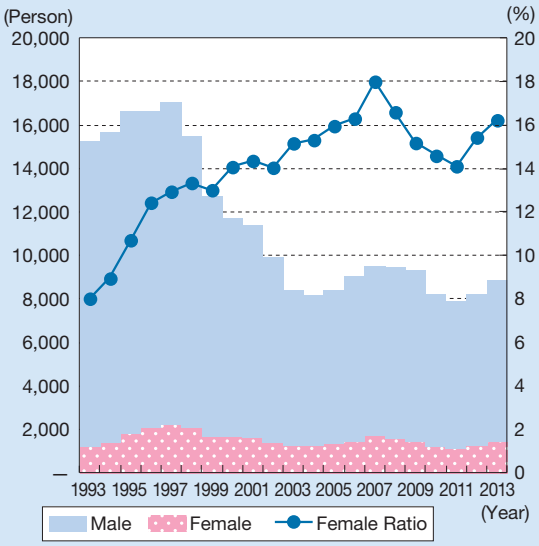
So then, how many female civil engineers actually currently exist? According to the National Census (2010) the number of female civil or surveying engineers was 5,870 women (ratio of 2.4% women), and according to the "Engineers Trend Survey" published by Japan Society of Civil Engineers (December 2012), the women engineers are branching out into different types of businesses, working in various sectors including governments, universities, construction companies, electrical power companies, and consultancy companies.

Figure 2-3-51 The Shift in the Number of Civil Engineering and Construction Students and the Female Student Ratio



Source) Developed by MLIT via MEXT "Basic School Investigation" from "Japan's Education at a Glance"

Figure 2-3-52 The Shift in the Number of Employment of Construction, Civil Engineering, Surveying Technicians



Source) Developed by MLIT via MEXT "Basic School Investigation" from "Japan's Education at a Glance"

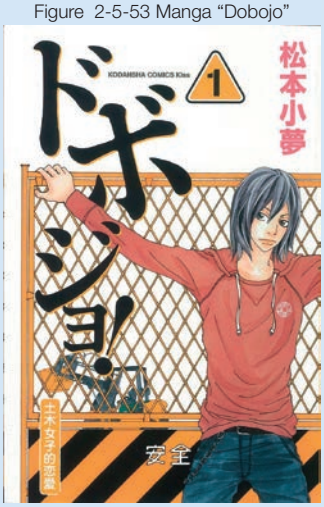
Note 1 Word that means "Engineering for the citizens," or "Work that facilitates a human-like environment for the dignified daily living of citizens." (from Japan Society of Civil Engineers http://www.jsce.or.jp/)

The nickname “Dobojo” has even been used for a heroine in a comic book. It is a term that is starting to take root as a way to refer to not only ‘women civil engineers,’ but also to ‘women that wear construction work wear and helmets, and work at civil engineering and construction sites.’ However, because construction sites are usually within an enclosure, it is very rare to see a “Dobojo” in action. For this reason, there are still a lot of uncertainties for women that are considering entering the world of civil engineering. The Society of Women Civil Engineers[Note 2], which was established in 1983, has created illustrations to introduce what working as a civil engineer looks like, and compiled the “Door to Civil Engineering”, which is a booklet containing messages from older women civil engineers as ‘role models,’ to encourage women who are working to become a “Dobojo.” The Japan Society of Civil Engineers has also published a book to encourage women civil engineers.

Going forward, with the prospect of more and more women becoming an active part of the workforce, the Japan Federation of Construction Contractors has created an action plan for employing more female technicians (March 20, 2014), with a goal to aim for double the number of women technicians within five years, and has requested that all their member companies actively work on creating a suitable work environment. The MLIT is also working towards creating a ‘construction industry where more women can work’ in both the public and private sectors.

For the women that work to bring a smile to the faces of many, we hope that in the future there will be an increasing number of civil engineering and construction work sites that brings a smile to their faces too.

Figure 2-5-53 Manga “Dobojo”



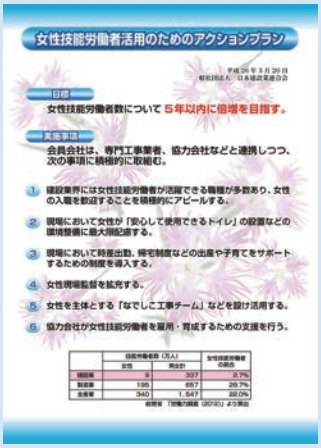
(c) Koyume Matsumoto / Kodansha

Figure 2-3-54 The Brochure for The Society of Women Civil Engineers

Source) The Society of Women Civil Engineers

Source) Japan Society of Civil Engineers

Figure 2-3-55 The Action Plan for Capitalizing on Skilled Female Workers



Source) Japan Federation of Construction Contractors

Note 2 Became ‘General Incorporated Association The Society of Women Civil Engineers’ on November 18, 2013.

Column

Skill Inheritance and Securing Technicians for Shikinen Sengu (installation of a new deity on a specified year)

In 2013, at one of Japan's foremost shrines, the Ise Jingu (Ise Shrine) in Mie, the Shikinen Sengu—a ceremony that is held once every 20 years—was conducted, and many worshipers attended. The word 'Shikinen' means the prescribed year, and 'Sengu' means building a new shrine and installing a deity within it.

The Ise Shrine's Shikinen Sengu started in the 690th year of the Asuka period, and has a history of almost 1,300 years, though it was suspended during the Sengoku period (the age of provincial wars). All the shrine pavilions, apparel, and treasures in the Shoden (main building) of Naikū (Inner Shrine) and Gekū (Outer Shrine) of the Shogū (main shrine compound) and Betsugū (associated shrine compounds), are all renewed and reconstructed every 20 years, up this present time. 2013 was the 62nd Shikinen Sengu year. The shrine pavilions are made in a distinctive 'Yuiitsu-shinmei-zukuri' architectural style—Japan's oldest architecture style with Horitate pillars made of untreated Japanese cypress wood and rooftops made with Kaya (type of straw)—and can be seen in its unaltered formed even now (Figure 2-3-56).

At this Shinto Shrine, both Naikū and Gekū has land of the same size to the east and west, and every 20 years each Shaden (shrine building) is alternately reconstructed in the same shape and size. The old material resulting from the reconstruction is reused as much as possible. For example, with the thickest pillars (*Munamoch-bashira*) in the main buildings of Naikū and Gekū, once they have been replaced, the old pillars are used for 20 years as the Torii (Shinto gateway) on the inner and outer ends of the Uji Bridge, which is at the outer entrance of the shrine compound. They are then used for another 20 years as the Torii of 'Seki-no-Oiwake' in Kameyama City, and 'Pass of Nanasato' in Kuwana City, both places in Mie prefecture. Other old materials are also reused for repairing and replacing work on Sessha (ancillary shrines) and Massha (subordinate shrines) within Naikū and Gekū, and also given for free to other shrines in Japan.

Previously, the cost for Sengu was funded by the court in ancient times, by the Kamakura shogunate in the Kamakura period, by the Tokugawa shogunate in the Edo period, and by the government until after the Meiji era before World War II. However, after WWII the Ise Shrine became a private religious corporation and separated itself from the government. Since then Sengu is no longer sponsored by the government, and the cost is funded by the Ise Shrine itself. The cost for this Sengu was published as approximately JPY55 billion.

Figure 2-3-56 The Shrine Proper (The Interior of the Main Building)

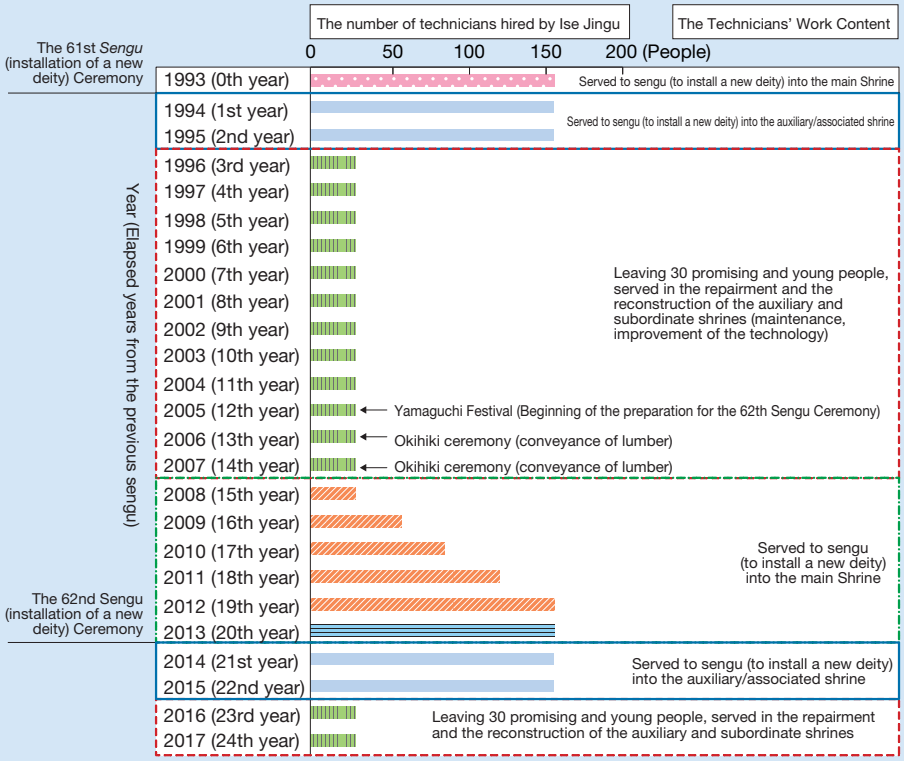
Source) Jingu (Shrine) Official

There are many theories as to why Sengu was prescribed to happen every 20 years, but one of those theories is the 'Technology Inheritance Theory.' The theory hypothesizes that time period of 20 years allowed for people in those days to be involved in Sengu at least twice within the average lifespan, which meant that it was a logical time frame for teaching and passing down the necessary skills to the next generation experiencing Sengu for the first time. So how have the construction techniques been passed down for Ise Shrine?

We will look at the overview of the employment situation and the work content of skilled workers from the of 61st Shikinen Sengu in 1993, and until 2016 when the 62nd Shikinen Sengu ends (Figure 2-3-57).

For Shikinen Sengu, once the Sengu of the Shogū is completed, there is still the Sengu to be done for the Betsugū. Therefore, for a span of two years, approximately 160 skilled workers would continue to be employed during that period. Once the Sengu of Betsugū has been completed, about 30 young or gifted skilled workers are kept on as permanent staff for the Shrine, and the other skilled workers are disbanded. The 30 skilled workers kept on as permanent staff would then spend the next 12 years working on the repair and replacement work for Sessha and Massha

Figure 2-3-57 The Shift in the Number of Technicians hired by Ise Jingu (Ise Shrine) and their Work Content



Source) Nomura Research Institute Ltd. "NRI Public Management Review" (April 2011)

shrines.

15 years after the Sengu had been completed for the main shrine, the wood working for the next Sengu begins. Also around this time, depending on the amount of work and progress, the hiring process starts for skilled workers from all over the country. At this time, the 30 skilled workers who have experience from the previous Sengu begins to train the newly participating skilled workers. Due to the 20 year cycle, some workers may participate in Sengu up to three times.

A noteworthy point from this is that the employment of the minimum number of skilled workers (30 workers) needed to pass down the skills is secured by hiring them as permanent staff after the completion of Sengu. Meanwhile, the skilled workers hired during the peak period are not limited to Miyadaiku (carpenters that work on shrines), but also include general carpenters who are trained on the necessary skills after being hired. This continuation of technical capabilities can be said to be made possible by the fact that the core skilled workers are kept on as permanent staff to do the repairs and upgrading work.

In this way, the Shikinen Sengu of Ise Shrine is looking to the next Sengu and implementing measures to secure human resources (a flexible hiring method to accommodate the peak period) and skill inheritance (maintaining a core permanent staff of skilled workers). In these days, as the lack of next leaders in the maintenance, management, and upgrading becomes a major issue, perhaps there are several aspects we can learn from this system which has continued for over 1,300 years.

Figure 2-3-58 The Appearance of the Shrine Structure

Source) The Jingu Shicho (Jingu Administration Office)

(References)
Ise Shrine Shikinen Sengu Public Relations Headquarters official website
http://www.sengu.info/index.html
Nomura Research Institute, Ltd. "NRI Public Management Review (April 2011)"

Chapter 3 Major Efforts Made in the Fields of National Land and Transportation

Chapter 2 has discussed and explored directions for the policies for maintaining, managing and upgrading social infrastructures from the three perspectives of "Using it Wisely, " "Supported by Everyone" and "Taking a Far-sighted Vision." While many of the schemes exemplified in Chapter 2 have already been initiated by the MLIT, it would still be necessary to continue developing measures aimed at "Using it Wisely," "Supported by Everyone" and "Taking a Far-sighted Vision" in order to achieve the goals of maintaining, managing and upgrading social infrastructures. This chapter introduces the principal actions to which the MLIT is currently committed from these three perspectives.

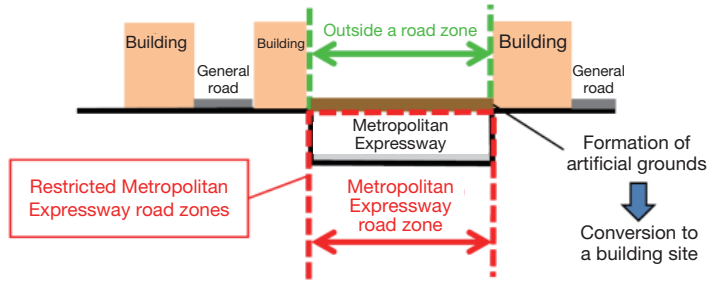
Section 1 Effort to Use Social Infrastructures Wisely

1 Effective Road Space Utilization

As explained in Chapter 2, the functionalities of social infrastructures can be augmented and made easier to use effectively by utilizing them as they are and their spaces. The space of a road as exemplified earlier can be put to diverse uses, such as local revitalization or disaster preparedness. The development of an environment allowing for effective road space utilization is also sought.

In this background, the Law for Making Partial Amendments to the Road Law, etc. came into effect in May 2014 to expand the scope of the three-dimensional road system (while a road zone covers both upper and lower spaces in principle, the system exceptionally allows a vertical range to be set for a road zone either spatially or underground) to include existing freeways when it had been restricted to the construction of new roads or reconstruction of existing roads. The system has made it possible to form artificial grounds on top of an existing freeway built in a canal structure, for example, and then build an architectural structure on such grounds (Figure 3-1) . Revenues accruing from the utilization of the space that is no longer a road zone can be appropriated to maintain, manage and upgrade Metropolitan Expressways and other freeways, facilitating the work of upgrading freeways and rejuvenating cities in an integrated fashion by leveraging private fund. In addition, even though there are clearances available outside a road zone, spaces under the elevated structures can be occupied. If occupancy of such spaces is useful for making fair and effective use of road spaces, the occupants can be chosen by tendering.

Figure 3-1 Expanded Scope of Application of the Three-Dimensional Road System (Amendments to Paragraph 7, Article 47, Road Law) to Existing Freeways



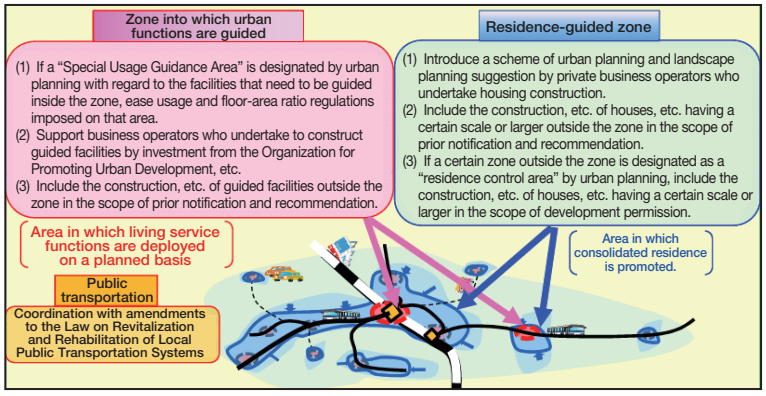
Source) MLIT

2 Forging a Compact City

As reviewed in the foregoing chapter, forging local municipalities into a compact city each is important as they are confronted with financial constraints amid diminishing population.

To move ahead with the forging of a compact city in which living service functions, such as welfare, and dwelling are guided and in which elderly people can live at ease, the Law for Making Partial Amendments to the Law for Special Measures concerning Urban Reconstruction, etc. came into effect in May 2014. The Law has opened a way for those municipalities that have drawn up a comprehensive master plan (location normalization plan) concerning the location of dwelling functions, and urban functions, such as welfare, medical care and commerce, enhancement of public transportation and so on to ease the floor-area ratios and land use regulations for those functions they want guided within a designated urban function zone. Moreover, if any function a municipality wants guided is located outside a designated urban function zone, the Law allows the municipality to submit a notification to work around the location problem, or to attract urban and dwelling functions into a desired area. A program has also been set up whereby the government extends its direct support to municipalities that provide publicly owned real estate to those private business operators undertaking to develop urban functions within a designated urban function zone.

Figure 3-2 Summary of the Law for Making Partial Amendments to the Law for Special Measures concerning Urban Reconstruction, etc.



Source) MLIT

Section 2 Supporting Social Infrastructures by Everyone

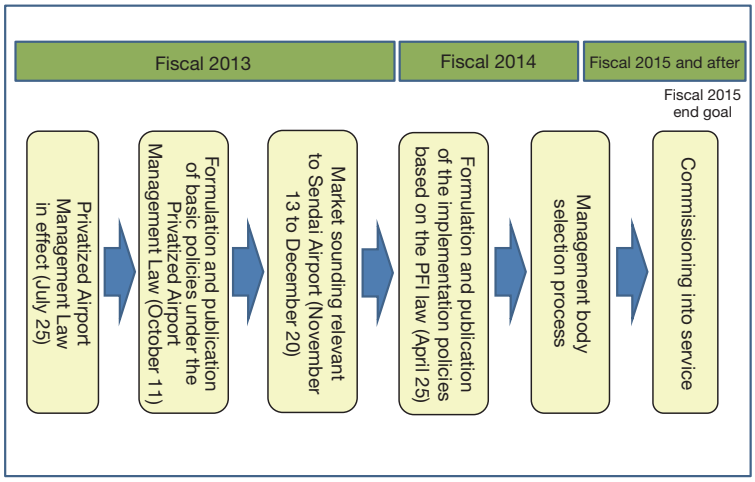
1 Driving PPP/PFI

(1) Promoting concession usage

As explained in Chapter 2, the implementation of PFI businesses, such as financially independent businesses, needs to be driven in the future. The use of concessions is seen important among else. The government has committed itself to a key policy of broadening the scope of concession-ready businesses in its implementation of "Action Plan for Drastically Reforming PPP/PFI," "Japan Revitalization Strategy" and "The Basic Policies for Economic and Fiscal Management and Structural Reform." The MLIT is stepping up its support of efforts to introduce the concession scheme, and to the work of local governments, in the fields of airports, sewerage systems and toll-road businesses administered by Local Road Corporations.

In the field of airports, the Law concerning the Administration, etc. of State-Managed Airports, etc. Leveraging Private Resources came into effect in June 2013 to allow concession-based management of state-managed airports, etc. Pursuant to this Law, a basic business scheme plan was published at Sendai Airport in November 2013, followed by the publication of an implementation policy in April 2014. The airport management entity was selected on public invitation in fiscal 2014. Outsourcing of port management is scheduled to start during fiscal 2015 (Figure 3-3). In the meantime, Kansai International Airport and Osaka International Airport entered into an administrative merger in July 2012 under control of New Kansai International Airport Co., Ltd. in a bid to revitalize Kansai International Airport as an international hub airport and expand demand for air transportation through appropriate, effective utilization of both airports. The new-born airliner is committed to keeping the two airports under consolidated management to augment their business values and realize the implementation of concessions at both airports as soon as practicable.

Figure 3-3 Status of Progress towards Sendai Airport Management reform



Source) MLIT

In the sewerage field, "Guidelines for the Implementation of Business Operations, etc. of Public Facilities, etc. in Sewerage Works (draft) " was formulated in March 2014 through discussions at an expert council to support local governments, sewerage systems management bodies, in their effort to pursue concession-based management of sewerage systems. Updates to the Guidelines are scheduled to reflect issues, etc. evolving in the course of pursuit of specific tasks while efforts continue to promote its broader dissemination.

As for the concession-based management of toll-road businesses by Local Public Road Corporations, efforts are underway to realize the concept of a structural reform special zone proposed by Aichi Prefecture by working in conjunction with the government ministries and agencies concerned to reflect findings of its review.

(2) Expanding scope of comprehensive work consignment to private sector

In its bid to address the challenges of ensuring the mid- and long-term availability of HUMAN RESOURCES to work for the construction industry, correcting dumped order-taking, maintaining and managing local social infrastructures and so on, the MLIT has decided to abandon its previous adherence to a uniform scheme of tendering and contracting and promote the introduction and practice of a choice of more diverse tendering and contracting methods selectable to meet the needs of the times and characteristics of the projects. Starting from fiscal 2014, the Ministry has started subsidizing the local governments working with such new tendering and contracting methods in their model projects. Among these new methods, comprehensive work consignment to private sector (multi-year contracting, multi-service batch ordering) aims to provide a precise maintenance and management solution to local social infrastructures. The Ministry has a policy of promoting the wider dissemination of diverse tendering and contracting methods, etc., including comprehensive work consignment to private sector, by preparing purchaser documentation that reflects the accomplishments of implementation

Figure 3-4 Examples of typical reviews of diverse tendering and contracting methods

<Typical reviews of diverse tendering and contracting methods>

When it is necessary to provide a precise maintenance and management solution to local social infrastructures or ensure preparedness against disasters, etc.	Multi-year contracting, multi-service batch ordering, joint order taking (cooperative business associations, local joint ventures)
Because of the high level of difficulty involved, maximum resort to knowledge and know-how from the private sector, plus dialogs, is appropriate for proceeding with flexible coordination between the contractor and contractee.	Method of selecting the company found to possess the most excellent expertise on public invitation and negotiate with it on the price, method of construction and so on before finalizing the contract.
Contractee is unable to develop an ordering scheme matched to the scale or difficulty of construction works.	CM method derived from efforts that have been made disaster-stricken areas

Source) MLIT

of model projects.

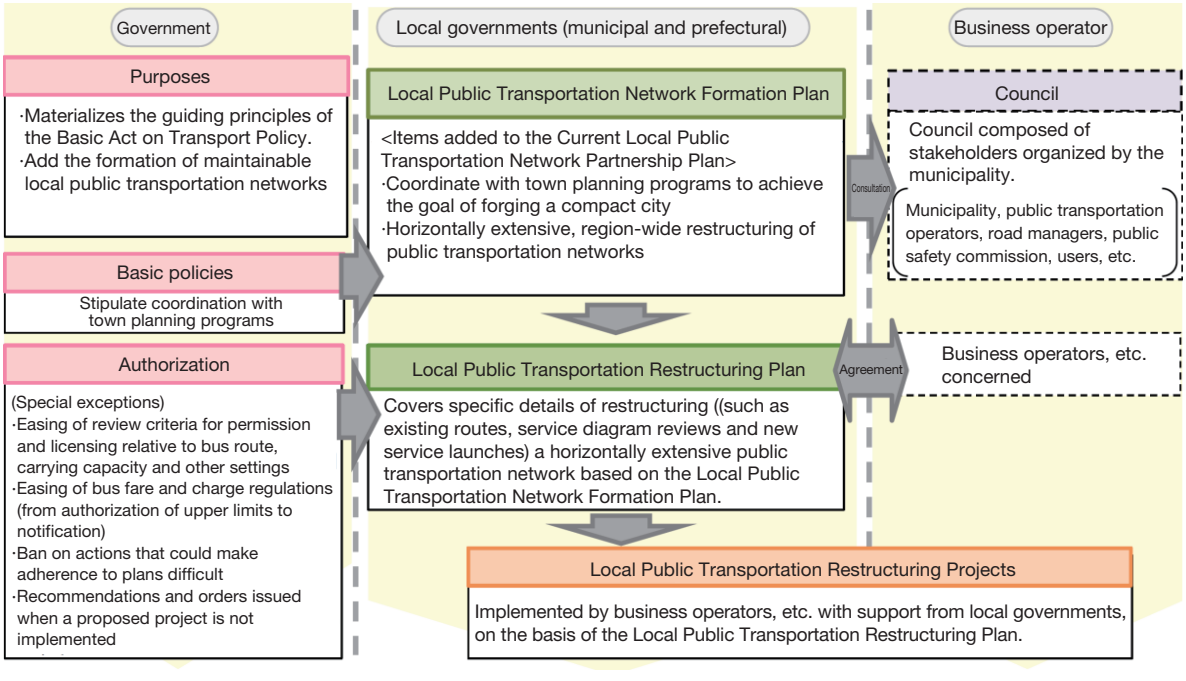
2 Resident Cooperation in Maintenance and Management

Efforts designed to back up active resident participation are needed to encourage more of the residents to participate in the work of maintaining and managing social infrastructures. As one of such efforts, the Law for Making Partial Amendments to the Coast Law was enacted in June 2014 to introduce the Coast Supporting Organization Program, which aids corporate bodies or entities (such as NPOs) in their voluntary efforts to maintain seacoasts, preserve seacoast environments and so on. The program is to designate corporate bodies or entities (such as NPOs) working to help maintain and manage seacoasts in partnership with coastal managers as coast supporting organizations and encourage their voluntary activities to help boost the maintenance and management of seacoasts in a way suited to local conditions.

3 Maintaining Local Public Transportation

As the climate in which local public transportation is placed grows increasingly tougher than before, it could risk the current level of scheme of management. When this happens, the local residents, administrators and business operators, as well as the business management bodies, would have to work in partnership to support the local public transportation. In the circumstances, the Basic Act on Transport Policy came into effect in December 2013 to lay a framework for driving the implementation of traffic policies on a comprehensive and planned basis. In connection with this, the Law for Making Partial Amendments to the Law on Revitalization and Rehabilitation of Local Public Transportation Systems came into effect in May 2014. The Law provides for the preparation of local public transportation network formation plans by municipalities, etc., the preparation of local public transportation restructuring plans to implement local public transportation restructuring businesses as specified in the local public transportation network formation plans and so on to revitalize and a animate local public transportation to help form connectable local public transportation networks. As horizontally extensive, region-wide public transportation networks are thus restructured in the initiative of local governments subject to agreement between the business operators and stakeholders, such as local residents, they are supported by the government (Figure 3-5).

Figure 3-5 Summary of the Law for Making Partial Amendments to the Law on Revitalization and Rehabilitation of Local Public Transportation Systems



Source) MLIT

Section 3 Efforts to Take a Far-Sighted Vision of Social Infrastructures

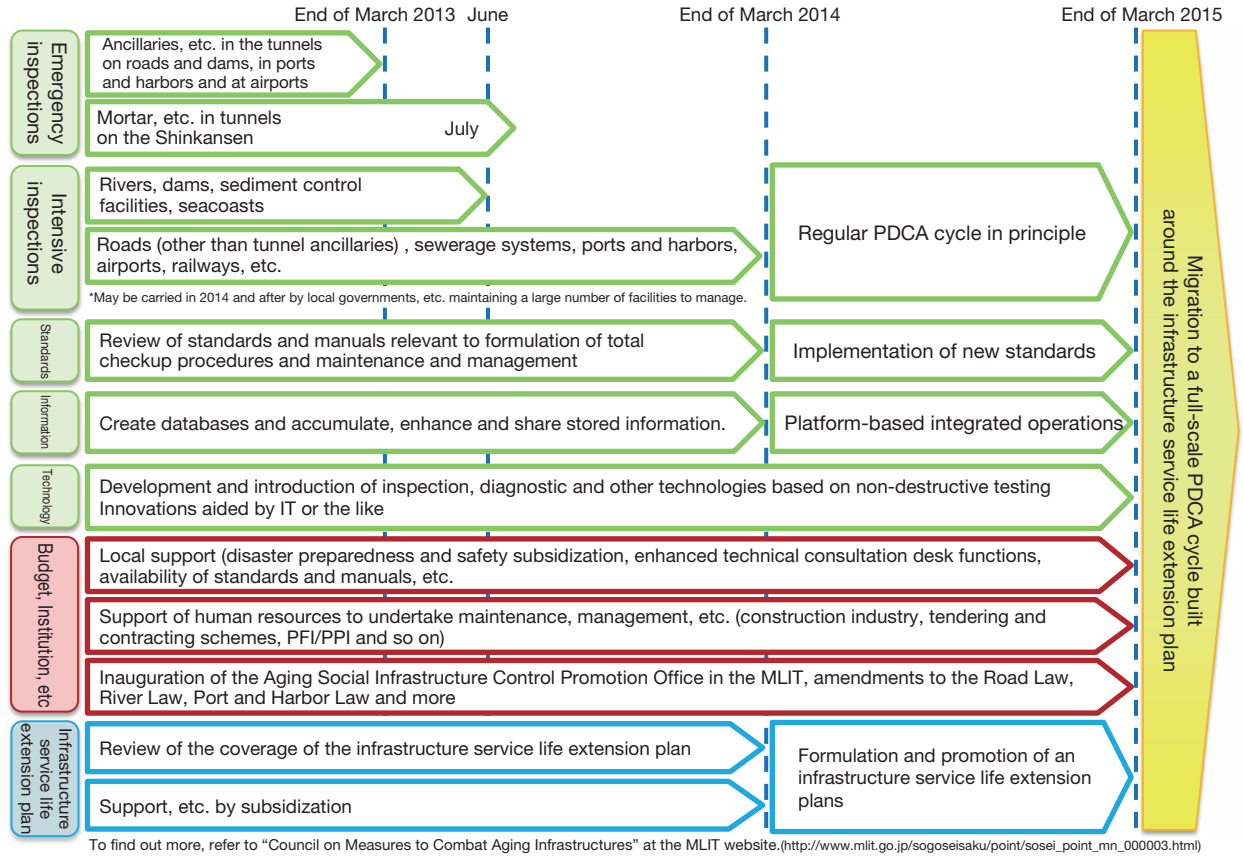
1 Efforts Made during the First Year of Social Capital Maintenance Activity and Carrying Them Forward through the Future

In its bid to allow existing social infrastructures to continue demonstrating their utilities over extended periods of time to come, the MLIT carries out their maintenance on a strategic and planed basis in an effort to take a far-sighted vision of infrastructures.

(1) Progress of comprehensive, cross-sectional efforts made pursuant to "Near-Term Actions to be Taken," etc.

Since the social capital that has been developed since the nation's period of rapid economic growth is on the brink of rapid aging from now, the MLIT has positioned the year 2013 as the "First Year of Social Capital Maintenance Activity" in its all-out effort to combat aging infrastructures and inaugurated the Council on Measures to Combat Aging Infrastructures chaired by the Minister of Land, Infrastructure, Transport and Tourism January of the same year. In March of the same year, the Council presented a three-year vision of the actions to be taken to combat aging social capital in a document titled "Near-Term Actions to be Taken to Maintain, Manage and Upgrade of Social Capital" to drive integrated, cross-sectional efforts (Figure 3-6) .

Figure 3-6 Roadmap (Summary) for Near-Term Actions to be Taken to Maintain, Manage and Upgrade Social Capital (decided on March 21, 2013)



Source) MLIT

The basic idea is to determine the current status of existing infrastructures through appropriate inspections and fix them properly on the basis of the results of such inspections and also to promote the formulation and enhancement of infrastructure service life extension plans, etc., which form an integral part of the PDCA cycle for driving these efforts on a strategic and planned basis. More specifically, the following kinds of efforts have been driven:

(1) Total inspections and repairs

Since emergency inspections prompted by the Sasago Tunnel ceiling board fall accident, etc. and intensive inspections that give top priority to eliminating damages to users and third parties virtually completed as scheduled for fiscal 2013, repairs have been promptly initiated on the basis of the results of these inspections.

(2) Reviewing standards and manuals

Since the formulation and review of various standards and manuals relevant to checkups, their frequencies and so on based on knowledge available to date, inspection results, etc. have virtually completed as scheduled for fiscal 2013, new standards have been put into service since fiscal 2014.

(3) Developing maintenance, management and upgrade information

The development of a database is underway with regard to the present status of each individual facility, as well as a facility ledger, to impel the implementation of a PDCA cycle relevant to facility maintenance, management and upgrade based on precise information. In fiscal 2013, a prototype of the platform of such information was developed to help share and utilize cross-sectional facility information. Functions of the database are now being configured to launch the database on a limited scale during fiscal 2014.

(4) Development, introduction, etc. of new technologies

Regarding the development and introduction of the inspection and diagnostic technologies that help speedily locate deteriorated and damaged points, those relating to nondestructive testing, etc. have been field-tested and assessed through public participation by taking advantage of New Technology Information System (NETIS) since 2013. At the same time, a maintenance and management support website focusing on maintenance and management technologies has been opened to elucidate technological characteristics. During fiscal 2013, the Next-Generation Social Infrastructure Robot Development and Introduction Review Panel meeting was also inaugurated to grope for ways to boost robots, etc. to the state of practical usefulness, as by defining needs and applications for them in such fields of social infrastructure maintenance, management, etc. Starting from fiscal 2014, useful technologies have been invited in public from private businesses, colleges and so on and subjected to on-site verifications and assessments by the Next-Generation Social Infrastructure Robot On-Site Verification Committee to further their utilization and development.

In fiscal 2013, the Committee for Reviewing and Promoting Usage of Social Infrastructure Monitoring Technologies met to propel the development, etc. of technologies, as through matching between field needs and seeds in an industry-academia-government collaboration, and to assess and analyze the usefulness of the technologies developed through field verifications. The Committee expects to perform field verifications and assessments on monitoring technologies by public invitation starting from fiscal 2014.

(5) Aids extended to local governments

While local governments have a large number of infrastructural facilities to manage, they still must work to combat their aging with severe constraints on their financial, technical, human and other resources. Financial aids are granted to these local governments by the disaster preparedness and safety subsidization program inaugurated in the fiscal 2012 supplementary budget to support their facility inspections and repairs and infrastructure service life extension planning. Further, a support desk providing consultation on efforts to combat aging infrastructures was set up at each Regional Development Bureau and elsewhere in July 2013 as a one-stop solution to receiving requests for consultation from the local governments and others. The Ministry's other ongoing efforts include releasing standards and manuals relevant to infrastructure maintenance and management and promoting then enhancement or refinement of technical workshop and training plans.

(6) Supporting human resources to undertake maintenance, management, etc.

To ensure the proper practice of the work of maintaining, managing and upgrading social infrastructures, securing the right human resources to undertake inspection, repair and other on-site jobs and enhancing their technical capabilities would be essential. From a viewpoint of sustaining and inheriting the technical capabilities of local contractors, the Ministry has started studying and implementing measures aimed at restructuring the existing scheme of tendering and contracting, such as placing blanket orders covering multiple projects in a single deal each and encouraging the use of multi-year contracting.

The Ministry also encourages the development of an environment in which social infrastructures can be maintained, managed and upgraded in a more precise fashion through the use of local partnerships and PPP/PFI concepts, in its effort to drive public-private collaborations in their maintenance, management, upgrade and so on.

(7) Developing an integrated scheme of state management, and legislation, etc.

In March 2013, the Office for Promoting Measures Against Aging Social Capital was set up in the MLIT to move ahead with cross-sectional efforts to measures to combat aging infrastructures and propel their appropriate maintenance, management, upgrade, etc. on-site in its effort to build up an integrated scheme of management.

In addition, relevant amendments were made to the Road Law, River Law, Port and Harbor Law and more in the same year to address certain issues, such as expressly defining their criteria on maintenance and management, such as inspections.

(8) Promoting infrastructure service life extension planning

Prioritized support is being extended to local governments, etc. lagging in their formulation of infrastructure service life extension plans by newly including seacoast maintenance, dam, sedimentation control and other facilities in the scope of disaster preparedness and safety subsidization, etc. and stretching the period to qualify for such subsidization, etc. for river and park facilities.

The MLIT formed the Social Capital Maintenance Strategy Subcommittee under the Infrastructure Development Council and the Transport Policy Council in July 2012 to proceed with inquiries and discussions, which came up with a recommendation titled “Future Concepts of Maintenance, Management and Upgrade Social Capital” in December 2013. The recommendation suggests prioritized measures to be taken by the MLIT, local governments, etc. Pursuant to this recommendation, the Subcommittee will proceed to probe steps to put these measures into action, such as launching qualification systems on inspections and diagnostics, forming associations of specialists and building a new framework of maintenance activity surpassing the administrative boundaries of smaller municipalities.

(2) Developing efforts targeting infrastructures of every kind and carrying them forward through the future

The Infrastructure Service Life Extension Master Plan (hereinafter the “Master Plan”) was compiled at a meeting of the Liaison Conference among Ministers and Agencies Concerned with the Promotion of Measures Aimed at Combating Aging Infrastructures in November 2013 to disseminate such efforts across the government and further to local governments, private business operators and more working on infrastructures of any kind.

The concept of the Master Plan is to keep the PDCA cycle for maintenance activity running consistently, or taking the right action positively at the right timing to suit the results of isnspections and diagnostics carried out at one instance and keeping a record of the facility conditions, logs of the actions taken and so on to aid in the implementation of inspections and diagnostics at the next. Pursuing this effort would help make the infrastructures longer-lived and avoid large-scale repairs and renewals to the extent possible, which could not only trim the total costs that may be incurred for the implementation of mid- and long-term maintenance, management, upgrade and other activities and level the budgets, but open up new markets relevant to the efforts made in the meantime, such as inspections, diagnostics, repairs and upgrades, in an evolving segment of growth technology.

While the Master Plan identifies the measures relevant to these concepts, it encourages the managers, etc. of infrastructures located in every part of the nation to prepare infrastructure service life extension plans (action plans) to pursue positive implementation of these measures.

After following up “Near-Term Actions to be Taken to Maintain, Manage and Upgrade Social Capital” at the May 21, 2014 meeting of the Council on Measures to Combat Aging Infrastructures, the MLIT has just come up with its action

plan to reflect recommendations by the Council (Figure 3-7) .

Figure 3-7 Summary of the MLIT's Infrastructure Service Life Extension Plan (Action Plan) (decided on May 21, 2014)

Compiles an action plan based on the Infrastructure Service Life Extension Master Plan to reflect accomplishments and tasks emerging during the First Year of Social Capital Maintenance Activity.
Make efforts intended to allow social infrastructures to demonstrate their intended utilities over extended periods of time so that a maintenance cycle will be built and developed continually.
Ensure public security and safety, cut and level total costs and realize competitiveness for the maintenance industry.

1. MLIT's Roles

Roles of the "competent authority" to build schemes, systems, etc. relevant to infrastructures — Roles of Infrastructure Managers

2. Scope of Planning

Target: All the facilities whose programs or the like are supervised by the MLIT.
Period: Fiscal 2014 to fiscal 2020

3. Mid- and Long-Term Cost Prospects

Need to have more precise estimates of the mid- and long-term prospects of the costs of facility maintenance, management, upgrade and so on by probing into the actual status of the facilities and by individual facility planning.

4. Present Status and Tasks, and Directions for Efforts

	Present status and tasks	Directions for Efforts relevant to required measures	Examples of specific efforts
Checkups, diagnostics/repairs, renewals, etc.	Responses for facilities other than those subjected to total checkups Responses to changes in the social structure, such as diminishing population Shortage of technically competent staff members Secure the budget needed to put efforts into action/ Secure human resources to undertake inspections, diagnostics, etc.	Build maintenance cycles for all facilities. Review the need to have facilities, measures to be taken and so on. Enhance consultation desk functions, and training and education. Carry on and enhance support as by subsidization. Review tendering and contracting schemes.	Timely, appropriate checkups and diagnostics based on standards Repairs, renewals, concentration, etc. based on individual facility planning Enhancement and continuation Support efforts by disaster preparedness and safety subsidization. Fair pricing, etc., optimization of ordering lots
Development of Standards	Unclear position of standards Standards yet to be updated with new technologies and knowledge	Maintain standards in order. Update standards with new technologies and knowledge.	Visualize all standards with their positions clearly defined. Revise standards as appropriate at the right timing.
Development and Utilization of Information Infrastructures	Deficiency or lack of ledgers, etc. Inadequate uniform management aimed at information usage	Gather information through checkups, repairs, etc. Accumulate information and consolidate information in a unified manner, including that available from local governments.	Create and upgrade databases, and accumulate and update stored information. Share information among stakeholders.
Formulate individual facility plans	Presence of facilities for which plans are yet to be formulated Variations in coverage	Promote planning and enhance contents.	Expand the scope of planning. Develop and release guides, etc, and support by subsidization, etc.
Development and introduction of new technologies	Inadequate matching between field needs and technical seeds Unclear characteristics of new technologies (such as applicable conditions)	Industry-academia-government collaboration, and matching between needs and seeds Clarification of field conditions, etc. tailored to new technology usage	Field demonstrations and assessments, as by seeking public subscriptions with needs expressly defined Support of on-site introduction of new technologies via maintenance and management websites targeting specific characteristics of checkup and diagnostic technology
Budget management	Non-planned investment Revenue sources to cover action spending yet to be allocated	Reduction and leveling of total costs Review of benefits and burdens	Planned actions taken on the basis of individual facility planning Review towards allocation of revenue sources to cover investment on renewal
Constructing of systems	Inadequate assessment of technicians' technical capabilities Difficulty for local governments to respond alone Inadequate participation of users, such as the general public	Enhance qualification systems, and utilize technicians versed in advanced technical capabilities. Build a scheme of partnership between managers. Gain understanding from users, such as the general public, and promote collaboration.	Assess private qualifications and dispatch national governmental personnel, etc. Support municipalities by way of associations of stakeholders. PR activities conducted as by field inspection tours
Development of legislation, etc.	Unclear position of laws and regulations governing checkups, etc.	Clarify obligations and respond to changes in the social structure.	Define shares of responsibility for maintenance and repairs.

5. Others Follow up plans to enhance and deepen efforts. — Release information positively through websites or else.

To find out more, visit the following address at the MLIT website: http: //www.mlit.go.jp/sogoseisaku/point/sosei_point_mn_000003.html

Source) MLIT

The MLIT's action plan is a "maintenance guide," or a roadmap to maintenance engineering, that finalizes and visualizes the specific efforts it makes to help formulate facility-specific service life extension plans on those infrastructures that are managed by local governments, etc., as well as the central government, and thrust actions based on such plans.

The Ministry commits itself to a continuing policy of taking prioritized, planned actions to combat aging social infrastructures so as to get the concept of the management cycle come to firm stay nationwide and to carry forward the serious meaningfulness of the First Year of Social Capital Maintenance Activity and the relevant actions through the futures.

2 Getting Construction Works Executed Right, and Securing Manpower to Undertake Them

Contractors working to maintain, manage and upgrade social infrastructures require human resources to undertake these jobs. The MLIT works is at work to secure such human resources.

In May 2014, the Law Making Partial Amendments to the Construction Contractors Law, etc. took effect to update the Construction Contractors Law, the Law for Promoting Proper Tendering and Contracting for Public Works and other legislation with a view to ensuring correct execution of works, including maintenance, management and upgrade, securing human resources to undertake these jobs, prevent dumped order-taking and so on, pursuant to the Summary of Near-Term Actions to be Taken worked out in January 2014 at the Subcommittee on Basic Problems, Construction Workgroup, Industry Work Shop, Central Council on Construction Contracting Business and Infrastructure Development Council. This law has introduced anti-dumping as an additional concept of normalizing the practice of tendering and contracting for public works, dictating the submission of breakdowns of the bid amounts upon tendering and imposing obligations, such as requiring contractors' associations to secure and foster human resources and the Minister of Land, Infrastructure, Transport and Tourism to support them. The Law for Making Partial Amendments to the Law for Promoting Quality Assurance for Public Works effective in May 2014 also sets forth the mid- and long-term availability of human resources

as its key philosophy and recommends purchasers to set predetermined prices properly and take effective anti-dumping measures.

While demands for a certain amount of demotion work have loomed into sight as an era of full-scale maintenance and upgrade work sets in, it has become an imminent task to build an appropriate framework of construction in position to respond to a large bulk of problems, including fears of serious accidents involving the public and environmental issues. To preclude accidents during the execution of demotion work and ensure the quality of the work, demolition work has been added as a new sector of the construction industry relevant to its licensing to ensure the quality of the work, so that technicians equipped with relevant technical experience or qualifications will be deployed.

The Construction Industry Revitalization Council (chaired by Senior Vice-Minister Takagi) of the MLIT met in January 2014 to commit itself further to securing and fostering human resources to drive the construction industry in its continuing pursuit of short- and long-term solutions.

Conclusions

Thus discussed, various efforts are presently underway from the three perspectives of "Use it Wisely," "Supported by Everyone" and "Taking a Far-Sighted Vision." Working to ensure that these efforts will demonstrate their effects is necessary. What is also important is to drive further discussions to probe into the futures of the social infrastructures.

Efforts made from the perspective of using social infrastructures wisely can be exemplified by amendments made to the Road Law. As explained in Chapter 2, it is important to proceed with discussions of the scheme and concept of using social infrastructures wisely relevant to national land and transportation. Particularly, ways how to use the schemes of efficiently selecting users of social infrastructures and providers of services using social infrastructures should be explored in various aspects.

Efforts that have been made from the perspective of "Supported by Everyone" include the introduction of a concession scheme at an airport or else, an expanding scope of comprehensive work consignment to private sector and so on. To keep up with further progress, for example, it might be necessary to explore comprehensive work consignment to private sector deals that cover diverse or multiple fields of industry by themselves or promote a way of encouraging greater resident participation, as in Chiba Repo demonstration test.

From a perspective of "Take a Far-Sighted Vision" of social infrastructures, we need not only to support the implementation of efforts conscious of their longevity and life-cycle costs as they are used by local governments but also work to develop an environment that permits securing such human resources capable of maintaining, managing and upgrading them. Meeting these goals should dictate partnership between the central and local governments, and a mechanism to commit the construction industry to a long-term program to secure and foster human resources. In the meantime, it would be necessary for the administrators to keep local residents positively informed of the present status and future prospects of social infrastructures to enable the local residents to select and decide which social infrastructures to eliminate and consolidate and how to maintain, manage and upgrade them, with burdens on their future generations taken into consideration.

We need to always aware of what we can leave for our future generations as we strive to maintain, manage and upgrade social infrastructures.

Annotation 1 Estimating the Productivity Effect of Social Capital

1 Estimated Equation

The following Cobb–Douglas production function that allows for social capital stocks explicitly is presumed (one term earlier variables are used for private capital and social capital to deal with the endogeneity problem:

$$Y_t = A\,(H_t \cdot L_t)^{\alpha}\,(CU_t \cdot K_{t-1})^{\beta}\,G^{\gamma}_{t-1}$$

Y = total production, A = technical level of economy, H = number of hours worked, L = number of employees, CU = operating rate, K = private capital stock, G = social capital stock
Subscript t denotes the term.

At estimation, a linear homogeneity of production function ($\alpha+\beta=1$) relating to the labor and private capital was postulated to estimate the following logarithmically converted estimated equation in the least square method:

$$\ln Y_t = c + (1-\beta)\ln H_t \cdot L_t + \beta \ln CU_t \cdot K_{t-1} + \gamma \ln G_{t-1} + \varepsilon_t (\varepsilon\text{: error term})$$

The results of such estimation are summarized in the table below. Case 2 presents the results of estimation for social capital broken down into seven fields under the jurisdiction of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) (roads, ports and harbors, airports, sewage systems, urban parks, flood control and seacoasts). Case 3 presents the results of estimation for social capital limited to the three fields of traffic (roads, ports and harbors and airports) .

Social Capital Stocks	Case 1	Case 2	Case 3
Constant term (c)	-8.916 (-7.872) **	-8.917 (-8.310) **	-9.329 (-8.781) **
β	0.315 (2.822) **	0.309 (2.855) **	0.267 (2.481) *
γ	0.226 (2.700) *	0.229 (2.851) **	0.266 (3.263) **
Number of samples	35	35	35

(Notes) 1 The parentheses under the coefficient estimate enclose a t-value, which has been subjected to a robust Newy-Wet correction for the serial correlation.
2 * is significant with a significance level of 5%. ** is significant with a significance level of 1%.

2 Data

(1) Total production

For 1975 to 1979, the rate of change in the total production from a year earlier was determined from the values of subtotals "Gross Domestic Product (Real) by Economic Activity" in the Cabinet Office's Fiscal 1988 Annual Report on National Accounts (1990 Basis, 68SNA)," so that the total production was retrospectively estimated from the values of subtotals in 1980 in "Gross Products by Economic Activity (Real)" in the Cabinet Office's Fiscal 2009 Annual Report on National Accounts (2000 Basis, 93SNA). For 1980 to 2009, the values of subtotals in "Gross Products by Economic Activity (Real)" in the Cabinet Office's Fiscal 2009 National Accounts (2000 Basis, 93SNA) are used.

(2) Number of hours worked

For 1975 to 1979, yearly ratios were calculated from five-year data for 1980 to 1984 on surveyed industry totals (30 persons or more) and from the number of hours worked for the same period out of the data on "Number of Employees, Number of Employers and Number of Hours Worked by Economic Activity" in the Cabinet Office's Fiscal 2009 Annual Report on National Accounts (2000 Basis, 93SNA). Then, data on surveyed industry totals (30 persons or more) for 1975 to 1979 out of the Ministry of Health, Labour and Welfare's Monthly Labor Statistics Survey was multiplied by the five-year average of these yearly ratios as a conversion rate. Data for 1980 to 2009 was cited from "Number of Employees, Number of Employers and Number of Hours Worked by Economic Activity" in the Cabinet Office's Fiscal 2009 Annual Report on National Accounts (2000 Basis, 93SNA).

(3) Number of employees

Data for 1975 to 1979 was cited from "Number of Employees and Number of Employers by Economic Activity" in the Cabinet Office's Fiscal 1998 Annual Report on National Accounts (1990 Basis, 68SNA). Data for 1980 to 2009 was cited from "Number of Employees, Number of Employers and Number of Hours Worked by Economic Activity" in the Cabinet Office's Fiscal 2009 Annual Report on National Accounts (2000 Basis, 93SNA).

(4) Operating rate

For the manufacturing industries, operating rate index data out of "Indices of Industrial Production", the Ministry of Economy, Trade and Industry(METI), was used. However, since only data in 1978 and after was available, the operating rate data for 1978 to 2009 was subjected to regression with business sentiment diffusion index data on the manufacturing industries in the Bank of Japan's "Explanation of the Short-Term Economic Survey of Enterprises in Japan" to estimate the operating rates for 1975 to 1977 on the basis of the business sentiment diffusion index data.

For the nonmanufacturing industries, data from the METI's "Indices of Tertiary Activity" was used. Since only data in 1988 and after was available, data for 1979 to 1987 was estimated using the same method as for the manufacturing industries.

(5) Private capital stocks

Data on the real capital stocks of the manufacturing and nonmanufacturing industries in "Japan Industrial Productivity (JIP) Database 2013" by the Research Institute of Economy, Trade and Industry (RIETI), an incorporated administrative agency, has been used. Housing has been removed from data on the nonmanufacturing industries.

(6) Social capital stocks

Data was cited from the Cabinet Office's Japan's Social Capital 2012. To keep the scope of data consistent with the data on the private capital stocks, data from all the 17 fields of social capital listed there has been converted to 2000 basis and further to calendar year values, excluding railways, public rental housing, water services, forestry and fisheries, school facilities, postal services and industrial water, according to Miyagawa, Kawasaki and Edamura (2013). Further, patterns of diminishing social capital efficiency (physical depletion, obsolescence and so on) have been set and the value of capital services derived from the future social capital estimated from these patterns has been converted to a present worth using a discount rate.

[References]

Cabinet Office (2010): "Fiscal 2010 Annual Report on Japanese Economy and Public Finance"

Tsutomu Miyagawa, Kazuyasu Kawasaki, Kazuma Edamura (2013): "Review of the Productivity Effect of Social Capital," RIETI Discussion Paper Series 13-J-071

Annotation 2 Verifying the Welfare Effect of Social Capital

1 Estimated Equation

Following Karaki et al. (2006), the following equation has been estimated (for the process in which the estimated equation has been derived, refer to Karaki et al. (2006):

$$\ln R_i = a_0 + a_1 \ln I_i + a_2 \ln t_i + a_3 \ln g_i + a_4 \ln N_i + \varepsilon_i$$

R = residential land price per unit area, I = disposable income, t = commuting expense, g = social capital,
N = urban size (number of employees)
Subscript i denotes the area.

The marginal utility (R_g) measured in terms of the land price of the of the social capital stock can be stated in an equation as:

$$R_g = a_3 \frac{R_i}{g_i}$$

Estimation results are summarized in the following table:

Table Estimation Results (Metropolitan Employment Area)

Range of social capital stocks	Social capital	Under the jurisdiction of MLIT	Living and disaster preparedness under the jurisdiction of MLIT
Estimation method	Instrumental variables method	Instrumental variables method	OLS
Constant term	-1.906 (-1.726)	2.394 (1.660)	-6.221 (-8.134) **
a_1	1.822 (14.047) **	0.302 (1.168)	2.065 (17.906) **
a_2	-1.317 (-4.760) **	-0.780 (-5.822) **	-0.122 (-2.112) *
a_3	0.0330 (0.989)	0.142 (5.666) **	0.123 (7.012) **
a_4	0.317 (7.904) **	0.557 (9.036) **	0.109 (5.764) **
adj.-$\bar{R}^2$	0.505	0.459	0.639
Number of samples	919	919	919
Instrumental variable Note 3	Ratio of commuting to the central city	Ratio of commuting to a local municipality, central city dummy	-

(Notes) 1 The parentheses under the coefficient estimate enclose a t-value, which has been calculated using a robust White standard error against a non-uniform dispersion of the error term.
2 ** is significant with a significance level of 1%. * is significant with a significance level of 5%.
3 The variables listed on the "Instrumental variable" line are used as instrumental variables of the commuting expense.

Table Estimation Results (Micropolitan Employment Area)

Range of social capital stocks	Social capital	Under the jurisdiction of MLIT	Living and disaster preparedness under the jurisdiction of MLIT
Estimation method	Instrumental variables method	Instrumental variables method	OLS
Constant term	-1.767 (-1.418)	-0.608 (-0.640)	-0.703 (-0.719)
a_1	1.029 (4.210) **	1.384 (9.305) **	1.492 (10.283) **
a_2	-0.444 (-1.910)	-0.152 (-2.456) *	-0.174 (-3.424) **
a_3	0.0215 (0.218)	0.125 (3.260) **	0.0762 (2.137) *
a_4	0.546 (2.046) *	0.0158 (0.244)	0.0192 (0.308)
adj.-$\bar{R}^2$	0.290	0.426	0.408
Number of samples	328	328	328
Instrumental variable Note 3	Ratio of commuting to the central city	Ratio of commuting to a local municipality, central city dummy	-

(Notes) 1 The parentheses under the coefficient estimate enclose a t-value, which has been calculated using a robust White standard error against a non-uniform dispersion of the error term.
2 ** is significant with a significance level of 1% and * is significant with a significance level of 5%.
3 The variables listed on the "Instrumental variable" line are used as instrumental variables of the commuting expense.

2 Data

The municipalities that have been analyzed are those included in Metropolitan Employment Areas (MEA) and Micropolitan Employment Areas (McEA) (one government-designated city and one special district in each area) based on the 2005 Metropolitan Employment Area Standard available from Center for Spatial Information Science, the University of Tokyo.

The residential land price is the municipal average of residential land prices from "Prefectural Land Price Survey." The income is the municipal taxable income from the Ministry of Internal Affairs and Communications "Survey of the Status of Municipal Tax Imposition, etc." divided by the permanent population. The prefectural social capital is the prefectural social capital stock from the Cabinet Office's Japan's Social Capital 2012 that is prorated among the municipalities according to a certain standard. Further, the urban size is the number of employees in a Metropolitan Employment Area calculated from the MIC's "Population Census." The amount of the commuting expense is based on the average commuting time calculated from the MIC's "Housing and Land Survey" and the "Population Census."

[References]

Yoshitsugu Kanemoto, Kazuyuki Tokuoka (2002): "Japan's Urban Area Setting Criteria," Journal of Applied Regional Science, No.7, 1-15

Yoshihiro Karaki, Takashi Okuhara, Satoshi Tomari, Chisato Asahi, Tomoaki Nishihata (2006): "The Economic Effects of Public Capital Stock: Measuring Productivity Effects and Welfare Effects Through Urban Area Classification," Report No. 68, Policy Research Institute for Land, Infrastructure, Transport and Tourism

Annotation 3 Estimating the Effects of the Compactness of a City May Have Upon Administrative Spending

(1) Estimation method

Regarding a municipality having a DID district, the following equation has been estimated using the number of residents (N), the population density of the DID district (Density), the area of the municipality (Square) and the time dummy (Dummy) as explaining variables and the amount of annual spending per resident (EXP/N) as an explained variable, in which a fixed effects model is used for estimation to allow for the municipality-specific severalty:

$$EXP/N = c + \alpha \ln(N) + \beta \ln(Density) + \gamma_1 Square + \gamma_2 Dummy + \varepsilon$$

The estimation has been carried out using data derived from the two periods of fiscal 2005 and fiscal 2010 available in the MIC's "Regional Statistical Databases."

(2) Estimation results

Estimation results are summarized in the following table:

	Constant term	Population (logarithm)	DID district population density (logarithm)	Area	Adj R^2
Amount of annual spending per capita	2670.084*	-191.833*	-25.137*	0.003*	0.927

(Notes) 1 The time dummy is not shown here.
2 * is significant with a significance level of 1%.

Part II

Trend in MLIT Policies

Chapter 1 Initiatives towards Restoration and Reconstruction from the Great Eastern Japan Earthquake

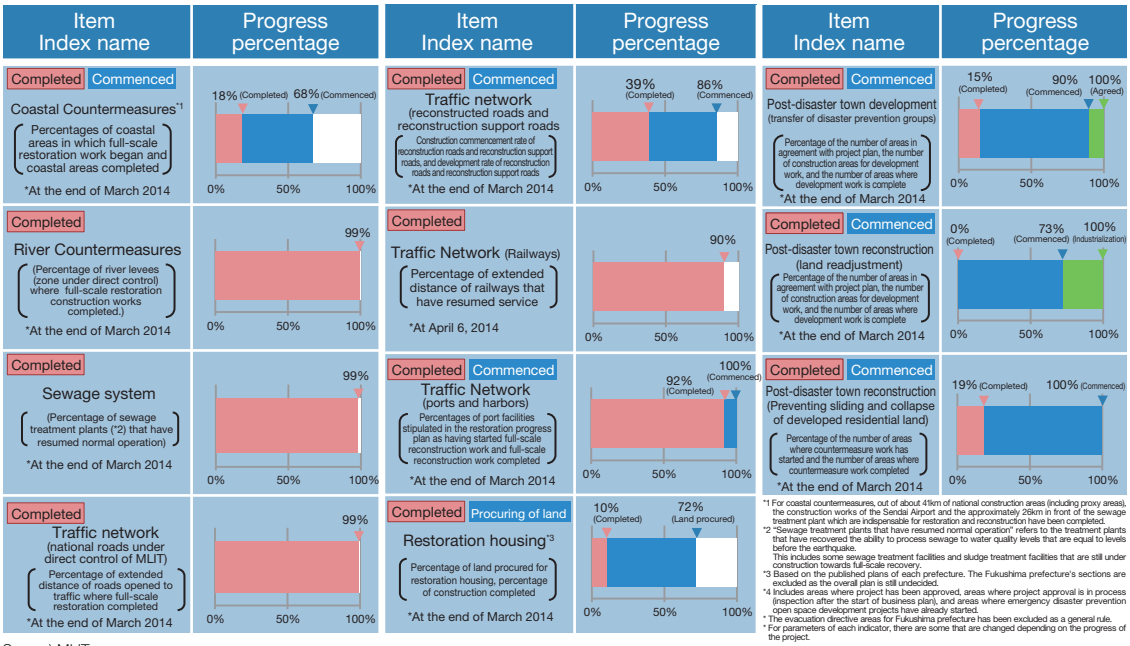
Section 1 The Current Status and Measures towards Restoration and Reconstruction

Accelerating the restoration from the Great East Japan Earthquake is currently the most important task the MLIT currently faces. Although the number of refugees has decreased from the initial 470 thousand individuals at the time of the earthquake, around 260 thousand people[Note1] currently lead lives in evacuation in approximately 1,200 municipalities[Note2] throughout 47 prefectures. The MLIT is working on further expediting the restoration and reconstruction process, making an all-out effort so that the people from the affected areas can begin to experience reconstruction in their lives.

Attentive to voices from areas affected by disaster, the MLIT will work as a united body to swiftly respond to on-site needs of the Regional Development Bureau, the District Transport Bureau, the Meteorological Agency, and the Japan Coastguard. In order to achieve this goal, in January 2013, we split the parliamentary secretaries into groups of three, and assigned a prefecture to each group as an affected Area Assistance Team within the MLIT to respond sensitively to requests from each area affected by disaster.

The emergency restorations of basic infrastructures such as roads and ports are mostly complete, and full-scale reconstruction work advances steadily as well. We will continue to faithfully execute the work according to the infrastructure progress schedule. Meanwhile, due to the necessity of expediting housing reconstruction and post-disaster town development, we will implement measures in the housing reconstruction and post-disaster town development process that will help accelerate progress. Specifically, we will do this by conducting a flexible review of the labor unit cost, securing human resources and materials by facilitating the supplying of ready-mixed concrete, and shortening the amount of time it takes to acquire land, so that we can help breakthrough any bottleneck in the process for affected area municipalities, according to the situation. We will also work to secure local public transportation and promote tourism in the affected areas.

Figure II-1-1-1 Status of Progress Towards Full-scale Restoration and Reconstruction of Public Infrastructures



Source) MLIT

Note 1 263,958 people, at March 13, 2014, according to Reconstruction Agency investigations.
Note 2 At March 13, 2014, according to Reconstruction Agency investigations.

Section 2 The Steady Recovery and Reconstruction of Infrastructures and Transportation

(1) Outline

For the public infrastructures under the jurisdiction of the MLIT, we are steadily working towards transitioning from emergency restoration phase to full-scale restoration and reconstruction, based on the project plan and progress schedule. We will continue our endeavors now and in the future to achieve the full recovery of north-eastern Japan as soon as possible, while staying mindful of requests from disaster stricken areas.

(2) Coastal Countermeasures

Of the 471 coastal districts, the full-scale restoration work on the sea embankment has started in 318 districts, and completed in 86 districts by the end of March 2014. Out of these areas, within the approximately 41km of the national construction section (including sections where disaster restoration is nationally covered), the construction has been completed for about a 26km section, and the rest is aimed to be completed around the end of March 2016. The bay entrance breakwaters, which will take some time to restore, are being reconstructed according to plan, to keep from hindering the city development and industrial activities as much as possible. The aim is to complete the reconstruction by around the end of March 2016.

In proceeding with construction, whenever possible, we are incorporating structures where the effects of the embankments will persistently demonstrate their capabilities, even when they are struck by tsunamis. In Iwanuma City, Miyagi, we have established a model where the embankments are integrated with green seawalls comprised of embankments with vegetation planted throughout. We also actively use disaster waste for embankment material, while paying careful attention to the surrounding landscape and natural environment during reconstruction.

(3) River Countermeasures

Aside from 2 of the sections that were inflicted with immense damages, we have completed the full-scale recovery of damaged embankments under government jurisdiction to safety levels (including for subsidence) equal to those before the earthquake. We will continue efforts while conforming to reconstruction plans formulated by municipalities in areas with the possibility of being struck by tsunamis and promote the elevation of embankments. As we aim to complete this project by the end of FY2015, we will progressively effectuate earthquake-resistant measures in embankments, liquefaction countermeasures, and the automation and remote operation of floodgates.

(4) Sewage System

Out of the 120 sewage treatment plants affected by the disaster (not including the 9 plants within the evacuation order area in the Fukushima prefecture), 2 plants do not need to be in operation as there is no waste-water being generated, and for the 117 other plants—not including the Sendai Minami Gamo Purification Center where the damage was extensive—the recovery of normal processing levels were completed by the end of FY2012. Of the treatment plants located within Fukushima prefecture's "evacuation order cancellation ready area," 3 plants have already completed full-scale recovery. In regards to the 675km of sewer pipes affected by the disaster, 603km of it was fully recovered from the of FY2013 to the present. We will continue to work in accordance with the reconstruction plan, and aim for earliest possible restoration and reconstruction, combined with the incorporation of earthquake and tsunami-resistant structures.

(5) Countermeasures against Sediment-related Disasters

Within Miyagi, Fukushima, Ibaraki, Tochigi, and Niigata prefectures, we have completed the sediment-related disaster countermeasures in 41 of the most urgent areas that were at risk of a collapse occurring. In addition, we are working on landslide countermeasures in water system areas like the Abukuma River, where there is a strong possibility that an intense seismic movement would cause unstable sediment to fluidize, which would lead to extensive damage to important transportation networks that are essential to the reconstruction work in the affected areas. Our goal is to complete these countermeasures by the end of FY2015.

(6) Roads

In regards to roads, 1) For expressways, of the sections restricted before the review of the Joban Expressway, the road

between the Joban Tomioka IC and Hirono IC that had been closed due to effects from the disaster, was re-opened on February 22, 2014, while the road between Minamisoma IC and Namie IC—which had been under construction when the disaster occurred—is scheduled to re-open sometime in 2014, and the road between Namie IC and Joban Tomioka IC has ongoing maintenance work being done with the goal of opening for use before Golden Week holiday period (from the last week of April to the second week of May)in 2015, 2) National highways under direct control had mostly completed full-scale recovery by the end of FY2012 (National highway No.45, which had been damaged in major areas like bridges, was recovered according to the reconstruction plan), 3) Reconstruction roads and reconstruction support roads, with the inclusion of sections that had been newly added to the project, are moving forward with construction work by using the technical capabilities of the private sector in a project development system (project promotion PPP), and started construction work on 4 roads in 18 sections by the end of FY2013. Furthermore, in April 2014, the prospect of the roads being opened to traffic was confirmed for the first time for reconstruction roads and reconstruction support roads that were added to the project after the disaster. 5 sections—42km—of roads is expected to be opened for use within 6 to 7 years after commercialization, which is an unusually quick time frame. This has confirmed the opening of approximately 60% of the total area, including sections that have already been opened for use.

(7) Railroads

Out of all the railways affected by the Great East Japan Earthquake, there are 6 railway lines from the Sanriku Railway and JR East that still have sections that have suspended services (JR Yamada line, Ofunato line, Kesennuma line, Ishinomaki line, Senseki line, and Joban line).

The Sanriku Railway used the support system that was newly established in the FY2011 Third Supplementary Budget to start reconstruction work during that same year, and re-opened services between the Tanohata station and Rikuchunoda station on the Kita-riasu line by April 1, 2012, and service between Yoshihama station and Mori station on the Minami-riasu line by April 3, 2013. Currently, reconstruction work on the remaining suspended service sections continues, and it is expected that the service between the Kamaishi station and the Yoshihama station on the Minami-riasu line, and service between Tanohata station and Shohon station on the Kita-riasu line, will be re-opened by April 5 or 6 of 2014, which would mean full recovery of the Sankiru Railway lines.

In regards to the service between Tatsuta station and Hirono station on the Joban line, the service is expected to re-open in accordance with Nahara Town's "returning to the town decision," which will be determined in the spring of 2014. Furthermore, the reconstruction work has already been started to re-open services on the Ishinomaki line and Senseki line within 2015, and the service between Hamayoshida station and Soma station on the Joban line to be re-opened by the spring of 2017.

Meanwhile, the MLIT Tohoku Department of Transportation has been appointed the secretariat for the Yamada line, Ofunato line, and the Kesennuma line at the reconstruction coordination meetings—comprised of municipalities along the railway lines, JR East, and restoration offices—of each railway line, in order to move forward ideas for integrating the restoration of the railway lines with the city development. In addition, to secure public transportation for the time being, BRT [Note] has been set up as a temporary recovery measure for the Kesennuma line since December 22, 2012, and for the Ofunato line since March 2, 2013.

(8) Ports and Harbors

The disaster recovery work was completed for the Port of Hachinohe at the end of July 2013. In regards to the other ports, we have been advancing the restoration of thing like the bay entrance breakwaters according to the 'Industry and Logistics Reconstruction Plan,' while working to restore port facilities like quays and breakwaters, which will become the foundation for economic recovery.

Meanwhile, the sea area landfill sites of Sendai Shiogama and Ishinomaki ports zone and the Ibaraki and Hitachi-Naka ports zone are undergoing maintenance in order to advance the disposal of disaster waste produced by the Great East Japan Earthquake. Landfill disposal has started in the Sendai Shiogama and Ishinomaki ports zone in February 2013, and in the Ibaraki and Hitachi-Naka ports zone in July 2012.

Note Abbreviation for Bus Rapid Transit. Refers to a bus transportation system that is faster and more punctual than regular bus systems by using bus-only roads.

Section 3 Promoting Post-Disaster Town Reconstruction and Securing Stability of Residency

(1) Promoting Post-disaster Town Reconstruction

We are working on making smooth progress in the reconstruction projects, in accordance with residential reconstruction plans that incorporate flexible reviews of project techniques and project zones, and ingenuity, such as the stage-based execution of reconstruction projects.

By the end of March 2014, Promoting Group Relocation for Disaster Mitigation, such as the relocation of group to upland, had already secured the consent of the Minister of Land, Infrastructure, Transport and Tourism which is the legal procedure for undertaking projects and all 339 districts scheduled to be relocated, based on the "Work Schedule for Housing Reconstruction," and have already commenced construction work on 304 districts. For the land readjustment projects, all 51 districts scheduled to be done according to the "Residence Recovery Construction Time Table" are already in the project commencing stage, with construction started at 37 districts. As the reconstruction projects progress full-scale in the disaster affected areas, we need to compensate for the lack of personnel and know-how in the disaster affected municipalities, to help the projects progress smoothly.

For these reasons, in addition to supporting the progress of projects by providing personnel support to disaster affected local public organizations, implementing procurement methods for relieving the burden of procurement operations in disaster affected local public organizations, and utilizing the Urban Renaissance Agency, we also disseminate information by providing technical support through notifications regarding procedures for the efficient execution of reconstruction projects, and also by posting the 'Reconstructive City Development INDEX,' an online website for compiling support initiatives.

(2) Securing Stability of Residency

Similar to town development, based on the residential reconstruction plan comprised of reconstruction schedules respective to district, we are working to swiftly secure stability of residency through support projects mentioned below. For victims who are able to build or obtain housing by their own means, interest rates are lowered for disaster recovery housing loans provided by the Japan Housing Finance Agency. Disaster recovery housing loans are also provided to victims who have suffered damages to their sites. Pre-existing loans are given extensions of payment term and payment deferment which are up to 5years, as well as interest rates being lowered for loans during deferment.

Victims who face difficulties in building or obtaining housing by their own means are being provided public housing (restoration housing) by local public organizations. In addition to distributing grants to offset the cost of maintenance in these facilities and expenses resulting from lowering rent for victims, we are devising special arrangements concerning the requirements for occupant qualification and assignment of housing facilities.

Moreover, in response to the Fukushima No.1 Nuclear Power Plant Accident, we plan to secure the stability of residency for the refugees residing in evacuation zones by providing them the same accommodations as the natural disaster victims of the earthquake and tsunami, such as moving into restoration housing.

Figure II-1-3-1 Development Status of Restoration Housing (March 31, 2014)

Prefecture	Building sites	Planning initiated	Construction initiated	Construction completed	Provision plan
Iwate prefecture	107 districts 4,028 houses	89 districts 3,461 houses	51 districts 1,862 houses	23 districts 574 houses	Approximately 6,000 houses (11 municipalities)
Miyagi prefecture	237 districts 11,363 houses	190 districts 10,129 houses	88 districts 4,757 houses	30 districts 1,343 houses	Approximately 15,000 houses (21 municipalities)
Fukushima prefecture	72 districts 3,274 houses	64 districts 2,944 houses	36 districts 2,072 houses	12 districts 357 houses	Overall plan is yet to be decided

Source) MLIT

Column Efforts towards Creating the "New Tohoku"

Even before the earthquake disaster, the Tohoku region faced significant amounts of the challenges of which many other regions currently face, like population decline, aging population, and de-industrialization. For this reason, instead of merely restoring the region to the level before the earthquake, we are working on using the reconstruction opportunities of disaster recovery to overcome some of these challenges to create a national and global model of "New Tohoku."

First, we are implementing the "New Tohoku" cutting edge model creation project, based on advice from a wide range of leaders (such as companies, universities, and NPOs), to accelerate the pioneering efforts. For example, in terms of town development, in FY2013 Rikuzentakata City, Iwate adopted the concept of "Sharing life with family and friends, appreciating enjoyments close to home," and began to work on designing residential districts that reflected the opinions and ideas of actual residents. This included having workshops for residents to endeavour to design meeting facilities that are easy to gather at, and makes people want to meet there.

Also, in the construction of disaster public housing being advanced in each area, there are many that have incorporated "creativity" for solving future regional challenges, and "particularity" in design to highlight the advantages and characteristics of the region and towns. For example, at the housing complex constructed in Otsuchi Town, Iwate, in addition to installing verandas in each residential unit, they have also placed a meeting facility and a square at the entrance to the housing complex as a place for community building for the whole region, using creativity to create opportunities for pedestrians and residents to have daily interaction.

In these ways, the areas affected by disaster are using both 'hard' and 'soft' approaches to start initiatives that aim for community development, and active, comfortable lifestyles. These initiatives are not limited to disaster affected areas. Our hope is to extend these efforts to other regions nation-wide that are facing the same challenges.

Disaster Public Housing, Ogakuchi District, Otsuchi Town, Iwate Prefecture

Source) Reconstruction Agency
(Reference) "New Tohoku" Case Studies of Well-Designed Residences
http://www.reconstruction.go.jp/portal/juutaku_koukyou/20131206171957.html

Section 4 Securing Local Public Transportation and Promoting Tourism

(1) Securing Local Public Transportation

In regards to the local public transportation, which suffered damages from the Great East Japan Earthquake, we are taking exceptional measures such as mitigating the auxiliary requirements for The Program for Ensuring, Maintenance and Improvement of Local Public Transportation Systems to support the securing and maintaining of local public transportation systems such as buses and share taxis in disaster affected areas. Specifically, these measures support the securing and maintaining of inter-regional mainline bus transportation networks, as well as community bus transportation for daily commutes between evacuation shelters, temporary housing, remaining settlements, and newly built housing, hospitals, shops and public agencies. From FY 2012, the maximum limit for financial aid to community bus transportation was increased for conditions that meet specific requirements.

(2) Reviving Tourism

To recover the major drop in the number of foreign tourists coming to the Tohoku and North Kanto areas after the earthquake, we are working on dispelling harmful rumors in major overseas markets and engaging in PR work regarding the recovering of tourism in these regions.

To be more specific, we posted accurate information regarding things like radiation doses on the Japan Government Tourist Office website for the benefit of overseas consumers, and we invited members of foreign media to the Tohoku region to promote the appeal of the Tohoku as a tourist destination. In addition, we invited overseas travel companies to the Tohoku region, and communicated tourism information about the Tohoku region by supporting the development of travel products and having an overseas travel exposition. Furthermore, for overseas governments, we held the Japan/ASEAN Tourism Cooperation Policy Dialogue in the Tohoku region. These visits to the Tohoku area, and the sending out of accurate information and appealing to the attraction of Tohoku, as well as other efforts to recover the demand for tourism, resulted in the number of overseas tourists visiting Japan reaching the highest it ever had of 10.36 million visitors in 2013 (24% increase compared to previous year, 67% increase compared to two years ago).

We are also implementing different initiatives to recover national tourism. For the Pacific Ocean coastal areas in particular, we have supported efforts for both going to other regions and receiving visitors from other regions by developing public relations, improving the dispatch of information, advancing the creation of travel products and recovery tours that are unique to the region, passing on the memories from the earthquake, and creating systems to promote visitation exchanges. In addition, to facilitate the earliest possible recovery of tourism in Fukushima prefecture, we supported tourism-related businesses that contributed to the efforts for reputation damage control and disaster recovery.Furthermore, starting in March 2012, we began the full-scale promotion of the "Tohoku & North Kanto Visiting Campaign," which supports the recovery of Tohoku and the North Kanto regions through visitation. Aiming to expand the scale of solidarity, we are widely requesting the cooperation of local citizens by collecting and disseminating information regarding activities of endorsement organizations on the Japan Tourism Agency website.

According to the Accommodation Survey conducted by the Japan Tourism Agency, the annual values of 2013 [Note 1] showed that the number of overnight guest was about 456 million overnights, the highest value since the survey had been conducted from 2007, and an increase of 3.8% compared to the previous year, showing a noticeable trend of recovery in the domestic economy.

In the 6 prefectures in the Tohoku area [Note 2], the total number was about 39 million overnights, showing a 0.8% increase from 2010, from before the earthquake disaster. However, if we look at the total number that are mainly for tourists [Note 3], the number has decreased by 21.2% compared to 2010, showing that the major scars left by the earthquake disaster is preventing the national economic boom from reaching these areas.

Section 5 Ensuring the Smooth Execution of Reconstruction Projects

Due to the increase in the number of construction work orders for restoration and reconstruction projects in the disaster affected areas, there have been cases of problematic bids and non-bidding, mainly for construction work with difficult execution conditions. Even for such construction projects though, by the ordering party being more creative when re-ordering—like increasing the size of the order lot—most projects have been able to reach the contract stage. In order to secure the smooth execution of construction projects by considering the amount of manpower and materials required for construction, the MLIT has taken the necessary measures by cooperating with relevant organizations and related businesses through the "Reconstruction Acceleration Conference," (the meeting was held three times since March 2013) and the "Liaison Council for Securing Construction for Restoration and Reconstruction Projects" (the council was held eight times since December 2011). At these meetings, to set the estimated price in accordance with the prevailing price, the labor unit price at disaster affected areas was increased by approximately 21% in April 2013, and increased again about another 8% in February 2014. We are also introducing reconstruction factors that are derived from reconstruction unit prices and indirect construction costs that take into account the actual construction conditions in disaster affected areas.

Note 1 Provisional value
Note 2 The 6 prefectures in Tohoku region: Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima.
Note 3 Facilities mainly for tourists refers to facilities that answered that over 50% of all their overnight guests stay there for tourism purposes.

In addition, the national and prefectural governments are working on setting up plants to address particular concerns regarding the shortage of raw concrete.

Section 6 Reconstruction, Revitalization and Etc. of Fukushima

After the occurrence of Tokyo Electric Power Fukushima No.1 Nuclear Reactor accident, the number of refugees from the evacuation zones was approximately 81,000 individuals, while the total number of refugees in the Fukushima prefecture including self-imposed evacuees climbed to approximately 135,000 individuals as of March, 2014 (according to studies by the Reconstruction Agency). Considering that the review of the evacuation directed areas was completed by August 2013, and that the evacuation directive was lifted from the Tamura City on April 1, 2014, the national government must now work on the recovery of infrastructures and daily living-related services in other municipalities, speeding up the progress in decontamination work, and expanding and improving the support provided for people starting over their lives and the early return support measures, so that the residents and local governments can begin to take new steps towards their future. The MLIT strives to actualize the soonest possible return of those in evacuation through efforts such as reconstructing infrastructures, implementing measures for the toll-free use of expressways for refugees, and overcoming harmful rumors, in accordance with the "Early Return and Resettlement Plan," established in March 2013, and the "Speeding Up of Recovering Fukushima from the Effects of the Nuclear Accident," which was approved by the cabinet in December of the same year.

Section 7 Developing Tsunami-resistant Communities learned from the Great East Japan Earthquake

Learned from the Great East Japan Earthquake, "Act concerning the Development of Tsunami Resistant Communities" was enacted and enforced in December of 2011. According to the principle of "Human life is most important," this law promotes a development of tsunami-resistant communities based on the concept of multiple defenses which combines infrastructure development and other forms of measures targeting the largest class tsunami.

In 2012, the MLIT provided technical advice related to the enactment of the aforementioned law to support local governments in building communities resistant to tsunamis, and published guidance documents regarding the settings for tsunami flood measurement. We also established a consultation service for inquiries related to tsunami flood suppositions and exchanged opinions between municipalities.

As a result, since August 2012, tsunami flood suppositions for maximum level tsunami occurrences have been published for 17 prefectures (as of March 2014). In addition, in March 2014, for the first time nation-wide, a damage potential zone was specified for Tokushima prefecture, and a plan (Promotion Plan) was formulated to promote the overall tsunami-resistant community development for Yaizu City, Shizuoka.

In the disaster stricken areas, recovery efforts have been promoted by utilizing "Act concerning the Development of Tsunami Resistant Communities." For example, 18 city planning districts of "Collective Facilities Forming Tsunami-resistant Urban District", including Shizugawa district in Minamisanriku Town, have decided as of March 2014.

By maximum use of existing public and private facilities and relevant tsunami-resistant measures, the MLIT will actively put forward developing tsunami-resistant communities in order to protect the lives of citizens.

Chapter 2 Deploying Land, Infrastructure, Transport and Tourism Administration Tailored to Urges of the Times

Section 1 Driving the Implementation of a National Land Policy Package

The implementation of a comprehensive national land policy package has been driven on the basis of a full package of measures designed to guide the work of national spatial land planning; namely, National Spatial Strategies (national plan) (2008 Cabinet decision), which envisions "the construction of a national land where diverse regional blocks develop autonomously and the creation of a beautiful national land where life is comfortable" as a new vision of national land, Global Regional Plans (2008 Minister decision), which summarize the regional strategies of the individual global blocks and the specific approaches they take to implement the strategies and the Fourth National Land Use Plan (national plan) (2008 Cabinet decision), which is committed to a key principle of sustainable land management. The implementation of these plans is being monitored from year to year to get them consolidated among the stakeholders concerned with National Spatial Strategies.

About six years since the formulation of National Spatial Strategies (national plan), Japan is confronted with drastic changes, such as intensifying competition between nations and cities in pace with progressive globalization and imminent possible threats from huge natural disasters, such as right-under-capital earthquakes and the Nankai Trough Megaquake, as well as a rapidly shrinking population in an aging society with falling birthrates, with the population predicted to halve in about 60% of all the regions in 2050 and elderly people accounting for about 40% of the total population. To address these changes, it is necessary to share the sense of crisis and then put together the wisdom of the public people to conceive national land policies from long-term perspectives.

Since October 2013, a new, mid-to-long-term (about 2050) "National Land Grand Design Plan" had been explored to determine the future course of national land and community development through sessions, etc. of expert panels. In March 2014, a general outline of the Plan was publicized.

Views and opinions on this outline will be collected from broad sources, including locals, to discuss it in further detail so the new "National Land Grand Design Plan" will be finalized.

Section 2 Driving the Implementation of Third Priority Plans for Social Infrastructure Development

Priority Plans for Social Infrastructure Development are formulated to drive the efficient and prioritized implementation of social infrastructure development projects in accordance with the "Act on Priority Plan for Social Infrastructure Development."

The Third Priority Plan for Social Infrastructure Development (FY2014 to FY2016), approved at an August 2012 Cabinet meeting, envisioned what the ideal form of medium-to-long-term social infrastructure development should be to address a variety of issues, such as tight fiscal situations and proceeded to set forth four priority goals based on the standard of selection and concentration (namely, "mitigation of large-scale or broad-based disaster risks" "reinforcement of nation's industrial and economic foundations and international competitiveness," "realization of a sustainable and vital national land and regional development" and "precise maintenance, management and renewal of social infrastructures") in its continual bid to develop social infrastructures in true need.

The effectiveness of plans is ensured by conducting follow-ups. The planning group of the transport policy committee under the Social Infrastructure Improvement Council and Transport Policy Council worked to determine the status of achievement of the goals declared in the Priority Plans, the status of implementation of projects and measures and so on.

Section 3 Promoting the Implementation of Transport Policy

1 Basic Act on Transport Policy

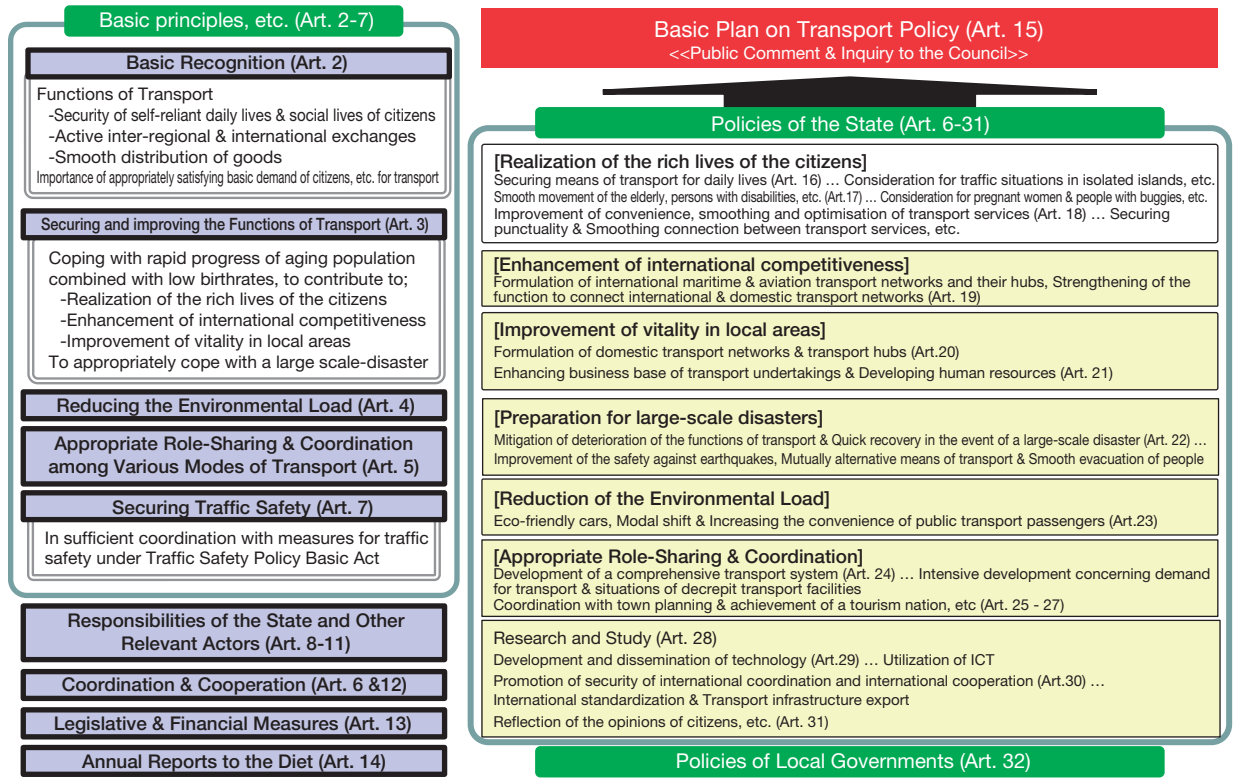
The Basic Act on Transport Policy was promulgated and enforced in December 2013 as a key legislation that defines the basic principles of the transport policy, stipulates the policies to be taken to implement these principles and the responsibilities of the State and local governments, and so on.

The Basic Act on Transport Policy is meant to establish a framework that formulates and implements policies on transport with integrated support from relevant parties in order to meet the needs of the present age for transport. It stipulates the basic principles in promoting transport policies, such as realizing the rich lives of the citizens, enhancing international competitiveness, improving vitality in local areas and getting prepared for large-scale disasters, and the basic policies that need to be implemented to realize these principles, in recognition of the value of properly fulfilling the basic demand for transportation among the public, etc..

The Act goes on to lay down the responsibilities of the State and local governments for formulation and implementation of policies on transport, the responsibilities of the operators and the role of the citizens in cooperating on implementation of the policies, and coordination and cooperation among these parties, etc.. Further, the Government is set to formulate a "Basic Plan on Transport policy", a fundamental scheme relating to policies on transport, and to articulate key guidelines and goals of the policies on transport as well as measures to be taken by the Government, and so on.

The Government is committed to tackling various tasks relating to transport policies in a concerted effort to promote implementation of policies on transport in a comprehensive and systematic manner.

Figure II-2-3-1 Structure of Basic Act on Transport Policy



Source) MLIT

2 New Institutional Approaches to Enhanced Local Public Transportation

While population progresses to decline in an aging society with falling birthrates, concerns grow over downsized public transport networking and a degraded quality of services particularly in localities. In the meantime, local public transportation is of vital importance particularly to those who are unable to drive car, such as students and elderly people. Keeping up and even consolidating local vitalities also calls for enhancing local public transportation in coordination with a compact community development endeavor.

As the management climate continues to grow harder on the undertakers of local public transportation than ever, the traditional framework dependent on private operators would no longer be fit to fill the social needs for local public transportation. An urgent task looms, therefore, to build a new framework for implementing an optimal localized solution to transport networks and transport services in the initiative of the local governments responsible for total local administration by maintaining reasonable shares of responsibility with the stakeholders, with consensus from them and from viewpoints of community development, tourism vitalization and so on.

Under the circumstances, the Local Public Transportation Group of Transport System Section of the Traffic Policy Council came up with an intermediate recommendation titled "Basic Philosophy Concerning New Institutional Approaches to Enhancing Local Public Transportation," in January 2014 after having met five times since September 2013.

Figure II-2-3-2 Present Status and Problems of Local Public Transportation

Drastically declining number of passengers carried

	Year 1990	Year 2000	Year 2010
Passenger bus service	6.5 billion passengers	4.8 billion passengers	4.2 billion passengers (down 35% from 1990)
Local railways	5.1 hundred million passengers	4.3 hundred million passengers	3.8 hundred million passengers (down 25% from 1990)

(Source) Annual Report on Road Transport Statistics, Annual Report on Railway Transport Statistics and Ministry of Land, Infrastructure and Transport survey

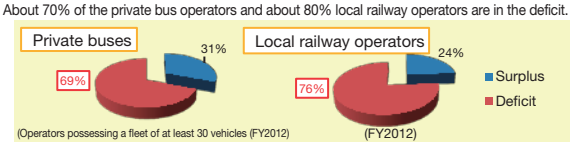
Passenger bus routes covering about 8,160 km were totally abolished for the last five years.
Railway routes covering about 105 km at about seven locations were abolished for the last five years.

Reduced service frequencies (passenger bus service)

	Year 1970	Year 1989	Year 2009
Average number of service runs per km of route	About 16	About 11	About 7.3

(Source) "Japan's Bus Service," Nihon bus Association

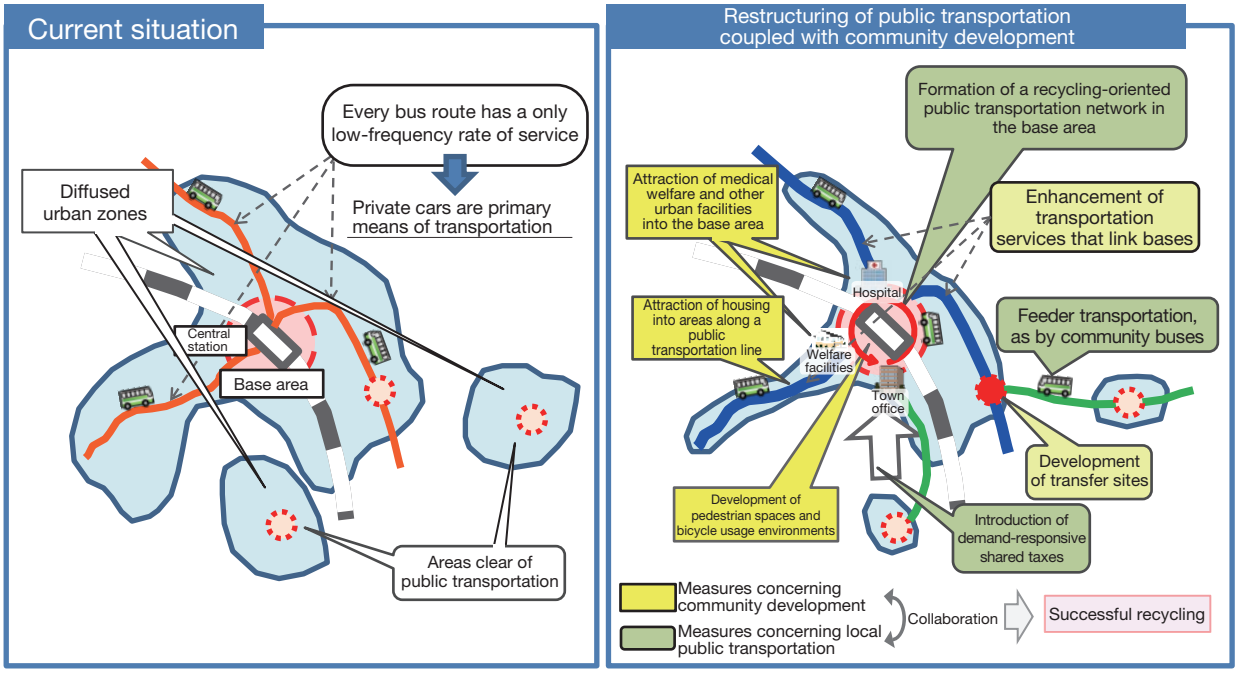
About 70% of the private bus operators and about 80% local railway operators are in the deficit.



Source) MLIT

Responsive to this move, the Ministry of Land, Infrastructure and Transport submitted the Bill for Making Partial Amendments to the Act on Revitalization and Rehabilitation of Local Public Transportation Systems to the 186th session of the Diet to get it resolved in May 2014.

Figure II-2-3-3 Concept of How Public Transportation Can Be Restructured by New Institutional Approaches



Source) Prepared by the MLIT based on the approaches taken in Toyama City, Kumamoto City, Toyooka City, Sanjo City and elsewhere.

Section 4 Driving the Implementation of Ocean Policy (Oceanic State)

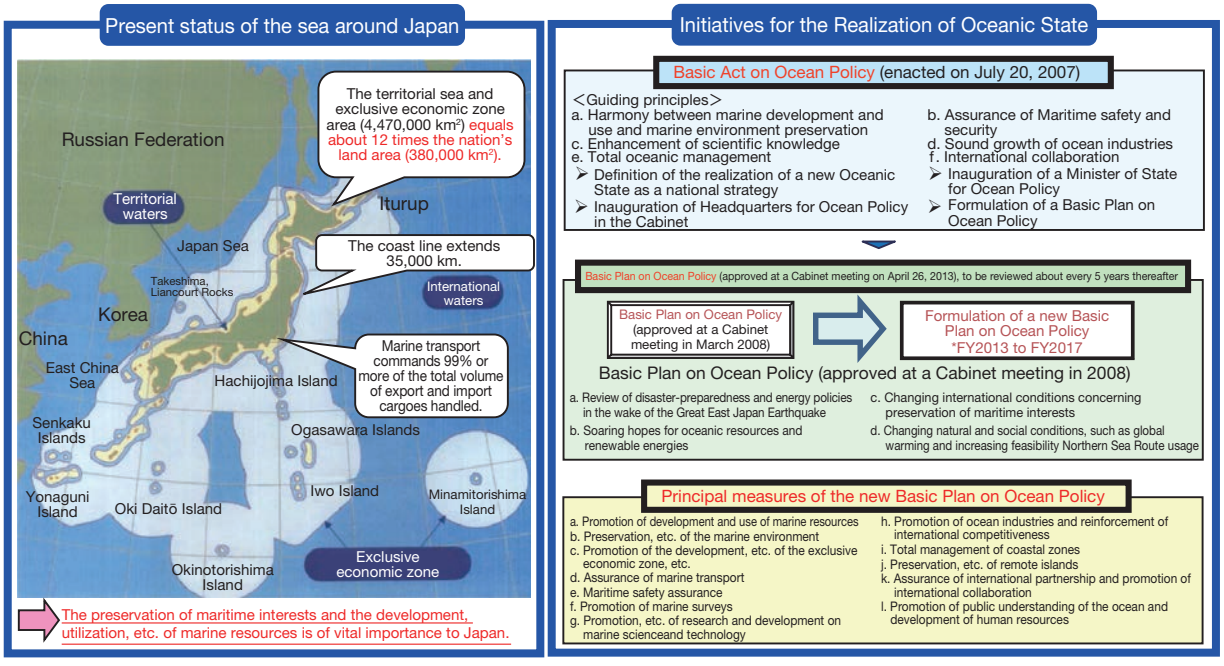
A nation surrounded by sea on its four sides, Japan recognizes the vast expanses of surrounding sea as a frontier, which urges the nation to grow into an "oceanic state" in its true sense. The Ministry of Land, Infrastructure and Transport has been driving the implementation of ocean policies by working in conjunction with the governmental agencies concerned pursuant to the "Basic Plan on Ocean Policy" based on the "Basic Act on Ocean Policy" as many of the administrative fields relevant to oceans fall under its jurisdiction.

The first version of the Basic Plan on Ocean Policy came as a Cabinet decision in March 2008 with the understanding that it would be reviewed about every five years. In April, 2013, a new Basic Plan on Ocean Policy was approved at the Cabinet meeting.

In the current context of disaster preparedness and energy policies having been refurbished in the wake of Great East Japan Earthquake, soaring hopes for oceanic energies and mineral resources, such as methane hydrates, and changing social conditions, including international climates concerning the preservation of maritime interests, the new Basic Plan on Ocean Policy is organized of four approaches and directions designed to let Japan grow into an oceanic state: a. International collaboration and contribution to the international community, b. Wealth and prosperity derived from oceanic development and usage, c. Transition from a sea-guarded state to a sea-protecting nation and d. Challenging an untrampled frontier.

The Ministry of Land, Infrastructure and Transport is also geared at driving the implementation of the ocean policies at a steady pace according to the guidelines stipulated in the new Basic Plan on Ocean Policy. Specifically, it is committed not only to encouraging the usage of renewable oceanic energies, oceanic resources, etc., ensuring efficient marine transportation of energies, etc. and revitalizing ocean industries, but also bolstering the structural strength of the Japan Coast Guard to protect Japan's sovereignty and territorial land and waters and further to conditioning the environments for supporting oceanic frontiers, etc. as by promoting the maintenance and management of exclusive economic zones, implementation of ocean surveys, etc., protecting low-water lines that justify Japan's exclusive economic zones and developing footholds on Okinotorishima Island and Minamitorishima Island.

Figure II-2-4-1 Driving the Implementation of Ocean Policy



Source) MLIT

Section 5 Efficient, Prioritized Deployment of Measures

1 Driving Improvement of the Total Cost Structure of Implementation of Public-Works Projects

With tight financial status, etc. in the background, the whole government is pursuing to improve the cost of implementation of public-works projects. The Ministry of Land, Infrastructure and Transport formulated a Program for Improving the Cost of Implementation of Public-Works Projects in March 2008 in its bid to improve the total cost structure. The Program values the concept of maximizing VFM [Note 1], in addition to the actions already taken, and uses a "total cost improvement factor" to "evaluate the improvement of the social cost structures of environmental load abatement, etc.," "the improvement of life-cycle cost structures using longer-lived facilities" and "the improvement of cost structures through technical innovations by private businesses." It aims to boost the total cost improvement factor by 15% over a five-year period from its FY2007 level. In FY2012, the MLIT and the associated agencies, etc. realized a total cost improvement factor of 11.7%.

2 Ensuring the Quality of Public Works and Promoting Proper Tendering and Contracting for Public-Works Projects

(1) Review of the comprehensive evaluation bidding method [Note 2]

The "Act on Promoting Quality Assurance in Public-Works Projects" (hereinafter called "Quality Assurance Act") enforced in April 2005 requires the quality of public works to be "assured by signing a contract that is generally superior in both terms of price and quality with due consideration given to economics and diverse non-pricing factors taken into account."

The practice of a comprehensive evaluation bidding method has been promoted after enforcement of the Quality Assurance Act to such extent that it has penetrated almost all of the construction works carried out under direct supervision of the MLIT since FY2007, and all prefectures, government-ordinance-designated cities and 62.5% of all the municipalities have introduced the method.

As more efforts continue to broaden the scope of its application, its problems have loomed, such as increased burdens on the competition participants and purchasers and deviations from the guiding principles of the method. To resolve these problems, remedial measures have been put into action, including polarization of the construction directly supervised by the Ministry into two alternative approaches starting from FY2014, namely, the "construction capability evaluation type", whereby contractors' construction capabilities are evaluated, and the "technical proposal evaluation type", whereby technical proposals submitted by the contractors, as well their construction capabilities, are evaluated.

(2) Introduction of the regional maintenance contract method

In August 2011, amendments to the "Guidelines on the Measures Taken to Promote Proper Tendering and Contracting for Public-Works Projects" were approved at a Cabinet meeting to fuel further improvement of the tendering and contracting system, ushering in the "Regional Maintenance Type Contracting Method" as a new method of contracting to help acquire supporters of regional maintenance projects (disaster recovery, snow clearance and infrastructure maintenance and management projects) and to encourage the central and local governments, etc. to leverage diverse methods of ordering, such as blanket ordering to cover both design and construction and construction-managed ordering.

(3) Approaches to assuring quality in the construction stage

Other ongoing efforts include the promotion of information sharing between contractor and contractee to assure the quality of work objects, and the trial practice of "in-process inspections," which verify the status, etc. of construction works across the flow of construction processes, and "quality certifications by third parties under contract from the builders."

Note 1 Value for Money, or the concept of providing the most valuable service for investment in the implementation of a public-works project, from inception, through planning, to maintenance and management, with due consideration being given to its economics.

Note 2 The method of selecting a successful bidder by giving a comprehensive evaluation to pricing and non-pricing factors.

(4) Review of varied tendering and contracting options, etc.

From now on, it would be necessary to maintain, manage and upgrade social capital stocks keeping in balance with the development of social capitals in true need. In the meantime, concerns over the future strategic maintenance, management and upgrade of social capital stocks mount as diminishing construction investment has left local constructors in ruins, forcing them to take orders dumped amid stiffening market competition, with the result of constrained subcontractors, a declining population of young workers entering the industry and so on.

Administrators of social capitals are also urged to properly respond to the challenges of diversified and sophisticated needs for infrastructure services with their limited supply of human resources, dictating a drastic overhaul of the ways jobs get done, including shares of responsibility between the public and private sectors.

Filling this need calls for building a stable construction, production and management system that properly gets the jobs of servicing infrastructures, such as planning, surveying, designing, constructing and maintaining and managing them, getting prepared for natural disasters and so on, for maintaining proper shares of responsibility between the public and private sectors and between the private sectors and also for the introduction, use, etc. of varied tendering and contracting options tailored to the needs of the times and characteristics of the public-works projects.

To this end, the "Conference on the Future Concept of the Construction Production and Management System for Fulfilling Contractees' Responsibilities" has met since November 2013 to explore the concept of implementing the integrated work flow of social capital development, from planning to design, construction and management, from contractees' viewpoints with the results of reviews of a tendering and contracting system reform for assuring the quality of infrastructures and securing their supporters made at the Subcommittee on Basic Problems, Construction, Construction Workshop, Industry Workgroup, Central Council on Construction Contracting Business and Social Infrastructure Development Council (measures to be immediately taken compiled in January 2014).

The Amended Quality Assurance Act, which came into effect in May 2014, provides for the introduction and use of varied tendering and contracting options, including methods for negotiating technical proposals and step-by-step screening.

Section 6 Forming a New Phase of Relationships between the Central and Local Governments and Private Sector

1 New Phase of Relationships between the Central and Local Governments

The implementation of measures, etc. on a nationwide scale or from nationwide perspectives has been driven to approach vital tasks that have a direct bearing upon national life, such as forming an animated economic society and establishing safety and security for the regions, etc. with keeping appropriate shares of responsibility between the central and local governments.

Under the circumstances, the MLIT has been working towards the decentralization of power, including reviews of obligations and conformances and transfers of paperwork routines and authorities.

The "Act on the Formulation of Legislations Relevant to the Promotion of Reforms for Enhancing Local Autonomy and Independence (Third Decentralization Legislation)" was enacted and enforced in part in FY2013 in connection with reviews, etc. of obligations and conformances. In addition, the Cabinet passed decisions on the transfer of certain paperwork routines and authorities involved in the registration, etc. of paid passenger transport services using privately owned automobiles from the central government to the local one seeking these services, those involved in the formulation, etc. of urban plans on town planning areas from the prefectural government to designated cities (only those relating to urban planning areas within a single designated city) ,and so on. Then the resultant bill for the Fourth Decentralization Legislation was submitted to the Diet and resolved in May 2014 based on those decisions.

2 Driving Public-Private Partnerships, etc.

The formation of new scheme of PPP (Public-Private Partnership)/PFI and concrete proposals has been promoted to develop, maintain and manage social infrastructures of real need by expanding the utilization of private funds under stringent financial conditions. Further, the preparation of PPP/PFI project proposals pertaining to the restoration of the areas stricken by the Great East Japan Earthquake is being propelled.

Proposals that had been filed as a means of driving the implementation of public-private partnership projects were compiled into agenda of deliberation to explore ways to use a mixed concession program for public facilities, etc.

A total of 31 innovative public-private partnership support projects were adopted and feasibility studies, etc. were conducted in Hamamatsu City to explore the sewage projects by utilizing the concession program for public facilities, etc.

In addition, 14 public-private partnership support projects designed to facilitate recovery from the Great East Japan Earthquake were adopted and feasibility studies, etc. were conducted in Kesennuma City, Miyagi Prefecture to implement an earthquake recovery community development project, involving a supply of disaster public housings, in a public-private partnership.

Section 7 Policy Evaluations, Project Evaluations and Interactive Administration

1 Driving Policy Evaluations

Pursuant to the "Ministry of Land, Infrastructure, Transport and Tourism Basic Plan for Policy Evaluations," the three key schemes of evaluating policies, namely, policy assessments (Project Evaluation Method), policy checkups (Performance Evaluation Method) and policy reviews (Comprehensive Evaluation Method) have been defined in a bid to achieve the following three goals: realization of efficient and high-quality nation-oriented administration; promotion of performance-centric administration; and thorough perfection of accountability to the nation. At the same time, individual public-works projects, individual research and development issues, regulations and special taxation measures have been subjected to policy evaluations to suit specific policy characteristics. In August 2013, policy checkups were made on 13 policy goals using 44 measure goals and 181 performance indicators. Further, 36 new measures were subjected to policy assessment at the time of the request for FY2014 budget appropriation on the basis of directions, etc. for the improvement of policies evaluated. In March 2014, policy reviews were conducted on three subjects [Note 1].

2 Implementation of Project Evaluations

A fully integrated scheme of evaluating individual public-works projects is built in place to enhance the efficiency and transparency of their implementation. Under this scheme, new public-works projects are evaluated upon initial adoption and then reevaluated and post-evaluated upon completion. Evaluation results, including cost-effectiveness back data on new adoption, reevaluation and post-evaluation, are compiled into project evaluation charts to help confirm their background, which are posted on the Internet or the like [Note 2].

The Ministry of Land, Infrastructure, Transport and Tourism also conducts its own planning stage evaluation for new projects under its direct supervision in preparation for their evaluation upon initial adoption.

3 Driving Administrative Management Open to the Nation and Interactive Administration

(1) Land, Infrastructure, Transport Hotline Station

In driving the land, infrastructure, transport and tourism administration that has a close bearing on people's lives, it is important to gain a broad insight into the views, requests and other voices of the people and deploy administrative measures that are directly linked to the people. To this end, the Land, Infrastructure, Transport Hotline Station is open, collecting about 1,100 views a month on the average.

Note 1 Ministry of Land, Infrastructure, Transport and Tourism Policy Evaluation Website http://www.mlit.go.jp/seisakutokatsu/hyouka/index.html

Note 2 Project Evaluation Website http://www.mlit.go.jp/tec/hyouka/public/index.html
Project Evaluation Chart http://www.mlit.go.jp/tec/hyouka/public/jghks/chart.htm

(2) Releasing information to consumers, etc.

In addition to the traditional schemes of administrative guidance, the "Negative Information Search Page" is available from the Ministry of Land, Infrastructure, Transport and Tourism Website, which contains a summary history of the administrative penalties imposed on the business operators in the past in connection with buildings, such as houses, and public transportation facilities, to ensure safety and security through proper selection by consumers and market supervision.

(3) Making the process of social infrastructure development program formulation more transparent

Driving the implementation of a social infrastructure development plan calls for winning understanding and cooperation from local residents to ensure transparency and fairness from its stage of inception afterwards. Comprehensive studies have been made from various perspectives, such as social, economical and environmental, to encourage the participation of various entities, including local residents and also guidelines that set forth basic concepts of the reasonable formulation of plans are extensively used to add to further transparency.

Section 8 Approaches to Hosting Tokyo 2020 Olympic and Paralympic Games

At the September 7, 2013 plenary meeting of the International Olympic Committee (IOC), Tokyo was chosen to host the 2020 32nd Olympic Games and 16th Paralympic Games. At a meeting of the cabinet ministers concerned held on September 10 of the same year, the government confirmed its commitment to developing and supporting a relevant framework for hosting the Olympics in an alliance of the competent offices and agencies.

The Ministry of Land, Infrastructure and Transport, with its eyes already set on building a national land tailored to the years 2040 and 2050, will follow a consistent policy of implementing projects designed to facilitate smooth movement of a growing number of foreigners forecast to visit Tokyo and other parts of Japan, making communities friendly to anybody, including the elderly and physically challenged, and staying completely disaster-preparedness for possible major natural disasters.

For example, the Ministry will be working in accord with the Tokyo Organizing Committee of the Olympic and Paralympic Games and the Tokyo metropolitan government and other stakeholders in the implementation of measures, such as constructing access roads to the arenas and athletes' villages, filling the demand for transportation to and from the metropolitan airports, the gateways to Japan, facilitating access, providing multilingual versions of guide signs, releasing visitor information, keeping lodging facilities better conditioned for hosting foreign tourists.

Chapter 3 Realizing a Tourism Nation and Beautiful Nation Building

Section 1 Trends in Tourism

1 Significance of a Tourism Nation

Tourism is a growth field of exceptional importance that helps restore the power of Japanese economy by making contributions to every sector of national economy, such as revitalizing local economies and increasing job opportunities but also drives international mutual understanding and capturing global demand, including that in rapidly advancing Asian nations.

2 Tourism Now

(1) Trends in the nation's tourism

The number of domestic pleasure trips with lodging made in 2013 averaged 2.35 overnight stays per capita (against 2.14 a year earlier). Spending on the domestic trips with lodging, including homecoming and business trips, amounted to about 15.8 trillion yen (15.3 trillion yen a year earlier), and the number of overnight stays, the number of trips taken and the amount of spending all advanced from their year earlier levels.

The number of overseas tourists in 2013 dipped 5.5% (about 1.02 million) from the previous year to about 17.47 million, with their spending in the same year falling to about 4.6 trillion yen from its year earlier level of (about 4.7 trillion yen).

(2) Trends in foreigners touring Japan

The number of inbound foreign tourists in 2013 totaled about 10.36 million (up 24% from the previous year), achieving the 10-million mark, a government-set yearly goal, for the first time since commencement of the Visit Japan Campaign in 2003.

By nationality and region, Korea accounted for about 2.46 million (up 20% from the previous year), followed by Taiwan with about 2.21 million (up 51%) and China with about 1.31 million (down 8%). By visitor market, Taiwan, Hong Kong, Thailand, Singapore, Malaysia, Indonesia, Viet Nam, India, Australia and France registered a record high each in the Visit Japan Campaign.

Spending on the inbound foreign tours in 2013 advanced 30.6% (up 332.1 billion yen) from the previous year to reach about 1,416.7 billion yen.

Column

Achieving the 10-Million-Inbound-Foreign-Tourist Mark for the First Time in History

On December 20, 2013, the 10-million-inbound-foreign-tourist mark was achieved for the first time in history.

As a consequence of successful efforts to stir inbound Japanese tourism, including an easing of the visa requirements and a promotional campaign conducted in a unified "All Japan" effort, the number of inbound foreign tourists in 2012 virtually came back from the aftermath of the earthquake, etc. to reach about 8.36 million. In 2013, various approaches were taken to promote inbound Japanese tourism towards the achievement of 10

million inbound foreign tourists, including a package of measures taken by the whole government, with public and private sectors working in accord, such as an easing of the visa requirements for Southeast Asia since July and the implementation of an inbound Japanese tourism campaign, and the acceleration of the Visit Japan Campaign undertaken by the Japan Tourism Agency to complete by the end of the year to the extent possible and the introduction of additional new projects. Further, cooperation was sought from stakeholders both at home and abroad, including local governments, economic groups and enterprises, in hosting study tours of Japan.

These efforts resulted in the attainment of 10 million inbound foreign tourists for the first time in history on December 20 2013, the 10th anniversary year of the launch of the Visit Japan Campaign.

On December 20 on which the record 10 million was attained, a celebration ceremony was held at Narita International Airport with the presence of Minister of Land, Infrastructure, Transport and Tourism Ohta, who declared the attainment of the 10 million inbound foreign tourists and presented a Thai tourist visiting Japan on a family trip with a token and the like to mark the 10 millionth visitor to Japan.

With the new goal set on attaining another milestone of 20 million inbound foreign tourists by 2020, efforts will be carried on to disseminate information about the exceptional charms of Japan touching the world's people, such as the picturesque four seasons of the nation and rich tourism resources, and safe and clean towns and the mind of hospitality, by taking full advantage of the latest developments now grabbing global attention, such as the selection of Tokyo to host the Olympic and Paralympic Games, the registration of Mt. Fuji as a World Cultural Heritage and that of Japanese cuisine as an Intangible Cultural Property, in a bid to welcome as many inbound foreign tourists as possible.

A photo of the ceremony held to celebrate the attainment of 10 million visitors to Japan

Source) Japan Tourism Agency

(3) Trends in the tourism industry

a. Travel trade

The volume of transactions by 58 major travel agencies in FY2013 totaled about 6,485.5 billion yen (up 3.7% from the previous year), broken down into overseas tours with about 2,270.5 billion yen (down 1.0%), domestic tours with about 4,131.8 billion yen (up 6.0%) and inbound foreign tours with about 83.2 billion yen (up 26.1%).

b. Registered hotels and Japanese inns

The rate of room occupancy at major registered hotels in FY2012 stood at 73.3% (up 5.5% from the previous year). The rate of room occupancy at major registered Japanese inns advanced 58.5% (up 0.7%). Among the major registered hotels and inns, 68.1%of the hotels were in a surplus (up 20.2%), and 59.3% of the inns (up 16%).

Section 2 Approaches to Forging a Tourism Nation

Since the "Action Program toward the Realization Japan as a Tourism Nation" was approved on June 11, 2013 at a meeting of the Ministerial Conference on the Promotion of a Tourism Nation held in the Prime Minister's initiative, the whole government, and public and private sectors have worked in accord to implement it. In the wake of the attainment of the 2013 goal of 10 million inbound foreign tourists, deliberations commenced at the meeting of the Ministerial Conference held in January 2014 towards making amendments to the existing Action Program to attain another milestone of 20 million inbound foreign tourists by 2020.

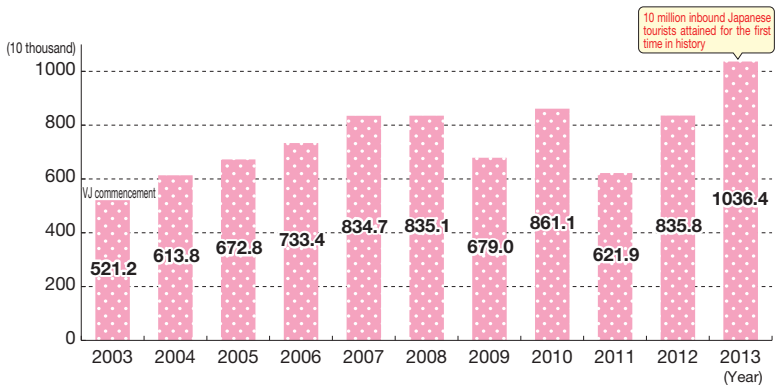
1 Creating and Promoting a Japan Brand

The Visit Japan Campaign has been run in a unified "All Japan" effort of public and private sectors to promote the charms of Japanese tourism to stir inbound Japanese tourism.

The campaign has focused on the nations holding a prospective population of visitors to Japan (Korea, China, Taiwan, Hong Kong, Thailand, Singapore, Malaysia, Indonesia, Australia, U.S., Canada, U.K., France, and Germany) by launching:

a. Projects targeting overseas travel agencies, such as inviting them or putting joint tour ads;
b. Projects targeting overseas consumers, such as putting overseas ads and inviting overseas media;
c. Regional collaborative projects jointly implemented in a wide area by Transport Bureaus, etc. with local authorities to grab foreign tourists; and
d. Approaches to promoting inbound Japanese tourism in a unified "All Japan" of with the government ministries and agencies concerned, including overseas diplomatic establishments abroad, and private enterprises.

Figure II-3-2-1 Changes in the Number of Inbound Foreign Tourists



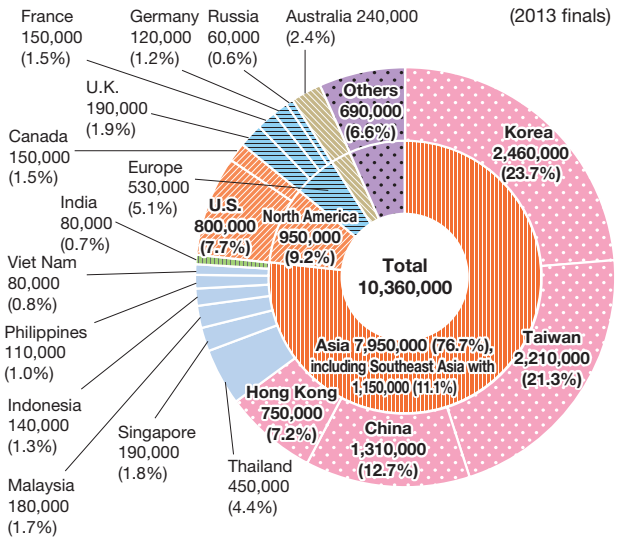
(Note) Values in 2012 and earlier are final; the 2013 value is an estimate.
Source) Japan National Tourist Organization (JNTO)

2 Fueling Japanese Travel with Eased Visa Requirements, etc.

In 2013, attention turned to recently rapidly advancing ASEAN nation. Visas have been waivered for Thailand and Malaysia, multiple-entry visas introduced for Viet Nam and the Philippines and the stay period for multiple-entry visas for Indonesia extended starting from July 1 to mark 40th anniversary of ASEAN-Japan Friendship and Cooperation. Further, the introduction of multiple-entry visas has been commenced for Cambodia and Laos and for Myanmar since November 18 of the same year and January 15, 2014, respectively.

Further, in order to explore the possibility of introducing a program that allows foreigners visiting Japan for sightseeing purposes to stay longer if they meet certain requirements, which could grab long-stay demand from overseas wealthy people, overseas programs have been surveyed and discussions commenced on the basis of survey findings.

Figure II-3-2-2 Ratios of the Number of Inbound Foreign Tourists in 2013 (by nation and region)



(Notes) 1 Parentheses enclose the percentage shares of the total number of inbound foreign tourists.
2 "Others" includes unaccounted-for nations and regions from Asia, Europe and elsewhere.
Source) Prepared by the Japan Tourism Agency from data available from the Japan National Tourist Organization (JNTO).

3 Improving Reception of Inbound Foreign Tourists

To attain a milestone of 20 million inbound foreign tourists by 2020, it would be of exceptional importance to create an environment for these tourists to be able to move and stay in with comfort and smoothness and to allow them leave Japan at the end of their tours satisfied, and then come back to Japan in the future as repeat customers.

To this end, multi-language support was improved and enhanced at art galleries, museums, natural parks, tourist resorts, roads, public transportation facilities and so on during FY2013, as by formulating common guidelines from foreigners' viewpoints pursuant to the "Action Program toward the Realization Japan as a Tourism Nation" decided in June. At the 49 locations that have been designated as strategic or regional sites nationwide, the conversion of road signs from Romanized to English notation has been preliminarily pursued, with help from foreign students and the like, to make them more intelligible to visiting foreigners. Other efforts include the acceleration and simplification of the entry and departure routines at airports and ports, enhanced convenience of public transportation to meet a growing number of personal travelers, promotion of voluntary preparing of free public wireless LANs, encouragement of the installation of overseas credit card-ready ATMs and the development of an environment to host Muslim tourists.

Host environment development projects were carried out at 15 of the 49 locations nationwide in FY2013 to develop an advanced local environment for hosting inbound foreign tourists in these regions and expedite its diffusion into other regions.

Other efforts made to allow inbound foreign tourists to visit Japan and enjoy their stays with an ease of mind include the preparation of manuals for lodging and tourist facilities to guide their guests in times of natural disasters in their initial response, the development of a scheme of keeping tourists informed by means of IT (applications) and the preparation of guidelines for local governments to show how to respond to foreign tourists into their local disaster preparedness plans, etc.

As a precise solution to the diversified needs for inbound foreign tourism, improvements and upgrades have been made to the licensed interpreter-guide program, including a widened scope of exemption from the written test of the examination and introduction of examination quasi-sites. In addition, the steady implementation of a special measure has been pursued to allow people other than licensed interpreter-guides to work as a paid guide under the "General Act on Special Districts", etc.

4 Consolidating International Competitiveness in the Field of MICE

MICE[Note] is an essential tool of capturing people and wisdom from the countries abroad into Japan. Promoting the work of attracting and hosting MICE gatherings will help create not only business opportunities and innovations but huge local economic effects as well and, what is of broad significance, augment national and urban competitiveness and power and do more. With such growing significance of MICE and an expanding market in the background, competitive Asian nations carry on vigorous campaigns to attract MICE. As Japan's MICE suffers a proportionate decline in its international competitiveness in the meantime, it needs to be boosted now.

The "Japan Is Back" strategy decided at a Cabinet meeting in June 2013 set forth a goal of "elevating Japan to hold an established position as the number one Asian nation to host international conventions by 2030." To achieve this goal, the following new measures have been taken:

a. Selecting and fostering "Global MICE Strategic Cities" capable of winning stiffening rivalry with overseas competitive nations;
b. Appointing those individuals who exert influence at academic conferences, etc. as "MICE Ambassadors" to promote and publicize the value of hosting international meetings; and
c. Hosting conferences and receptions at historic buildings, in public spaces and the like to promote the use of "unique venues" demonstrating a sense of extraordinariness and regional characteristics.

Note MICE is an acronym for (Meetings), or meetings held by businesses and the like, incentive and study tours (Incentive (Travel)) conducted by businesses, (Conventions), or international conferences and (Exhibitions), or trade fairs and exhibitions.

As a result of these efforts dedicated to attracting MICE, Japan was appointed in September to host large international conventions, including the "23rd World Congress on Neurology" (7,000 participants scheduled) in 2017, the "11th International Water Association World Water Conference" (6,000 participants scheduled) in 2018 and the "22nd International Union of Nutritional Sciences" (4,500 participants scheduled) in 2021.

5 Consolidating the Tourism Industry and Developing Human Resources

(1) Consolidating the tourism industry

Following a recommendation by the "Tourism Industry Policy Review Panel" compiled in April 2013, the "Travel Industry Study Group" met with experts to probe into the future concept of the tourism industry responsive to the emergence of overseas online travel agents (OTAs) and a growing volume of Internet-based deals, review the standard from travel agent contract to catch up with evolving changes in the travel trade environment, such as the rise of new tourism nations and so on.

(2) Developing human resources in the tourism industry

Making local tourism attractive requires the lodging industry, the core of local tourism, to maintain and even boost its vitality. To this end, ambitious local and neighboring colleges worked in accord to implement a human resources development program on the young and would-be proprietors and hotels and Japanese inns to foster human resources with high managerial capabilities.

In addition, an internship model project was carried out for college students with help from tourism-related bodies and enterprises to help them develop a better understanding of the tourism industry and brew a sense of employment in it.

(3) Assuring pleasure trip safety

In the wake of an express tour bus accident on Kan-Etsu Expressway and a distress accident near the Great Wall of China that happened in 2012, and other relevant issues, the concept of organized safety management in the travel trade has been explored.

Further, approaches have been taken to ensure enhanced safety on the basis of the "Expressway and Chartered Bus Safety and Security Recovery Plan" worked out to reflect the results of discussions at a review panel held in response to the Kan-Etsu Expressway express tour bus accident.

6 Developing Attractive Tourism Area

(1) Developing attractive tourism areas with high international competitiveness

The development of "Tourism Zones" readied for the stay-and-exchange type of tourism has been promoted pursuant to the "Act on Promotion of Tourists' Visit and Stay Through Development of Tourism Areas (Tourism Zones Development Act)" to create special-interest tourism areas with exceptional charms to appeal both at home and abroad. In FY2013, six Tourism Zones were designated, including one located in Furano and Bihoro.

In addition, local branding strategies were formulated for these six tourism areas and the implementation of "Tourism Area Branding Support Projects" consistent with these strategies was supported.

As for the "Practical Planning for Tourist Area Development" program, which puts government-controlled projects and measures into action to provide general support to approaches to tourism-driven community development, the Yatsugatake Tourism Zone was accredited in FY2013 as part of governmental support in the development, etc. of social capitals relevant to the accelerated construction of Tourism Zones. Moreover, a liaison conference was held in each Tourist Zone among the stakeholders concerned with tourism and the development of social capitals. By March 2014, field surveys had been conducted in 19 Tourism Zones (including those accredited in accordance with the Basic Policy on the Development of Tourism Zones before amendment).

(2) Supporting approaches to developing human resources to work for creating tourism areas

To accelerate voluntary, self-reliant regional approaches to developing human resources to work for creating tourism areas, the methods, etc. for human resources development tailored to specific local conditions have been formulated and tried and their nationwide dissemination and deployment has been expedited.

Tourism nation education has also been promoted to foster a "Travel Mind" among the children in collaboration of school officials keen about tourism nation education.

(3) Accelerating approaches to tourism tailored to diversified tourist needs

Releasing travel commodities tailored to diversified tourist needs by taking advantage of local characteristics, such as natural environments, agriculture, cultures and local industries, takes on growing importance. For this reason, measures to diffuse and promote locally developed travel commodities among the general consumers, travel agencies and the like were weighed and compiled into a working guide in FY2013 in the wake of a review of the measures to make for better user satisfaction in FY2012.

In addition, the Japan Tourism Agency concluded policy promotion partnerships in November 2013 with the Agency for Cultural Affairs and with the Ministry of Agriculture, Forestry and Fisheries in January 2014 to provide locally distinctive charms to suit visitors' needs by taking advantage of local cultural properties and farming, mountain and fishing villages' resources and also to externally disseminate information about these charms Japan-branded.

Regarding sports tourism, actions designed to introduce Japan's sports, tourism and cultures were supported at the "Sport Accord Convention" held in May 2013 in Saint Petersburg, Russia. In July, the first meeting of "Marathon Japan" took place in Seoul, Korea in an active quest to introduce various marathon races held in Japan as attractive sports tourism resources to foreign countries.

(4) Promoting universal tourism

Approaches to consolidating local preparedness to host tourists of any kind, including those having constrained physical access to travel, such as elderly or physically challenging people, have been made and studies for accelerating the availability of universal travel commodities launched, so anybody can enjoy touring.

7 Encouraging holiday taking

The Japan Tourism Agency carried out the "Create Family Time Project," a scheme aimed at adapting adults' and children's holidays to each other in an unified community effort through flexible school holiday scheduling, at 134 schools in 11 regions nationwide during FY2013 to help create travel demand.

In the meantime, the "Positive Off" movement has been driven jointly with the Cabinet Office, Ministry of Health, Labor and Welfare and Ministry of Economy, Trade and Industry to encourage businesses and groups to take a positive approach to taking and enjoying holidays (off time). As of the end of FY2013, 387 businesses and groups were in support of this movement.

8 Preparing tourism statistics

Efforts have been made to hasten the timing at which to release findings of statistical surveys on trips with lodging, the Accommodation Survey, the National Tourism Survey and the Consumption Trend Survey for Foreigners Visiting Japan. The methods of analyzing these three kinds of travel statistics have also been introduced.

In addition to these three kinds of tourism statistics, the Regional Tourism Economic Survey was conducted on about 90,000 business establishments nationwide, at the timing of the implementation of the Economic Census for Business Activity, to shed light on the basic structure of the tourism industry (number of travel agents, sales, status of employment and working employees, and so on). A preliminary report on the tourism area economic survey was released in August 2013.

Section 3 Building a Beautiful Nation Blessed with Pleasing Landscapes, etc.

1 Pleasing Landscape Formation

(1) Accelerating community development leveraged by the Landscape Act, etc.

Efforts to form pleasing landscapes have been accelerated by landscape administrative bodies[Note] based on the "Landscape Act," which numbered 598 groups as of September 30, 2013, with 399 of them pursuing their own landscape plans. Further, the number of municipalities that have been designated a landscape administrative body to take over the prefectural authority of formulating ministerial ordinances pursuant to the "Outdoor Advertisement Act" rose to 62 groups as of April 1, 2014 as part of the consolidated approaches to pleasing landscape formation.

(2) Approaching landscape discussions as part of social capital development

To move ahead with landscape-conscious social capital development, a scheme of making post-project predictions and assessments of landscapes and factoring them into project plans while hearing diverse opinions from the local residents, academic experts and others has been pursued.

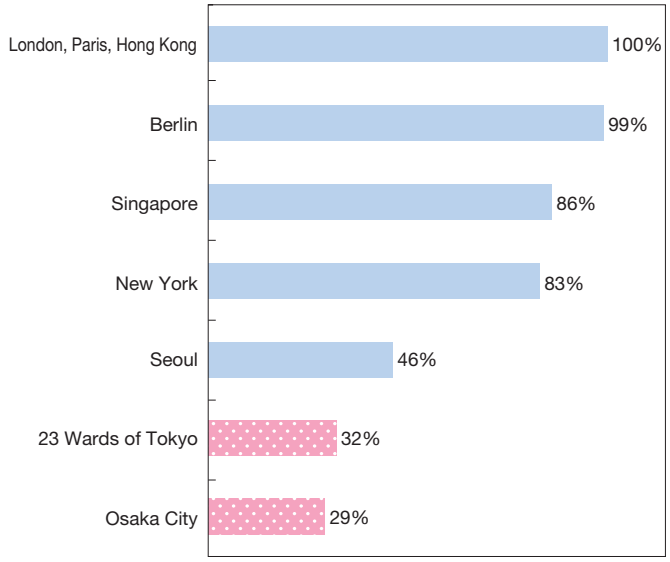
(3) Accelerating elimination of utility poles

From viewpoints of forming pleasing landscapes, promoting tourism, keeping passage spaces safe and comfortable, getting roads disaster-prepared and so on, the elimination of utility poles has been driven through the dissemination, etc. of various development techniques, such as constructing new roads alone or widening existing roads as well.

(4) Driving the "Scenic Byway Japan" campaign

The "Scenic Byway Japan" campaign has been driven with a view to furthering roadside landscape designs and greening by leveraging regional resources in a collaboration of various entities to help realize a tourism nation and contribute to regional revitalization. As of the end of March 2014, 132 routes were registered as the Scenic Byways Japan. Activities that help form pleasing landscapes and add to the charms of localities roadside by working in conjunction with Michi-no-Eki.

Figure II-3-3-1 Present Status of Underground Burial of Utility Poles in Japan Compared with Major European Nations and the U.S.



(Notes) 1 2004 status for London and Paris surveyed by overseas power survey companies (in terms of total cable lengths)
2 2004 status for Hong Kong surveyed by the Infrastructure Development Institute (in terms of total cable lengths)
3 2012 status for Berlin surveyed by the MLIT (in terms of total cable lengths)
4 1997 status for Singapore surveyed from overseas electric industry statistics (in terms of total cable lengths)
5 2011 status for New York surveyed by the MLIT (in terms of total cable lengths)
6 2011 status for Seoul surveyed by the MLIT (in terms of total cable lengths)
7 End of FY2012 status for Japan surveyed by the Federation of Electric Power Companies of Japan (in terms of total cable lengths)
(Underground burial ratio = Total length of underground lines/(Total length of aerial lines+ Total length of underground lines)×100)
Source) MLIT

Note A landscape administrative body is a prefecture, government-ordinance-designated city, core city or any municipality that handles landscape administrative affairs (those based on the provisions of Section 1 to 4, Chapter 2 and Chapters 4 and 5, Landscape Act) upon prior consultation with the governor of its prefecture.

(5) Promoting the development of waterfront spaces, etc.

The development of rivers conscious of water amenity, landscapes etc. has been driven to allow them to be used as a natural space friendly to anybody through the implementation of such endeavors as "Multi-natural River Development," "River Community Development Support Program" and "Waterside School Project," with their indigenous nature, culture, histories, etc. taken into consideration.

Other ongoing efforts directed at regenerating and creating waterside environments from the facility spaces of sewage line and from sewage plant effluents include development of babbling water streams taking advantage of storm sewers and that of facilities for putting sewage plant effluents to use as babbling water. The conservation and creation of excellent waterside environments is also ensured by the implementation of appropriate waste water treatment.

2 Community Development Leveraging Nature and History

(1) Developing National Government Parks to contribute to the preservation, utilization, etc. of Japan's indigenous cultures

The development of National Government Parks has been driven to ensure the preservation, utilization, etc. of Japan's superb indigenous cultures. A total of 17 National Government Parks are already open, including the Asuka Historical National Government Park. In FY2013, the area surrounding the Kitora Tumulus, etc. was refurbished in the Asuka Historical National Government Park (Asuka Zone).

(2) Preserving historic landscapes in ancient capitals

In Japan's ancient capital, such as Kyoto, Nara and Kamakura, restrictions are placed on constructing new buildings, etc., making additions and modifications to existing ones, developing housing land and so on under the "Act on Special Measures for Preservation of Historic Natural Features in Ancient Cities (Ancient Capitals Preservation Law)." The Act also provides for the implementation of ancient city preservation projects, such as purchasing land, and publicity, educational and other activities, to help preserve historic landscapes in these cities.

(3) Preserving and utilizing historic public buildings of historical value, etc.

The preservation and utilization of locally long-loved governmental and other public facilities has been promoted. In addition, efforts have been encouraged to turn erosion and sabo facilities of historic significance (as of March 31, 2014, two designated Important Cultural Properties and 177 designated Registered Tangible Cultural Properties) and their ambient surroundings into a new forum of human interaction by positioning these facilities as a core of tourism resources.

(4) Promoting urban development to take advantage of histories and cultures

To promote urban development that takes advantage of regional histories and traditional cultures, "A plan for the maintenance and improvement of historic landscape plans in 44 municipalities (as of March 31, 2014) have been accredited pursuant to the "Act on Maintenance and Improvement of Historic Landscape in a Community (Historical Urban Development Law) to support activities adhering to the plans." Further, experimental reviews and surveys have been conducted in 13 regions nationwide towards the resolution of common tasks facing the formation of historic landscape.

Inariyama Erosion Control Dam Mix (Nikko City, Tochigi Prefecture)
Tourism and exchange activities are promoted using historic sabo dam facilities that protect the communities

Source) MLIT

(5) Driving projects for creating futures of waterside and community

Efforts have been driven by local residents, businesses and administrative authorities in accord to brew attractive waterside spaces that combine beauty with stateliness and thus to conserve and create buoyant, animated natural landscapes, etc. In Tokyo in particular, associated endeavors will be promoted alongside the Sumida River and elsewhere in timing for the Olympic and Paralympic Games 2020.

Effort to enhance motivation using a logo

MIZBERING
ミズベリング

Column Japan's First Cruise Train "Seven Stars in Kyushu" Just in Service

"Seven Stars in Kyushu" is a cruise train that has been in service since October 15, 2013. The lure of travel aboard of Japan's first luxury cruise sleeper train lies in the cars in which the mind and expertise of craftsmanship are unified, cuisine and hospitality packed with considerateness and care and then communication with the train crew – all derived from the regional affluence of Kyushu. "Seven" in the train name purportedly signifies the seven prefectures of Kyushu, seven principal tourism attractions in Kyushu (nature, food, spas, history and culture, power spots, human empathy and train) and the "seven-car coach."

The eight-car is furnished with seven passenger cars and one engine, with a total of 14 rooms and a maximum passenger capacity of 30. The interiors of the train are decorated with wood and fabric (cloths, textiles) in various designs to create a most superior sophisticated spatial merger of things Japanese and Western and old and new.

Two courses are selectable: thee-night-and-four-day, which tours the five prefectures of Fukuoka, Oita, Miyazaki, Kagoshima and Kumamoto, and one-night-and-two-day, which covers the northern part of Kyushu, or Fukuoka, Saga, Nagasaki, Kumamoto and Oita. The thee-night-and-four-day course offers lodging outside the train in the Kirishima Spa Resort.

The one-night-and-two-day course, slated for service from August to November 2014, sells for 180,000 to 525,000 yen as of December 2013, when compared with 430,000 yen to 1,250,000 yen for the three-night-and-four-day course. Despite its pricings that possibly target wealthy travelers, the Seven Stars in Kyushu cruise train enjoys exceptional popularity as subscriptions nine times greater than the number of available seats have been received.

The launch of "Seven Stars in Kyushu" has grabbed numerous tourists from both at home and abroad, with impetus gained from the opening of services on the entire Kyushu Shinkansen Line in March 2011. A greater number of tourists are expected to visit Kyushu more for "riding and viewing" than simply local sightseeing.

Cruise Train "Seven Stars in Kyushu" website
http://www.cruisetrain-sevenstars.jp/

Source) Kyushu Railway Company

Chapter 4 Promoting Regional Revitalization

Section 1 Approaches to Regional Revitalization

The government recognizes regional revitalization as a key issue and pursues a policy of achieving regional revitalization from cross-ministerial and cross-measure perspectives under a scheme of integrated governance (Integrated Headquarters for Regional Revitalization).

As part of this effort, a third international forum was held in Kitakyushu City in October 2013 to publicize the "Environmental Future City" initiative to the world.

According to the comprehensive special zone program, 48 special zones have been specified and deliberations on exceptions to the governing regulations to help these special zones fulfill their own endeavors are in progress. Under the special structural reform zone program, preferential deregulation measures tailored to regional characteristics, such as an easing of use categorizations in reclaimed land in public waters. Under the regional revitalization program, financial and banking aids have been extended to the voluntary, self-reliant efforts being made by local governments to provide an integrated, effective impetus to the goals of rejuvenating local economiies, creating job opportunities locally and so on. The selection of additional "Environmental Model Cities" for the 3rd time has also been commenced to proceed with the goal of low-carbon city development.

Because more of the local residents' voices need to be heeded in promoting the endeavors for regional revitalization, the governmental system of consultation has been molded into a one-stop sequence to follow up the endeavors for regional renovation in a fully integrated flow for each regional block.

The MLIT promotes the implementation of comprehensive and strategic transport policies, such as revitalizing and renovating the means of regional public transport, such as local railroads, buses and sea routes to remote islands and improving on transport nodes, supports original and ingenious local endeavors, such as revitalizing central urban areas, renovating cities, migrating to an intensive urban structure and promoting tourism and encourages construction industries by promoting contracting at fair prices and supporting the growth of integrated regional industries with a view to realizing a regional economic society offering the ease of living with buoyancy and vitality.

For regions or elsewhere where the population is rapidly shrinking or aged, the Ministry works to help develop a community in which living is made easy from the local residents' standpoints, by supporting the work of community planning activities undertaken by various entities, including NPOs, securing the availability of vital day-to-day living services, such as medical care and shopping, by revitalizing the village functions and consolidating the means of daily regional transport by supporting the introduction of community bus services.

Regarding the issues of urban reconstruction, the MLIT pursues to:

a. Promote urban reconstruction projects, as by developing international airports and disaster prevention centers;
b. Promote urban development by private sectors pursuant to the "Act on Special Measures concerning Urban Reconstruction"; and
c. Promote nationwide urban reconstruction based on the urban reconstruction and development plans, etc. prepared by municipalities.

Section 2 Promoting Measures Supporting Regional Revitalization

1 Efforts Directed at Augment Regional and Private Self-reliance and Discretion

(1) Expanding and improving on administration on various subsidies

The "Regional Renovation Infrastructures Reinforcement Subsidies" are a cross-ministerial package of subsidies that

are granted to help develop functionally similar facilities in clusters in accordance with a regional renovation plan. The package comprises the "Road Development Subsidy" (municipal roads, wide-area agricultural roads or forest roads), the "Sewage Treatment Facility Development Subsidy" (public sewerage, village drainage or septic tanks) and the "Harbor Development Subsidy" (local harbor facilities or Category 1 or 2 fishing port facilities). As of the end of March 2014, 1,666 regional renovation plans were accredited. The "Regional Renovation Infrastructures Reinforcement Subsidies" are used to finance facilities development in the projects based on 1,030 of these regional renovation plans.

(2) Supporting local regional revitalization efforts

The MLIT supports local efforts aimed at revitalizing regions, as by dispatching regional revitalization task forces consisting of private experts and others to those regions. It also awards "Handmade Hometown Prizes" [Note 1] to promote further approaches to individualistic and charming regional planning. In FY2013, 20 activiites were chosen, including those aimed at adding to the festivity of urban centers and for reconstructing ancient trails. In addition, information that aids in regional planning, such as examples of regional planning construction works, has been disseminated [Note 2]. As of the end of FY2013, there are 1,188 subscriptions to the newsletter service.

(3) Promoting use of know-how and funds originating from private sectors

The MLIT provides support not only to excellent private urban development projects, such as those coordinated with urban reconstruction and improvement planning projects undertaken by local governments and accredited by the Minister of Land, Infrastructure, Transport and Tourism, through investment by the Organization for Promoting Urban Development, a general incorporated organization, through joint implementation or the like, but also to the funds for resident participation type of community planning activities by subsidization.

In addition, the MLIT supports experimental efforts, such as sponsoring events in parks and other public spaces, and putting outdoor advertisements, to realize the regional participation type of sustainable community planning and to get it consolidated by keeping up and elevating the the charms and vitality of communities.

The MLIT also seeks to upgrade the existing Tokyo Metropolitan Expressways in an integrated manner with the ongoing urban renaissance plan. To this end, the Ministry has revised the legal system behind the vertical use of street space by roads and buildings and started talking with other concerned organizations to put the plan into practice, using the Tsukiji River section as a model case.

Example of a private urban development project accredited by the Minister of Land, Infrastructure, Transport and Tourism
Sendai Aquarium (provisional name) Project

Customer attraction and human exchange businesses had been badly damaged by the earthquake in this area. An aquarium is then built as a new core of custmer attraction to augment the charms of the area as sites of customer attraction and human exchange to regain and expand the nonresident population, thereby expediting the pace of restoration from the earthquake.

Source) MLIT

Further, the MLIT promotes openness of road spaces to help develop and manage infrastructures in a new initiative of partnership between public and private sectors financed by private funds and to create new business opportunities that exploit urban road spaces. One example of such efforts in order to introduce exceptions to road occupancy regulations is to inaugurate a program opening a way to create chances of festivity and human exchange (such as installing open cafes) through the amendments made to the Act on Special Measures Concerning Urban Renaissance in FY2011. Another example is also an inauguration of a program for consolidating the international competitiveness of the nation's industries and forming sites of global economic activities (such as sponsoring international events) in FY2013 under the Act on National Strategic Special Districts.

Note 1 A system of official commendation by the MLIT in recognition of satisfactory social infrastructures that creates regional charms and individualities and the associaed regional activities as a whole.

Note 2 Regional Planning Information System - Repis:http://www.mlit.go.jp/sogoseisaku/region/chiiki-joho/index.html

2 General Endeavors to Realize an Intensive Urban Structure

While regional cities have so far expanded their sphere of urban areas gaining primary impetus from population influx into them, diminishing population now threatens a degradation of the livelihood facilities in the upsized urban areas, with regional economies and vitality decaying. Realizing an intensive urban structure in which a certain population density is maintained and in which urban facilities, such as medical care, welfare, schooling and commerce, are laid out on a planned basis, would be essential to assure the residents of sound and comfortable living and maintain economic activities and sustainable urban management.

In the meantime, as large cities house a rapidly growing population of elderly people, with the resultant rises in the demand for medical care and nursing care, they call for properly laid out urban facilities, avaialbility to public transport and so on to assure elderly people of efficient access to medical and welfare services. Accelerated community planning with charms and walkability to encourage the outing of elderly people would also be important.

Figure II-4-2-1 Schematic of an Intensive Urban Structure

Source) MLIT

To drive these measures in an integrated fashion, a bill for making amendments to the "Act on Special Measures concerning Urban Reconstruction" was submitted to the 186th ordinary session of the Diet to pass on May 14, 2014.

Efforts are also under way to concentrate urban functions, such as medical care and welfare, into core community zones by leveraging private funds and public real-estate properties, such as schools, community centers and public domains, and enhance urban transport to maintain access to these urban functions.

3 Urban Planning and Infrastructures Development Taking Advantage of Regional Characteristics

(1) Emergency development of urban planning roads instrumental in encouraging private investment

The development of urban planning roads is significantly instrumental in facilitating urban renewal because it encourages the reconstruction, etc. of roadside buildings. For those routes under construction whose completion is bottlenecked because of only a small lot of land yet to be purchased, the local governments (project implementing entities) announce their pledges to complete the construction within a certain period of time (completion time declaration routes; as of April, 2013, 104 routes were declared by 48 project implementing entities) to speed up the development of the project benefits.

(2) Developing transport nodes

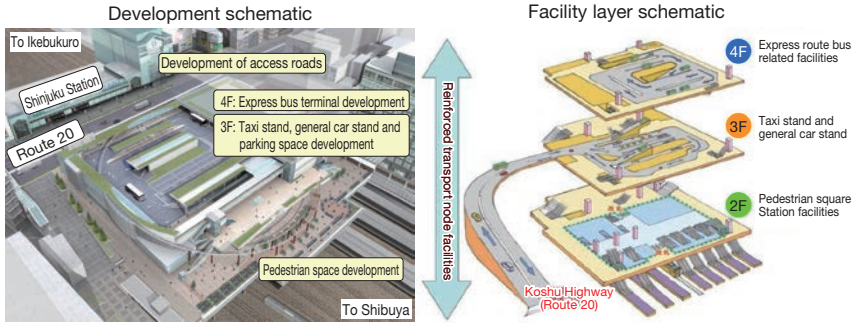
Transport nodes, such as railway stations and bus terminals, hold a high degree of convenience and potentials as a core of urban reconstruction, because they attract numerous people to use the various kinds of transport facilities that converge on them.

The MLIT leverages the implementation of transport node improvement projects, urban and regional transport strategy promotion projects, General Improvement of Railway Stations and so on at the transport nodes, such as the Shinjuku St. South Exit District, and in the surrounding areas to improve the ease with which passengers transfer from one means of transport to another, to consolidate the urban areas disrupted by railways, etc., to improve the station functions and so on and thus to streamline urban traffic and build up the functions of these transport nodes.

Further, the MLIT subsidizes the implementation of the Station-Town Partnership Project in progress in the Sannomiya

Station Front South District (Kobe City), a project based on a comprehensive plan formulated by a conference composed of local governments, railway operators and so on to keep the project moving efficiently. Coupled with a project for facilitating use for the Hanshin Sannomiya Station facilities, the project aims to renovate the station area in an integrated fashion.

Figure II-4-2-2 Example of a Transport Node Improvement Project (Shinjuku Station South Exit)



Source) MLIT

The MLIT also encourages upgrading of the station facilities as a general core of safe and comfortable regional living, as by building child-support and medical facilities in the premises of existing railway stations, from viewpoints of regional concentration by bringing medicine, work and living into closer vicinities.

(3) Wide-area development of infrastructures to induce firm location

Competition, collaboration and regional buoyancy in East Asia should benefit greatly by inviting and accumulating internationally competitive growing industries in the individual regions. Motivated by this recognition, measures have been promoted to support expanding regional employment and more buoyant economy by concentrating investment on the development of those infrastructures, such as airports, ports and harbors, railroads, and wide-area expressway networks, that are truly needed to carry out unique regional approaches.

a. Enhancing the functions of airport facilities

Air transportation networks connecting various locations at home and abroad contribute greatly to the revitalization of local communities by promoting regional tourism and supporting economic activities. Particularly, with the increasing globalization of the world economy due to the growing international division of labor, air transportation that can provide express delivery services is becoming increasingly important in recent years. To keep pace with such trends, MLIT is making efforts to reinforce airport functions, for instance, by promoting renovation projects in terminal areas, including aprons.

b. Port and harbor development

Amid globally tight supply-demand balances for resources, energies and so on, assuring Japan of stable, low-cost imports of these substances to build up industrial competitiveness of the nation's industries and to maintain and even create employment and revenues should be one of the tasks of foremost importance as the nation depends on imports for virtually 100% of its requirements. The MLIT seeks to build stable and efficient networks of marine transportation for resources, energies and so on by developing large ship-ready port and harbor facilities as key locations, promoting inter-business partnership and so on.

c. Railway development

The nationwide network of trunk railways is the lifeblood of passenger and freight transport, accelerating interaction between blocks and between regions, encouraging industrial location and activating regional economies to energize regional living. Rail freight transport, in particular, plays a dominant role in moving industrial commodities, etc. that support regional economies.

d. Road development

Most of the newly built plants are located within 10 km from an expressway interchange from viewpoints of simplified logistic flow, ready access to distribution and so on. The formation of highway networks, including arterial high-standard

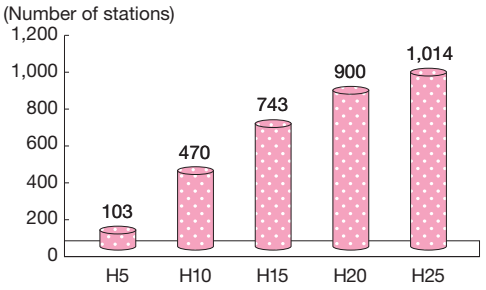
highways, are being promoted to strengthen international competitiveness and to further regional independence and industrial growth, as by realizing speedy and smooth logistics.

(4) Promoting community-conscious projects and programs

a. Michi-no-Eki

Located roadside, Michi-no-Eki is a facility with three functions; roadside amenities, including parking spaces and restrooms, a source of information, including highway and regional information, and a forum of regional partnership, which encourages interaction between a region and users of the roads in that region and between regions. As of March 2014, 1,014 Michi-no-Eki are registered. Support will be extended to renewing existing facilities, developing disaster preparedness facilities, responding to evolving needs in conjunction with the ministers and agencies concerned and so on to upgrade Michi-no-Eki from a mere source of roadside amenities to a forum for addressing local tasks.

Figure II-4-2-3 Changes in the Number of Michi-no-Eki Registered



Source) MLIT

b. Promoting river town development

The MLIT is keen to exploit the regional resources, or charms, of rivers, such as scenery, history and culture, that could help revitalize local industries, such as tourism, etc., and the wisdom, or ingenuities, of the locals. It is committed to expediting spatial planning to merge excellent concepts of community development with the waterside, through implementation of the highly practicable plans worked out in conjunction with local governments and local residents to develop and utilize rivers and the waterside.

c. Managing rivers with resident participation to suit regional characteristics

Those individuals who possess an expert knowledge of river environments and who are zealous for the idea of affluent river development are appointed "river environment preservation monitors" to help create and preserve river environments and carry out meticulous activities aimed at ensuring and promoting orderly river usage. "River environment protection monitors" are also appointed, and work at collecting information about river management, such as locating cases of illegal garbage dumping into rivers and detecting flaws in the river facilities, and promoting the philosophy of river preservation.

Further, with the inauguration of a river cooperation organization designation program, the MLIT designates those private organizations, etc. that pursue activities voluntary relevant to the development, maintenance, etc. of river environments as "river cooperation organizations" and legally accredits them as an organization working in conjunction with a river administrator, with a view to promoting their organized voluntary activities and driving diverse modes of river management tailored to specific regional conditions.

d. Supporting efforts to take advantage of the regional features of the seaside

The implementation of seaside environment development projects, which formulate seaside usage revitalization plans and develop seaside preservation facilities according to those plans, are supported by granting General Social Infrastructures Development Subsidies to them to revitalize the usage of the seaside and add to its charms as a tourist resource.

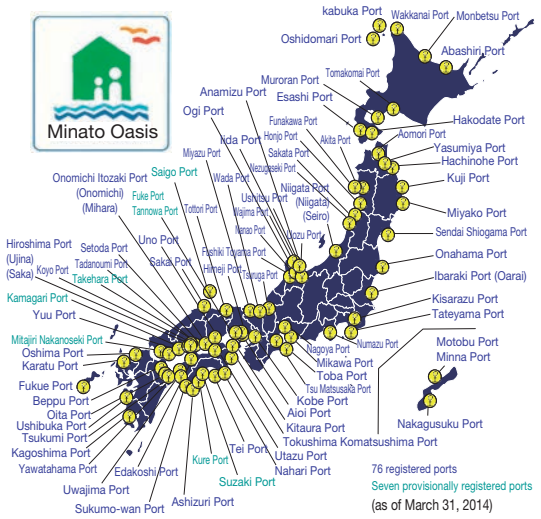
e. Regional promotion built around ports

Efforts made to help Japan grow into a tourism nation and grab more inbound foreign tourism include constructing passenger ship terminals, a gate to Japan's tourism, and opneing a one-stop desk for foreign cruise shipping companies inaugurate in the MLIT Ports and Harbors Bureau. Efforts have also been directed at driving the development of hardware and software environments for encouraging ocean-going cruise ships to call in at Japan in a bid to approach regional revitalization through activated cruising, such as setting up the website as a source of visitors' information in the vicinity of way port.

Further, Minato Oases have been deployed nationwide to use port and seaside facilities as the sources of information and centers of interaction with local people, tourists and so on. As of the end of FY2013, 76 ports are registered across

Japan. The National Council on Minato Oases, which is committed to making these Minato Oases a forum of information or human interaction, jointly implementing projects that help promote Minato Oases nationwide, sponsors events, such as "All Japan Sea-kyu Gourmet Competition," joint promotional activities and so on.

Figure II-4-2-4 National Map of Minato Oases

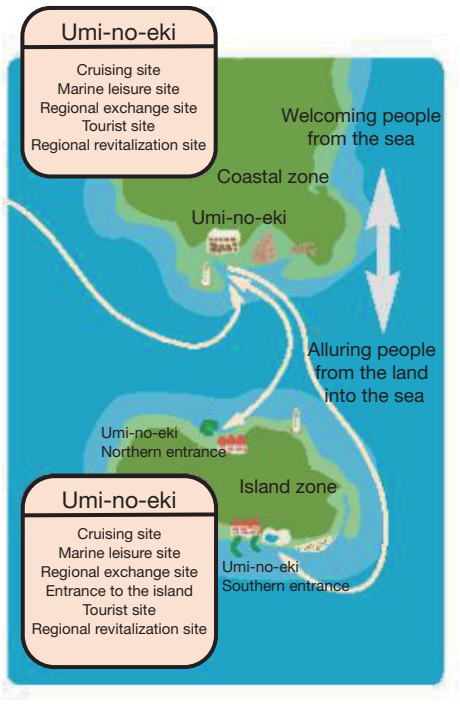


Source) MLIT

f. Building centers of marine leisure

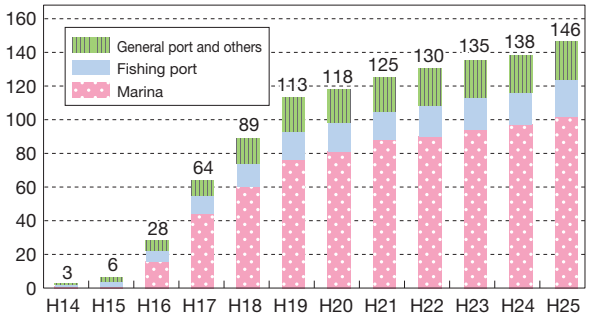
The MLIT not only drives the construction of Umi-no-Eki Stations as marine leisure sites that leverage existing port facilities, marinas, Fisharena (fishing + arena) and the like (as of the end of December 2013, 146 Umi-no-eki available) but also provides support, etc. to diverse, regionally distinctive efforts in progress at Umi-no-eki, such as cruising by rental boats, sale of marine products, a hands-on experience with fishing and sponsoring of events. The MLIT also collaborates with the Fisheries Agency to respond to pleasure boat users' needs by preparing and distributing access guides for pleasure boat users to use fishing ports having enough capacities to host them, promote the registration of such fishing ports as Umi-no-eki and so on.

Figure II-4-2-5 Schematic of an Umi-no-eki Station



Source) MLIT

Figure II-4-2-6 Changes in the Number of Umi-no-eki Registered



Source) MLIT

Column

Inaugurating a One-stop desk for Cruise Promotion – Efforts Directed at Encouraging More Cruise Ships to Call in –

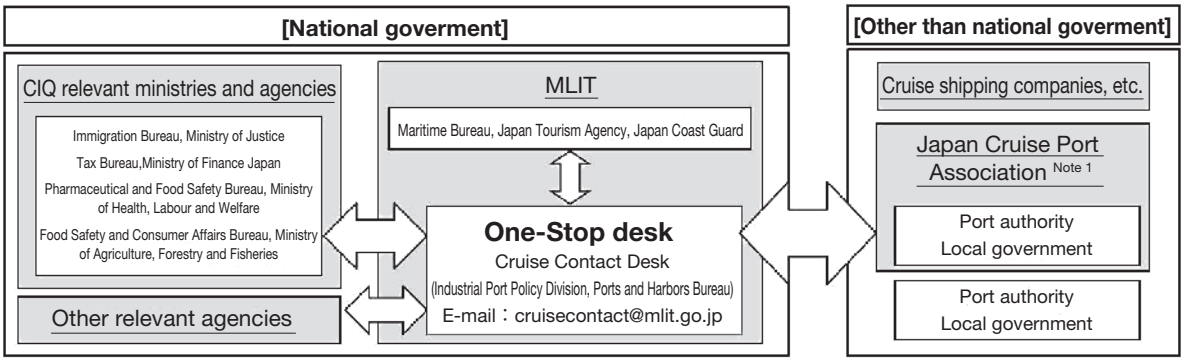
With the recent drastically growing population of cruise fans worldwide, the economically leaping Asia is seen no exception to this trend. As the number of cruise ships calling in at Japan, bringing in numerous passengers aboard to the ports of call, the resultant potentials of huge economic effects, among other things, might promise a clue to the advancement of tourism and regional revitalization.

While efforts are currently under way at various locations in Japan to encourage cruise ships to call in, it had been pointed out that Japan did not have a unified point of contact for overseas cruise shipping companies to consult as they sought to call in at Japan or that enough information was not available about the ports of call accessible in Japan. As a solution to these problems, a one-stop desk was opened in the MLIT Ports and Harbors Bureau in June 2013 in collaboration with the ministers and agencies concerned to encourage more foreign cruise ships to call in at Japan, so it could come up with unified responses to the queries from cruise shipping companies and the like. The one-stop desk shares information with, or works jointly with, associated administrative agencies to respond to incoming queries either on its own or by way of such administrative agencies.

Since the promotion of cruising has been declared in the "Action Program for Forging a Tourism Nation" (approved on June 11, 2013 at a meeting of the Ministerial Conference on the Promotion of a Tourism Nation), the MLIT will carry on its efforts to accelerate the calling-in of cruise ships, such as disseminating information about the inauguration of the one-stop desk.

One-stop desk for cruise shipping companies

The one-stop desk inaugurated in the MLIT Ports and Harbors Bureau shares information with, or works jointly with, associated administrative agencies, to respond to incoming queries from cruise shipping companies, etc. either on its own or by way of such administrative agencies.



*1 An association of 99 entities, including nationwide port authorities, formed to contribute to regional revitalization, etc. through the promotion of cruise shipping.

Source) MLIT

(5) Promoting the maintenance of cadastral maps positively

Cadastral surveys are conducted by municipalities with regard to the boundaries of each individual parcel of land. The MLIT is keen to promote the maintenance of cadastral maps positively through the acceleration of cadastral surveys in the urban areas where such surveys lag behind, the implementation of public-private boundary surveys by the government in preparation for cadastral surveys, the implementation of boundary information maintenance surveys in the mountainous villages, review of the ways to utilize survey findings other than cadastral surveys and so on.

In the Great East Japan Earthquake-stricken areas, the clarification of the boundaries of land is promoted through the implementation of public-private boundary surveys by the government to speed up the pace of reconstruction.

As a lessen learned from the Great East Japan Earthquake, the maintenance of cadastral maps is also promoted mainly in those areas that are predicted to fall victim to massive disasters in the future, to help enhance the regional power to

defend against quake damages in coordination with the efforts to prepare for and reduce the effects of natural disasters.

(6) Deep underground utilization

Technological studies on smoother reviews are in progress to facilitate the implementation of highly public projects in the three major metropolitan areas based on the "Act on Special Measures concerning Public Use of Deep Underground." In addition, information about deep underground is exchanged by means of the "Deep Underground Utilization Council" that has been formed of national administrative agencies and prefectures concerned for each of the target areas (Tokyo Metropolitan, Kinki Metropolitan and Chubu Metropolitan Areas).

4 Self-Reliance and Revitalization of Wide-Area Blocks, and Formation of National Land

(1) Self-reliance and revitalization of wide-area blocks

To achieve regional revitalization and sustainable growth, it is important to deploy measures in an integrated manner while drawing out regional wisdom and devices. To this end, the deployment of measures tailored to characteristics of the diverse wide-area blocks has been pursued with a view to shaping a national land in which the wide-area blocks can grow in a self-reliant manner in line with the National Spatial Strategies and Regional Plans. The MLIT also pursues measures to promote the formulation and implementation of strategies by public-private partnership organizations to allow various regional entities to step up the revitalization of their regions by taking advantage of their specific characteristics, to provide governmental aid to these entities and to proceed with community planning by the leaders of a "new standard of publicness."

a. Promoting regional self-reliance and revitalization

To implement hardware-software mixes of efforts designed to form self-reliant wide-area blocks and to revitalize the regions through buoyant human or material traffic, the MLIT has granted subsidies to 119 plans on the basis of wide-area regional revitalization infrastructures development plans prepared by prefectures. Of these plans, 44 have been worked out by multiple prefectures working in accord and cooperation in a bid to revitalize even wide areas.

b. Promoting the development of infrastructures for regional revitalization with partnership between the public and private sectors

To facilitate smooth migration of those projects that have been worked out in a partnership between the public and private sectors to contribute to the implementation of wide-area regional strategies for target regions, from the stage of infrastructures development planning into the stage of project implementation smoothly and speedily at the timing of private decision making, a system was inaugurated in FY2011. In FY2013, 6 surveys were supported, including those into the issues of feasibility of introducing renewable energies into public civil-engineering facilities.

c. Promoting regional planning with diverse entities interworking

To promote self-reliant and sustainable regional planning with diverse entities interworking, the MLIT has compiled:

(a) a scheme of supporting the local circulation of "meaninful funds" to provide regional planners with funds and resources, and

(b) know-how on excellent approaches to be taken by intermediate support groups, etc. and considerations in their implementation into sharable content.

(2) Promotion, etc. of regional center formation

a. Developing centers of self-reliant growth of diverse wide-area blocks

The MLIT has promoted development of regional centers as a foothold for the concentration of unique local industrial, cultural and other features in accordance with the "Multi-Polar Patterns National Land Formation Promotion Act." In addition, the development of Business Core Cities [Note] as defined in the National Capital Region Development Plan

Note A core city is a city located outside the wards of Tokyo that should serve as the core of a reasonably wide area that surrounds its location. (There are 14 core cities.)

continues, by relocating business facilities and concentrating various other functions in the core cities, helping ease excessive concentration in downtown Tokyo to some extent. The development of Business Core Cities will continue further. In addition, the MLIT has driven the construction of Tsukuba Academic City to pursue urban revitalization by taking advantage of an accumulation of science and technology in accordance with the "Act on Construction of Tsukuba Science City." Further, environmentally friendly cities are being built along the Tsukuba Express railroad line by leveraging the characteristics of Tsukuba Science City as the pace of urban development accelerates. The Ceremony of the 50th Anniversary of Founding of the Tsukuba Science City was held in Tsukuba City on November 12, 2013. In the Kinki Metropolitan area, on the other hand, the construction of Kansai Science City is underway to form a new foothold for the deployment of cultural, academic and research activity in accordance with the "Act on Promotion of construction of Cultural and Academic Cities in Kansai Area." Further efforts to promote the science city continue in a partnership among the ministries concerned, local governments, economic circles and so on pursuant to the "Basic Policy for the Construction of Kansai Science City" that reflects the "Third Stage Plan." In addition, the MLIT promotes the implementation of a development plan based on the "Act on Development of Osaka Bay Areas" to make a district that is complete with the facilities of a global city, good living amenities and more.

b. Promoting "small community" making within a village area

To sustain and rejuvenate underpopulated villages, etc. that suffer from a progressivly diminising or aging population, the MLIT drives "small community" making in a multi-village area, such as a elementary school district, by relocating the facilities and functions essential to daily livelihood, such as stores and medical clinics, and the places of regional activities within a walking distance, with access to neighboring villages.

c. Reviews of the relocation of the Diet and other central government offices

The MLIT aids the Diet in its reviews of the planned relocation of the Diet and other central government offices, by conducting surveys, disseminating information to the nation and so on.

5 Promoting Regional Partnerships and Interaction

(1) Forming a trunk-line network to support regions

To realize the safe, comfortable relocation in the central part of an area having urban functions, such as medical care and education, the MLIT supports the elimination of bottlenecks, as by widening the existing roads, and development of road networks supporting daily life. Further, in order to promote the integration of merged municipalities, the development of roads that connect the central area of a municipality to each of its centers, such as public facilities, bridges and so on is being promoted by implementing municipal merger support road development projects in collaboration with the Ministry of Internal Affairs and Communications.

(2) Promoting human interaction between cities and farming, mountain and fishing villages

The MLIT implements projects for promoting the revitalization of villages to support the renovation of the existing public facilities, such as closed school buildings, located in handicapped areas (depopulated areas, mountain villages, remote islands, peninsulas and heavy-snowfall areas) to turn them into human interaction facilities, forms axes of human wide-area interaction and partnership through the development of trunk road networks, supplies housing and housing lands to help realize a country life, develops ports and harbors to serve as centers of human interaction and more. It also promotes the creation of new breeds of tourism, such as green tourism, and the activities of "All Right! Nippon Conference" and so on in collaboration with the Ministry of Agriculture, Forestry and Fisheries and other ministries concerned to promote human interaction between cities and farming, mountain and fishing villages.

(3) Promoting regional settlement, etc.

Information on the municipalities that implement projects regarding U-, J- and I-turns and settlement in localities, such as mutual interactions between city dwellers and local residents through participation in community planning activities and exposure to agricultural or forestry experiences is being disseminated from a MLITI Website. In addition, information

about the support measures and approaches taken by the national and local governments with regard to dual habitation has also been disseminated [Note].

The MLIT also supports the appropriation of General Social Infrastructures Development Subsidies for the utilization of vacant houses and buildings and disseminates information about the measures taken by local governments in connection with house replacement and dual-area residence, information about nationwide banks of vacant houses and to address the issues of a wide range of regional issues.

(4) Introduction of local license plate numbers

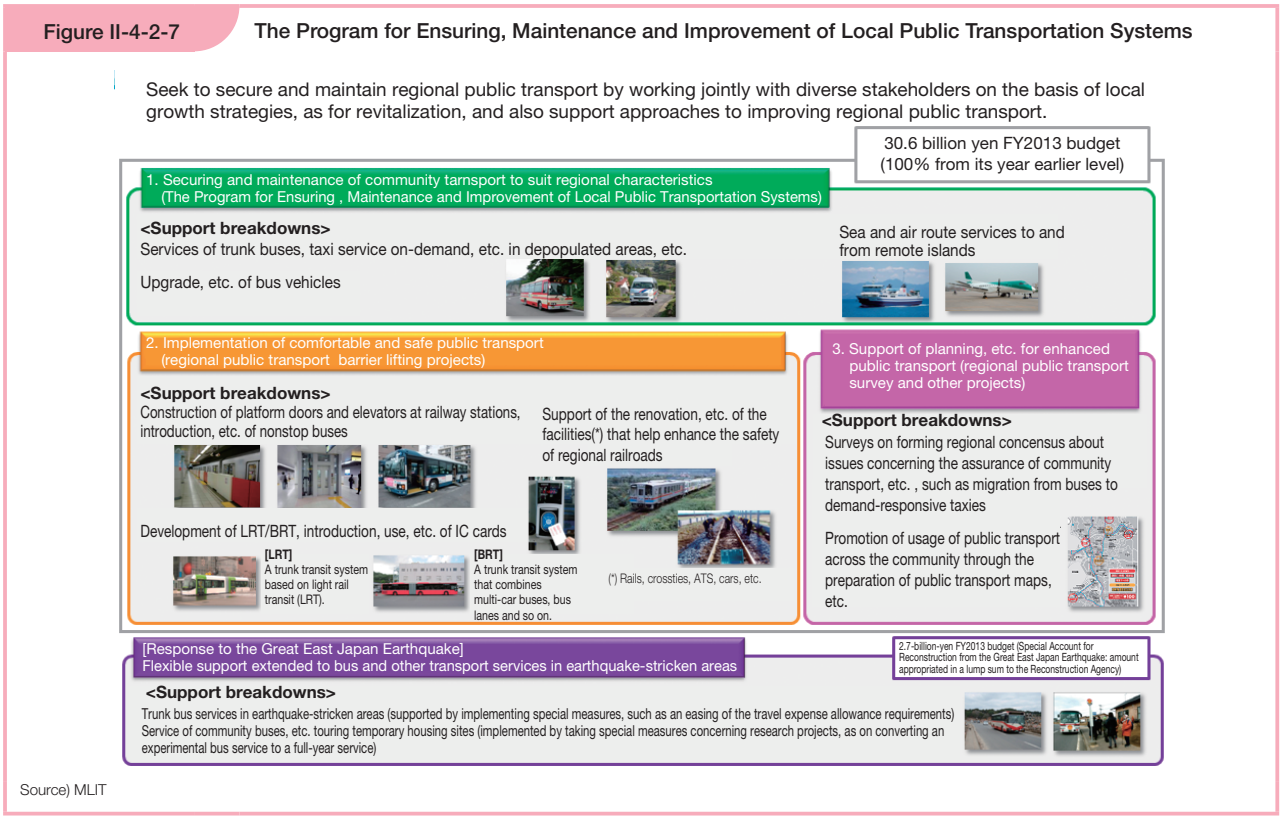
In August 2013, the areas in which local license plate numbers are introduced were decided for the second time (10 areas: Morioka, Hiraizumi, Kooriyama, Maebashi, Kawaguchi, Koshigaya, Suginami, Setagaya, Kasukabe and Amami) so that the regional names appearing in the license plates can be used as an aid to regional revitalization, etc. Lincense plates carrying the new regiona names are scheduled to be released during FY2014.

6 Securing Means of Regional Transport

(1) Securing, maintaining and improving means of regional transport

Maintaining day-to-day means of regional transport is of vital importance to the revitalization of regional communities. Out of this recognition, the MLIT supports efforts directed at forming comfortable and safe public transport, as by securing and maintaining community transport, such as regional bus routes and sea and air routes to remote islands, in collaboration with diverse stakeholders and developing facilities that help add to the safety of local railways.

Figure II-4-2-7 The Program for Ensuring, Maintenance and Improvement of Local Public Transportation Systems



Source) MLIT

(2) Activating regional railways and supporting safety assurance, etc.

While regional railways not only support the livelihood of the local residents living along the railways as a means of their daily transport but also play an important role in providing them with public transport of critical importance in supporting regional interaction between tourist resorts. However, their management is in an extremely tough situation. For this reason, the MLIT supports not only the maintenance, etc. of safety facilities by implementing regional public

Note http://www.mlit.go.jp/kokudoseisaku/chisei/kokudoseisaku_chisei_mn_000016.html

transport securing, management and improvement projects or offering tax incentives but also the construction, etc. of new stations on those local routes that have high potential needs for railway use by implementing projects designed to activate trunk railways, etc.

(3) Subsidizing regional bus routes

Securing and maintaining means of regional public transport, such as public buses, for the benefit of local residents, particularly those with limited access to transport, such as elderly people and schoolchildren, is of critical importance. To help secure and maintain optimal networks of regional transport tailored to specific regional characteristics and conditions, the government has a policy of providing integrated support to the availability of regional transport services (such as inter-regional bus transport networks [Note] or bus, demand-responsive and other forms of regional transport closely related to trunk transport networks) under a scheme of shared responsibility with local governments. For other routes, relevant financial measures are taken to enable local governments to maintain them at their own discretion.

(4) Supporting transport to and from remote islands

To secure air transport to and from remote islands, the MLIT subsidizes aircraft purchase costs, running costs and MTSAT Satellite-based Augmentation System (MSAS) receiver purchase costs and eases landing fees and aviation fuel and fixed property taxes for common air carriers serving as far as remote islands. Running costs have been subsidized since FY2011 by regional public transport securing, management and improvement projects. Passenger fares for islanders have been newly subsidized to extend the scope of support from FY2012 onward.

Remote island sea routes, a vital means of transport to support islanders' daily living, are now extremely tough to economically manage. The running costs of those sea routes that are anticipated in the red and for which no alternative routes are available are subsidized by regional public transport securing, management and improvement projects. In addition, discounted passenger fares for islanders have been subsidized and port facilities have been developed to close gaps with other regions and to add convenience to the islanders' lives.

In FY2013, 56 remote island air routes were in service, and 297 sea routes were in service at the end of FY2012 (120 of which are government-subsided sea routes).

Section 3 Promoting Urban Reconstruction Projects, etc.

1 Promoting Urban Reconstruction Projects

An urban reconstruction project is an action plan that combats a variety of urban issues that need to be solved in an all-out effort in cooperation and collaboration with the ministries concerned, local governments, private entities and so on. An action plan is selected if it:

a. Combats a basic issue relevant to an urban structure or requires in an all-out effort of the ministries concerned to combat one, with resort to a totally new method, or

b. Helps draw power from the private sector or makes for greater land mobility from a viewpoint of leading to an economic structural reform.

By the end of March 2014, 23 urban reconstruction projects had been accredited by the Urban Reconstruction Headquarters.

2 Promoting Urban Development by Private Sectors

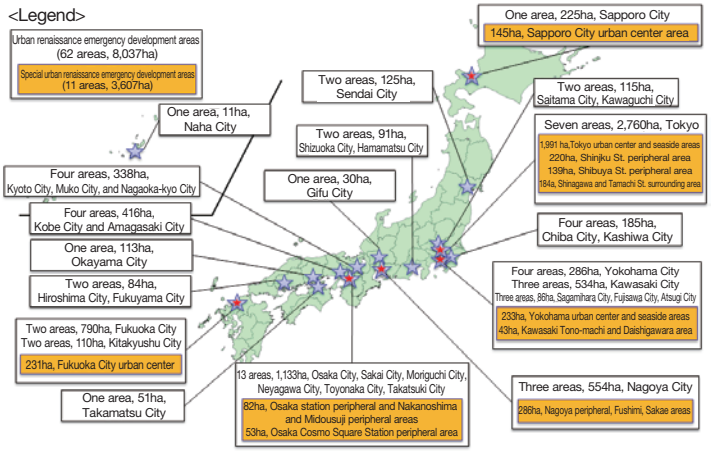
(1) Promoting urban development by private sectors based on the Specific Urban Reconstruction Emergency Development Area program

While rapidly growing Asian nations have resulted in a proportionate decline in Japan's international competitiveness,

Note Broad-area trunk bus routes whose maintenance has been justified at a conference and that meets government-established criteria (spanning multiple municipalties, with at least three runs of srvice a day).

it has become an essential task to provide a powerful boost to the development of the urban areas in the nation's major cities, a source of impetus to the national growth, in a partnership between the public and private sectors to turn them into attractive urban centers that lure businesses, human resources and more from overseas. To this end, the MLIT singled out 11 areas nationwide as "Specific Urban Reconstruction Emergency Development Areas" in January 2012 to enhance urban international competitiveness. In eight of them (as of the end of March, 2014), development plans were formulated by councils formed in a partnership between the public and private sector.

Figure II-4-3-1 Status of Designation of Special Urban Renaissance Emergency Development Areas and Urban Renaissance Emergency Development Areas (as of the end of March 2014)



Source) Regional Revitalization Bureau (Cabinet Secretariat) and MLIT

In Specific Urban Reconstruction Emergency Development Areas, the MLIT supports urban development by private sectors by deregulating the private use of untapped sewage energy sources and the use of road airspaces, offering tax incentives and so on, in addition to the support measures already available to an Urban Reconstruction Emergency Development Area. The International Competition Base City Development Project has also been launched to provide prioritized, concentrated support to the development of urban center infrastructures in accordance with development plans.

As of the end of March 2014, a total of 62 Urban Reconstruction Emergency Development Areas were registered in government-ordinance-designated cities and prefectural capitals, including Tokyo and Osaka, hosting a variety of urban development projects by private sectors in steady progress. In addition, a mezzanine financing service [Note] is implemented by the Organization for Promoting Urban Development to support the raising of middle-risk funds.

(2) Status of application of the measures to support urban reconstruction projects

a. Zoning for Special Urban Reconstruction Districts

A Special Urban Reconstruction District is a new concept of urban district, with greater latitude of zoning, that is exempt from existing zoning restrictions. A total of 66 Special Urban Reconstruction Districts were zoned as of the end of March 2014, 44 of which had been proposed by private entrepreneurs, etc.

b. Accreditation of private urban reconstruction project plan

Private urban reconstruction project plans accredited by the Minister of Land, Infrastructure, Transport and Tourism (67 plans as of the end of March 2014) are financially supported by the Organization for Promoting Urban Development or granted tax incentives.

(3) Promoting the formation of larger blocks

Since many of the central areas of Japan's major cities have been organized into blocks through the implementation of postwar reconstruction land adjustment projects, etc., the scales of these blocks, with the structure of the local streets, are not fully responsive to the prevailing needs, etc. for land usage, transport infrastructures and disaster preparedness. To reinforce the international competitiveness of the big cities, revitalize local cities and seek advanced and effective land usage to fill present-day needs, the MLIT promotes the aggregation of land that has been segmented into multiple blocks, the consolidated usage of sites and restructuring of public facilities in accordance with Guidelines for Formation of Larger

Note Mezzanine financing is a service that supports the financing of a middle-risk fund (such as a fund for loans provided with a clause for subordinated principal and interest payment) by the Organization for Promoting Urban Development, a general incorporated foundation, to cover the implementation of a project, accredited by the Minister of Land, Infrastructure, Transport and Tourism, that develops public facilities along with environmentally conscious buildings and their sites.

Blocks and also with References on Formation of Larger Blocks for Promoting Urban Development.

3 Approaching National Strategic Special Districts

Since the "Act on National Strategic Special Districts" came into effect in December 2013, the MLIT has been committed to comprehensively and intensively driving drastic regulatory reforms and other measures, including special measuers under the Building Standards Law, Road Act and City Planning Act, to target the projects that are pursued by the national and local governments and private sectors working in a united effort in a state-designated National Strategic Special District.

Section 4 Promoting Localized Promotion Measures

1 Measures Drected at Heavy Snowfall Areas

The MLIT not only promotes the availability of transport and the development of the living environment and national land management facilities under the "Act on Special Measures concerning Countermeasures for Heavy Snowfall Areas" but also conducts surveys for safe, comfortable community planning. As of April 2013, 532 municipalities were specified as heavy-snowfall areas (201 of which were designated as special heavy-snowfall areas).

2 Promoting Remote Islands Development

The MLIT has supported remote islands development pursuant to the remote islands development plans worked out by the prefectures in accordance with the Amended Remote Islands Development Act, which came into full effect in April 2013 not only by appropriating lump-sum budgets for the implementation of public works projects, but also extending Remote Islands Rejuvenation Grants, inaugurated since FY2013, to encourage settlement in remote islands, as by fostering industries and increasing employment, accelerating the scope of exchanges, as by promoting tourism, improve and consolidate safe and secure settlement conditions and so on.

3 Promoting and Developing the Amami Islands and Ogasawara Islands

The MLIT accelerates improvement on the underlying conditions, promotion of industries and tourisms, etc. through the implementation of promotion and development and other projects based on the Act on Special Measures for Promotion and Development of the Amami Islands and the Act on Special Measures for Promotion and Development of the Ogasawara Islands. On March 28, 2014, a bill for extending and making amendments to these two Acts on Special Measures was approved to foster industries and increase employment to suit regional characteristics and better the settlement environment for accelerated settlement in a bid to achieve self-reliant and sustainable growth.

4 Promoting Peninsulas

The MLIT supports development of peninsular loop roads, etc. and the promotion, etc. of industries in the peninsular areas under development (as of April 2013, 23 areas spanning 194 municipalities in 22 prefectures) based on the peninsular areas development plans prepared by municipalities in accordance with the "Peninsular Areas Development Act."

In addition to surveys on collecting and analyzing information necessary to enforce the Peninsular Areas Development Act, experimental surveys relevant to the formation of infrastructures that allow various stakeholders in the peninsular areas to approach regional revitalization and also to the advancement of inter-peninsular collaboration to consolidate required knowledge and disseminate it locally with a view to driving the self-reliant growth of the peninsular areas.

Section 5 Promoting Integrated Development of Hokkaido

1 Promoting the New Hokkaido Comprehensive Development Plan to Lead the Era of the Global Environment

(1) Promoting the Hokkaido Comprehensive Development Plan

Japan has followed an active policy of developing Hokkaido to help resolve the problems then facing the nation and to achieve powerful regional growth by taking advantage of the excellent resources and characteristics of Hokkaido.

The implementation of measures focusing on reinforcement of food supply capacities, promotion of inbound tourism, formation of a safe, secure national land and active regional planning activities is under way to approach the attainment of the three strategic goals of open and competitive Hokkaido, sustainable and beautiful Hokkaido and Hokkaido consisting of diverse, individualistic areas pursuant to the seventh phase of the New Hokkaido Comprehensive Development Plan That Users in an Era of Global Environment, on the basis of the results of an intermediate check on the plan implemented in FY2012, recent changes in the socioeconomic conditinons and so on.

(2) Working to realize the Plan

a. Strengthening the total food supply capacities

To strengthen the food supply capacities of Hokkaido that command 25% of the nation's farmland area, the farmland in Hokkaido has been consolidated in larger lots, etc. to augment the productive capacities. The MLIT also supports efforts to create higher added values through the implementation of more advanced expertise of quality control, collaboration with tourism and so on. In addition, the MLIT promotes the development of the infrastructures relevant to tougher logistics. Approaches to fostering food industries include the construction of HOP (Hokkaido export Platform) to facilitate direct, stable export of Hokkaido-made products.

b. Creating internationally competitive, appealing tourist sites

Efforts are underway to improve the tourist reception environment in Hokkaido by trimming travel time and easing round-trips through infrastructures development, working on the Scenic Byway Hokkaido campaign and so on to take advantage of the potentials of Hokkaido with its appealing tourist resources, such as scenic beauty and food. Further, multi-language editions of a drive handbook are distributed for the sake of better tourist convenience. Regional efforts aimed at promoting Hokkaido as a host to international conferences (MICE) in Hokkaido are also supported.

Roller coaster track in the town of Kamifurano

Source) The Federation of Hokkaido Chamber of Commerce and Industry

c. Forming a sustainable regional community that lives symbiotically with the nature

The MLIT has driven the conservation and regeneration of moorland environments, the construction of breakwaters conscious of the habitat of aquatic organisms, purification of rivers and lakes and so on to help form a community that lives together with the rich nature of Hokkaido. Further, since Hokkaido is rich in renewable energy resources, efforts to exploit them are being deployed across Hokkaido.

d. Enhancing network and mobility to support internal and external interactions

To achieve the three strategic goals of the Hokkaido Comprehensive Development Plan, the MLIT has driven the development of key transport infrastructures, such as high-standard highways, airports and harbors, the reinforcement of logistic network facilities, etc. effectively in collaboration

with various entities. The MLIT also carries on active efforts to improve the safety and reliability of winter-time transportation.

e. Building a safe, secure land

Japan has recently been hit by a chain of major natural disasters, including the Great East Japan Earthquake. Hokkaido, too, has suffered heavy snowfalls, severe snowstorms, landslide disasters and wind and flood damages and remains largely open to massive earthquakes, such as those stemming from the Japan and Kuril Trenches, and tsunami, posing a number of tasks that need to be solved before a safe, secure regional community can be formed. Hence, the MLIT has been working on. infrastructure development including enhancing seismic capacity of infrastructures, adopting integrated packages of flood control and landslide control measures, and building highly reliable networks of roads, reinforcement of the-crisis management systems and local disaster preparedness efforts in conjunction with local governments, residents, etc. At the same time, looming concerns over the maintenance and management of aging facilities step up efforts to get the jobs done effectively and efficiently, including ways to combat aging, make the facilities longer-lived and perform preventive management on them.

2 Promoting Distinctive Regions and Cultures

(1) Promoting the regions neighboring the Northern Territories

The MLIT has driven the implementation of those measures necessary to promote the regions neighboring the Northern Territories in which the desirable growth of a local community has been impeded because of pending territorial issues and to stabilize the living of the local residents in these regions in an integrated manner. More specifically, the MLIT pursues a mix of hardware and software measures necessary to take advantage of the hardware measures to build appealing regional communities in these neighboring regions pursuant to the Seventh Northern Territories Neighboring Regions Promotion Plan (FY2013 to FY2017) commencing from FY2013 as the first year, including the promotion of agricultural and fishery industries, development of transportation systems, implementation of public-works projects designed to preserve the national land, etc. supporting the implementation of software measures with funding from grants for the expenditures for promoting project implementations, such as Northern Territory neighboring region revitalization.

(2) Promoting the Ainu Culture, etc.

The concepts of the tradition and culture of the Ainu, a source of the pride the Ainu people take, is being disseminated pursuant to the "Act on the Promotion of Ainu Culture, and Dissemination and Enlightenment of Knowledge about Ainu Tradition, etc."

In FY2013, a campaign was launched to help people previously indifferent to Ainu culture to develop greater interest in it by getting the Ainu phrase "i ran karap te" (which means "how are you") consolidated on the minds of a greater proportion of the general public, including residents of Hokkaido, as a keyword of Hokkaido hospitality, on the basis of a report by the Policy Promotion Workgroup, Council for Ainu Policy Promotion (July 2012) and reviews of the concept of the future promotional and enlightenment activities partnering with various entities conducted discussed in FY2012. As part of the campaign, Ainu articles were exhibited at Kushiro Airport, as well as New Chitose Airport, in a quest for further promotion and enhancement.

Campaign kickoff ceremony held at New Chitose Airport

Source) MLIT

Column

An Approach to Advancing Tourism Built around Bird Watching in Nemuro City

The Nemuro Subprefecture of Hokkaido is known as one of the nation's most popular santuaries for wild birds, allowing you to watch about 360 of the 630 species of wild birds that can be seen in Japan. Nemuro City works on promoting round touristm focusing on bird-watching in its bid to attract more tourists from both inside and outside of Nemuro to take round trips and help revitalize regional economies.

Integrated activities carried out during FY2013 with funding from grants for the expenditures for promoting project implementations, such as Northern Territory neighboring region revitalization, include installation of a hide, or a hut that allows watching birds without stressing them, sheltered from cold, winds and rain, preparation of wild-bird touring leaflets in Chinese and English editions, which serve as a guide to tour planning, constrution of pier decks as part of Michi-no-Eki station or a tourist location and repair of wooden bridges at the Shunkunitai Bar, a bird-watching spot.

At Nemuro Bridland Festival 2014, which was held from January 27 to February 2, 2014 to augment an ability to attract customers in the winter time, focus was placed on information, environments and hospitality. It met with grand success, attracting a total of 2,200 visitors (up 20% from the previous year) from inside and out to enjoy bird watching at various spots.

Further efforts will continue to advance tourism built around bird watching.

Constructed hide (bird-watching hut)

Watching wild birds from the hide

Source) Nemuro City

Chapter 5 Creating a Comfortable Living Space

Section 1 Realizing Affluent Residential Living

1 Securing Stability of Residential Living and Advancing its Betterment

In accordance with the new release of the Housing Life Master Plan approved at the March 2011 Cabinet meeting, covering FY2011 to FY2020, to reflect the full-scale emergence of an aging society with falling birth-rates, declining population and families, changes in the socio-economic climate such as difficult employment and income environment, needs for housing life support services and more, the MLIT is advancing the implementation of measures aimed at securing the stability of residential living and its betterment with the following goals: a. Building a living environment that supports safe, secure and affluent residential living; b. Proper management and revitalization of housing; c. Preparing the environment for a housing market in which diverse housing needs are properly fulfilled; and d. Assuring the stability of housing for those who require special housing consideration.

(1) Building a living environment in support of safe, secure and affluent residential living

To create safe, secure housing and residential environments, we are advancing earthquake-resistant construction of houses and buildings to better prepared for large-scale earthquakes, while at the same time promoting "Smart Wellness Residences and Cities," where different types of residences—such as households with elderly people, households with disabled people, or households raising children—can interact to create places to live that are safe and healthy. It also encourages the construction of housing with better energy-saving performance, utilization of local wood, etc. to get closer to the goal of realizing a low-carbon society.

The MLIT is also keen to preserve and form townscape and scenic beauty to add to the comfort and affluence of residential life, while enhancing the convenience of houses for people like the elderly living in urban areas, based on the concept of universal designs.

(2) Proper management and revitalization of housing

While apartment buildings have become a vital mode of housing for the nation as we reached a stock of about 5.90 million apartments (at the end of 2012), we are urged to respond to a variety of tasks involved in advancing the proper management and revitalization of these buildings.

To advance appropriate maintenance, management and renewal, we are implementing the "Apartment Building Maintenance Optimization and Renewal Advancement Project," which aims to optimize the maintenance and advance the renewal of aging apartments buildings—the number of which is expected to increase in the near future—by accumulating success stories of forming consensus to address the challenges regarding apartment buildings.

In addition, to advance the construction of earthquake-resistant structures for apartment buildings, the "Law on Promotion of Renovation for Earthquake-Resistant Structures," was revised to mitigate the resolution requirements necessary for trying to implement large-scale earthquake-resistant structures for apartment buildings that have been certified as needing earthquake-resistant structures. Furthermore, to make the renewal of aging apartment buildings easier, the "Act on Facilitation of Reconstruction of Apartment Buildings"—regarding the creation of a system for the sale apartment building sites—was just recently established in June 2014.

(3) Preparing the environment for a housing market in which diverse housing needs are properly fulfilled

a. Preparing a market that facilitates the smooth trading of existing homes

The approaches (a) and (b) outlined below have been promoted to prepare a market in which existing homes are smoothly tradable, on the basis of the Total Plan for Renovating Existing Homes (March 2012).

Since March 2013, the MLIT had held the conferences on facilitation of trading and using existing homes to discuss challenges for the existing housing market. In June of the same year, the conference reported its activities and recommendations. In response to this report, the MLIT has addressed challenges to improve methods for evaluation of existing homes. Since September of the same year, the MLIT has held the round table discussions with members from private companies involved in the existing housing market and financial institutions to establish improved methods for evaluation of existing homes in the existing housing market and the housing finance market. Also, in the 2014 Tax Reform, in addition to making special provisions for the registration and licensing tax on acquiring existing homes that require a specific level of quality improvement, they have also decided that if an existing home is to have earthquake-resistance construction work done to it after acquisition, that it would be subject to mortgage tax breaks and other special provisions.

(a) Preparing the market environment in which consumers can renovate their homes with an ease of mind

Consumers planning to renovate their homes are concerned about the cost and how to select the right contractors. Keeping the worried consumers reassuring is essential to an expanding the home renovation market.

Efforts currently taken in this regard include telephone consultation, the "Renovation Estimate Checking Service," in which consumers can receive consultation on specific quotations, available from the "Center for Housing Renovation and Dispute Settlement Support," and "Expert Advice" at local bar associations. In FY2013, there were 9,017 cases of telephone consultation regarding renovation, 911 cases of renovation estimate check, and 671 cases of expert advice regarding renovation.

In FY2013, there were 2,638 subscriptions to the Renovating Defect Liability Insurance Program, an insurance package that combines an inspection on renovating works in progress with warranties against possible defects in the works, and subscriptions to the large-scale repair work liability insurance program for large-scale apartment building repairs were filed for 810 apartments.

Contractors seeking to be insured must be registered with the Housing Defect Liability Insurance Corporation, subject to their possession of a construction business license, proven performance, etc. The Program allows consumers to browse through a list of registered contractors at an Association of Housing Warranty Insurance website as a helpful tool in choosing contractors.

To further develop a market environment in which consumers feel they can commission renovating work without worry, we have a "Study Group on Promotion of Proper Residential Renovating Work through Trade Associations," to consider what initiatives the organizations of such business operators and their members need to implement in terms of promoting consumer protection and proper remodelling work.

(b) Preparing a market climate in which consumers can purchase existing homes without worry

As consumers consider purchasing an existing home, they are fearful about the quality or performance of the existing home. Expansion of the existing home distribution market would not be possible without resolving such fears felt by the consumers.

For this reason, to encourage smooth dissemination and secure consumers' confidence in the current state of housing inspections that are done to give consumers information regarding the state of an existing property when buying or selling, we compiled an 'Existing Housing Inspection Guidelines' in June 2013, which explains the points of consideration for inspection methods and service provision.

In FY2013, there were 4,072 subscriptions to the Existing Housing Defect Liability Insurance Program, an insurance package that combines an inspection on existing housing with warranties against possible defects in the housing. In the same fiscal year, for defect insurance in buying or selling an existing home, a new insurance product was created where the previous five-year insurance period for buying or selling property was changed to a one-year period for individuals, and to a two year period for businesses, and developed insurance products for buying and selling existing housing that are easy for consumers and businesses to use.

Like the Renovating Defect Liability Insurance Program, the Existing Housing Defect Liability Insurance Program allows consumers to search through a list of registered traders at a website to aid in their trader selection.

b. Forming long-lasting quality stocks

(a) Housing quality assurance

A 10-year defect liability obligation has been mandated for the basic structural part of new housing in accordance with the Housing Quality Assurance Act. At the same time, a housing performance marking program has been put into effect for objective assessment of the basic performance characteristics of new and existing homes, such as earthquake-resistance, energy-saving performance, and protection against the sick-house syndrome. In FY2013, Housing Design Performance Assessment Reports were issued for 231,450 houses to assess them in their stage of design documentation, Housing Construction Performance Assessment Reports (New House) were issued for 180,448 houses to evaluate them on field testing, and Housing Construction Performance Assessment Reports (Existing Home) were issued for 562 existing homes.

Disputes arising in connection with houses that have been subjected to a housing construction performance evaluation are to be promptly and legitimately settled by local bar associations, a designated housing dispute resolution body, with support from the Center for Housing Renovation and Dispute Settlement Support. The Center also accepts applications for consultation on housing issues. In FY2013, there were 27 cases of application for dispute resolution regarding a property for which a housing construction performance evaluation report was issued by the designated housing dispute resolution body, and 732 cases of consultation regarding a property for which a housing construction performance evaluation report was issued by the same center.

(b) Measures to extend the life of housing

The MLIT pursues the dissemination of housing that is structured and equipped to meet or exceed certain levels of performance requirements, such as durability and ease of maintenance and management (“Long-life Quality Housing”) under the “Act for Promotion of Long-Life Quality Housing” so that the property can be used continuously for extended periods of time in good condition (117,751 houses were certified as “Long-life Quality Housing” in FY2013).

(c) Promotion of wooden housing

In recognition of the national need for wooden housing in that as much as 80% of the Japanese people favor wooden housing [Note 1], the MLIT supports not only the construction of long-life quality wooden housing by a group of contractors working in the entire process of housing, from supplying local timber and other materials, to designing and constructing housing, but also the development of human resources relevant to the construction of wooden housing, to create quality wooden housing stock.

c. Making housing available to fill varied dwelling needs and closing gaps between supply and demand for housing

(a) Home financing

The Japan Housing Finance Agency offers securitization support services to support the availability of long-term, relatively low fixed-rate home loans from private financial institutions. The services include Flat 35 (purchase type), whereby the home loan credits from private financial institutions are pooled and securitized, and Flat 35 (guarantee type), whereby securitization by a private financial institution acting as an originator [Note 2] is supported. Flat 35 (purchase type), with a membership of 327 financial institutions, had 848,684 applications submitted for purchasing by the end of March 2014 and granted 600,489 purchases. Flat 35 (guarantee type), with a membership of five financial institutions, had 20,148 applications submitted for insurance coverage by the end of March 2014 and granted insurance coverage to 12,416 of them.

For houses that are entitled to receiving securitization support, property inspections are carried out against a defined set

Note 1 “Public Poll on Forestry and Living” conducted by the Cabinet Office (2011)

Note 2 A business enterprise that possesses assets to be liquidated. An originator raises funds by securitizing its assets, by transferring its credit, real properties, etc. to a special-purpose company.

of technical requirements, such as durability, to assure their quality. In addition, the framework of the securitization support service has been leveraged to offer Flat 35S, which reduces the interest rate of the loan on the acquisition of houses that meet any one of the performance requirements: earthquake-resistance, energy-saving performance, barrier-free readiness, and durability/modifiability, for the first 5 years of its repayment (for the first 10 years for long-lasting quality housing).

The Agency also provides direct loans in those areas that are important in policy but that cannot be easily addressed by private financial institutions, such as disaster recovery housing loans or loans for serviced rental housing for the elderly.

(b) Response to the rise in consumption tax rate

In response to the April 2014 consumption tax rate rise, we have recently significantly expanded the mortgage tax break and set cash benefit measures ("living benefits"), and will begin accepting applications for living benefits as of April 1, 2014.

Figure II-5-1-1 Benefit provided to New Home Owners at Consumption Tax Rate of 8%

(Reference) Estimate of income	Residence tax (prefectures): Prorated by income level(Note)	Benefit
Less than JPY4.25 million	Less than JPY68,900	JPY300,000
Over JPY4.25 million and less than JPY4.75 million	Over JPY68,900 and less than JPY83,900	JPY200,000
Over JPY4.75 million and less than JPY5.10 million	Over JPY83,900 and less than JPY93,800	JPY100,000

(Note) Residence tax for prefecture resident tax rate of 4% (prefectures) Prorated by income level
Source) MLIT

(c) Preparing the rental housing market

To improve the stocks of owner-occupied houses, such as stand-alone houses and condominium apartments, by making them available for rent in the rental housing market, the MLIT is working to prepare the rental housing market by disseminating the fixed-term housing rental system and by developing original standard contracts for subleasing [Note] housing.

(d) Improving the residential environment by promoting measures against vacant houses

To ameliorate the residential environment which can deteriorate due to an accumulation of vacant houses that are not being properly managed, we are working on developing ways to use or dispose of vacant houses and buildings, as well as a consultation system for owners of vacant houses.

(4) Assuring housing stability for those who require special consideration for housing

a. Supply of public rental housing

To deliver public housing supplied by local governments to low-income earners in serious need of housing, and to promote the supply of quality rental housing to households consisting of elderly people who need special consideration to stabilize their housing, the MLIT set up the Regional Excellent Rental Housing Program as a scheme that complements the work of public housing and subsidizes the expenses incurred for the development of public rental housing and also for the reduction of the rents.

To provide a housing safety net for those who are obliged to leave their homes because of dismissal or any other reason, the MLIT promotes a single-source information service that gives out information about public housing available to retiring individuals, and UR rental housing provided by Urban Renaissance Agency, in coordination with local branches of Hello Work (Public Employment Security Office), and also takes actions aimed at stabilizing the dwelling of the retiring individuals, by driving rent subsidization from General Grants for Social Infrastructures.

Note A rental housing management firm renting a building from its owner (landlord) or else for subleasing and then hiring it out as a subleaser to a subleasee (resident).

Figure II-5-1-2 Purposes and Results of Public Rental Housing

	Purpose	Number of houses managed
Public housing	Supplies quality rental housing to low-income earners who are in serious need of housing with low rent.	About 2.17 million houses (FY2012)
Improved housing	Supplies public rental housing to existing residents who are in serious need of housing in a deteriorated residential area.	About 150,000 houses (FY2012)
UR rental housing	Supplies quality rental housing that is conveniently located for access to work, focusing on family-oriented rental housing hardly in ample supply from private business entrepreneurs, in major urban areas, as well as develops residential districts (since FY2002, a privately supplied support rental housing program has been launched to support the supply of family-oriented rental housing from private business entrepreneurs).	About 750,000 houses (FY2012)
Agency rental housing	Supplies quality rental housing to fill the regional demand for rental housing.	About 130,000 houses (FY2012)
Regional excellent rental housing	Provides subsidies to private land owners to fund maintenance and other expenses and cover rent cuts to provide excellent rental housing for households consisting of elderly people, child-raising families, etc.	- About 130,000 designated excellent rental houses (FY2012) - About 34,000 designated excellent rental houses for elderly people (FY2012)

(Note) 1 The number of rental houses managed by the Urban Renaissance Agency includes the subsidized rental housing with high quality for elderly.
2 The number of public rental housings does not include those of the Specified Good Rental Housings and Subsidized Rental Housings with High Quality for Elderly.
3 The Specified Good Rental Housing Institution and Subsidized Rental Housing with High Quality for Elderly Institution were reorganized and the Good Quality Regional Rental Housing Institution established in FY 2007.
Source) MLIT

b. Utilization of private rental housing

The MLIT is committed to providing housing support services, including making housing information available, to enable elderly people, physically handicapped people, foreigners, child-raising families and so on to move into private rental housing smoothly through the help of a Housing Support Council, which is composed mainly of local governments, real estate associations and housing support bodies, to improve the safety net functionality of private rental housing.

2 Supply and Utilization of Good Housing Land

(1) Land price trends

The result of the 2014 posted land prices (as of January 1, 2014) showed that the national average price has still been dropping, however, the rate of decline has continued to shrink, and the percentage in the number of rising points have significantly increased. Particularly in the averages for the three major metropolitan areas, prices for both residental properties and commercial properties have started to rise.

If we look at the trend in posted land over the six months from the same point in the 2013 Prefectural Land Survey (as of July 1, 2013), the residential property prices in the three major metropolitan areas have mostly risen at the same rate, and prices for commercial properties have a stronger rising rate in the latter half. The rate of decline for both residential and commercial rates shrank in the latter half in the rural areas.

(2) Present status and problems in housing land supply

There is a driving shift from the traditional course of policy that promoted a large supply of new housing land to a housing land policy that reflects trends in population and household. The Urban Renaissance Agency now works only on the new town projects that have already been initiated. The MLIT also supports the development of public facilities relevant to the development of housing land, and offers preferential tax measures to promote the supply of housing land furnished with a good dwelling environment.

(3) Using fixed-term land leases

Fixed-term land leases is a system that is instrumental in providing quality housing at an affordable price, because contract termination is determined by the expiry of a predetermined contract term, without being renewed. By the end of 2012, more than 70,000 houses had been supplied on a fixed-term land lease basis.

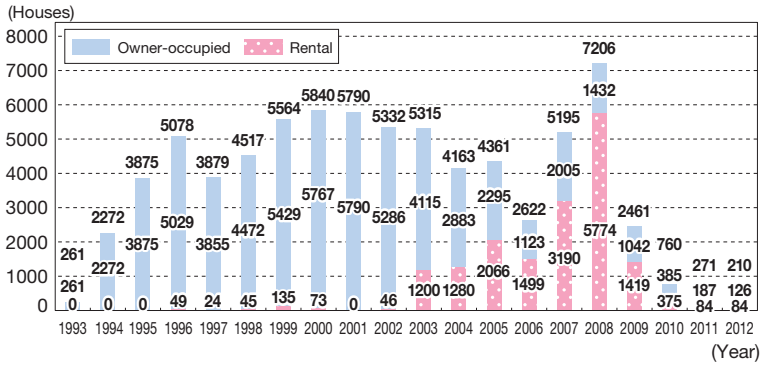
To facilitate wider acceptance of this system, the MLIT is working to clarify the tax procedures for handling prepaid rents – a third kind of lump-sum payment following deposits and premiums.

(4) Revitalizing aging new towns

The MLIT is ready to address the need to upgrade urban residential areas (new towns) that have been developed on a planned basis as their houses and facilities age and the residents get older and divide into smaller families and thus continue utilizing them as acceptable stocks.

We also provide information on area management [Note] that aids in revitalization of the new towns.

Figure II-5-1-3 Developments in the Supply of Housing on Fixed-Term Land Leases



Source) MLIT

Section 2 Realizing Comfortable Living Environments

1 Developing City Parks, and Shaping a Good Urban Environment

(1) Status of development of city parks and approaches to upgrading them

Because city parks are key facilities laid out to fill diversified public needs, national government parks, the development of national government parks, disaster preparedness parks, and the preservation of time-honored cities and green spaces have been implemented efficiently and on a planned basis, with primary emphasis on: a. Building a safe and secure municipality furnished with disaster preparedness parks that could serve as evacuation sites; b. Building safe and secure community sites to address the issues of an aging population with falling birthrates; c. Preserving and shaping a good natural environment that aids in building a recycling-oriented society and addressing global environmental issues; and d. Building sites for advancing tourism that takes advantage of regional characteristics or for inter-regional exchanges or collaboration.

Opening of Entire State-owned Michinoku Mori Lakeside Park area in June 2014 (Kawasaki Town in Shibata district, Miyagi Prefecture)

Source) State-owned Michinoku Mori Lakeside Park

At the end of FY2012, city parks were maintained at 102,393 locations nationwide, covering 120,217ha, or about 10.0m^2 per capita. National government parks were visited by about 35.21 million people by the end of FY2013, with 17 locations being developed and refurbished in FY2013.

(2) Shaping a green urban environment

The MLIT promotes urban greening and green space preservation by providing comprehensive support in financial and technical aspects, pursuant to the "Green Master Plan," a basic plan on the preservation of green spaces and promotion of greening formulated by municipalities to combat global warming and address global environmental issues, such as biodiversity, and preserving and shaping a good natural environment. The preservation of green spaces is ensured by

Note Proactive efforts by residents, business owners, and landowners to maintain and improve the value of the region and its good environment

advancing the development of green-rich city parks and by utilizing the Special Green Space Conservation District Program, which aims to protect planting of greenery by restricting the construction of buildings or purchasing land, and the Citizen Green Space Program, which makes green spaces available to citizens under contract. We are also promoting the greening of privately owned land by utilizing systems like the greening area system and the greening rate ordinance systems in district plans, as well as utilizing the productive green zone system to protect farmlands with multiple functions.

Other measures deployed nationwide to drive promotion and enlightenment include the sponsorship of "Protect Green" gatherings and national urban greening fairs, various systems to award people who are instrumental in greening and the rating and certification of corporate activities to pursue greening and preserve green spaces.

2 Advancing Road Development that Prioritizes Pedestrians and Bicycle Riders

a. Making secure pedestrian spaces

To achieve social safety and security, it is important to create people-oriented walking spaces that assure pedestrian safety. In particular, based on the results of emergency joint inspections carried out in FY2012, we are making progress in improving and developing roads used by children walking to school. Schools, the Board of Education, road administrators, police, and another stakeholders have been working together to implement traffic safety measures such as sidewalk development, painted curbs, guardrails, by carrying out joint periodic inspections based on the "School Route Traffic Safety Program".

b. Creating a safe and comfortable cycling environment

Bicycles play an important role as a very accessible mode of transportation, but they also tend to account for increasingly important proportion of total traffic accident rate. This shows that there is a need to develop bicycles-friendly environment focusing especially safety and comfort. Therefore, both the MLIT and National Police Agency developed new Guideline for Creating a Safe, Spacious and Convenient Bicycle Network in November, 2012. This involves reallocating road space and enforcing strict adherence to traffic rules. Through publicizing this guideline, the MLIT and National Police Agency promotes an environment for safe and comfortable usage of the bicycle.

Since the end of FY2012, 53 Japanese municipalities have been becoming involved developing Network plan based on this Guideline.

c. Shaping quality walking spaces

The MLIT supports the development of pedestrian roads and rest facilities that aim to create high quality pedestrian environments that ties together rich scenery and abundant nature with historical sites, to develop regions that are attractive and promotes health through walking.

d. Promoting road signs that are easy to understand

The MLIT is working on the installing road signs that are easy to understand to help guide pedestrians who are in an unfamiliar place to their destinations.

e. Building a flexible system of road administration

To implement a flexible of road administration system that provides a diversity of road functions tailored to the needs of the local residents along the way—including safe walking spaces and places of regional buoyancy and human exchanges, and making motor-vehicle traffic smoother and safer—the MLIT is implementing: (a) Preferential measures, such as the construction of new sidewalks on national or prefectural highways by municipalities other than designated cities: (b) A system of suggesting municipalities to refurbish pedestrian safety facilities; (c) Preferential measures for road occupancy such as boulevard trees planted by NPOs or others, street lamps, etc.; and (d) Preferential measures for the administration of off-street convenient facilities to keep roads and roadside facilities under integrated management.

Section 3 Realizing Traffic with Enhanced Convenience

(1) Advancing implementation of comprehensive Transport Strategy

Intensive town making assured of safe, smooth traffic requires a cross-sectional approach to the available transport modes—such as bicycle, railway, and bus, from users' standpoints, rather than reviewing the transportation modes or their operators individually. To this end, each local government should inaugurate a council composed of public transport operators and other stakeholders and let the council define a future vision of its cities and regions, the suite of transport services to be made available and so on, so that it can formulate "Integrated Urban/Regional Transport Strategies" covering relevant traffic measures, working programs and the like (at the end of March 2014, Integrated Urban/Regional Transport Strategies had been formulated or were being formulated in 84 cities), with the stakeholders taking their respective shares of responsibility for implementing measures or projects. The national government is expected to encourage the implementation of integrated and strategic packages of traffic projects, such as the development of LRT [Note 1] pursued according to the Strategies, and town making programs.

(2) Advancing TDM, etc. to mitigate traffic congestion

While conditions of vehicle traffic and solutions for road traffic jams vary from one city to another, TDM (transportation demand management) [Note 2] offers flexibility in dealing with various traffic-related problems depending on the urban characteristics. Therefore, the MLIT promotes the dissemination of integrated and effective TDM.

To mitigate traffic jams that could occur during morning and evening rush hours or at any time of the day, in addition to road network development, bottleneck mitigation and other similar measures to increase traffic capacity, the MLIT has been implementing various TDM measures, including promotion of public transit use (e.g. introduction of automatic bus location system), park-and-ride [Note 3] and staggered commuting. In some regions, the MLIT distributes bus route maps and leaflets to local residents to encourage them to review the way they use passenger vehicles and promote public transit use as a part of the mobility management [Note4]. The MLIT has also been trying to reduce and manage traffic disruptions by controlling road works.

In addition, the MLIT seeks for the optimal use of existing network by collecting and utilizing ITS-based big data and promotes other "Smart Use of Roads" efforts to provide smooth and safe traffic service for road users.

(3) Approaches to improve public transportation usage environment

The MLIT supports the introduction of LRT, BRT, IC cards and other less constrained systems through the implementation of the Program for Ensuring, Maintenance and Improvement of Local Public Transportation Systems, to accelerate the improvement of regional public transportation usage environment as part of its barrier-free community planning effort. In FY2013, light rail vehicles (LRVs) were deployed by Hankai Tramway Co.,Ltd. and other operators.

Note 1 Short for Light Rail Transit. A next-generation rail transit system that offers excellent characteristics derived from the use of light-rail vehicles (LRV), improvements to rails or stops—such as ease of getting on and out—, punctuality, speediness and passenger comfort.

Note 2 A method of mitigating road traffic congestion at a municipal or regional level by regulating traffic demand (traffic behavior), by varying road usage hours, routes or means, making efficient use of cars and/or adjusting the sources of congestion.

Note 3 An approach to mitigating traffic jams, whereby drivers leave (park) their cars in a suburban parking space and transfer (ride) to a public transportation facility, such as a railway or bus, to get to their destination.

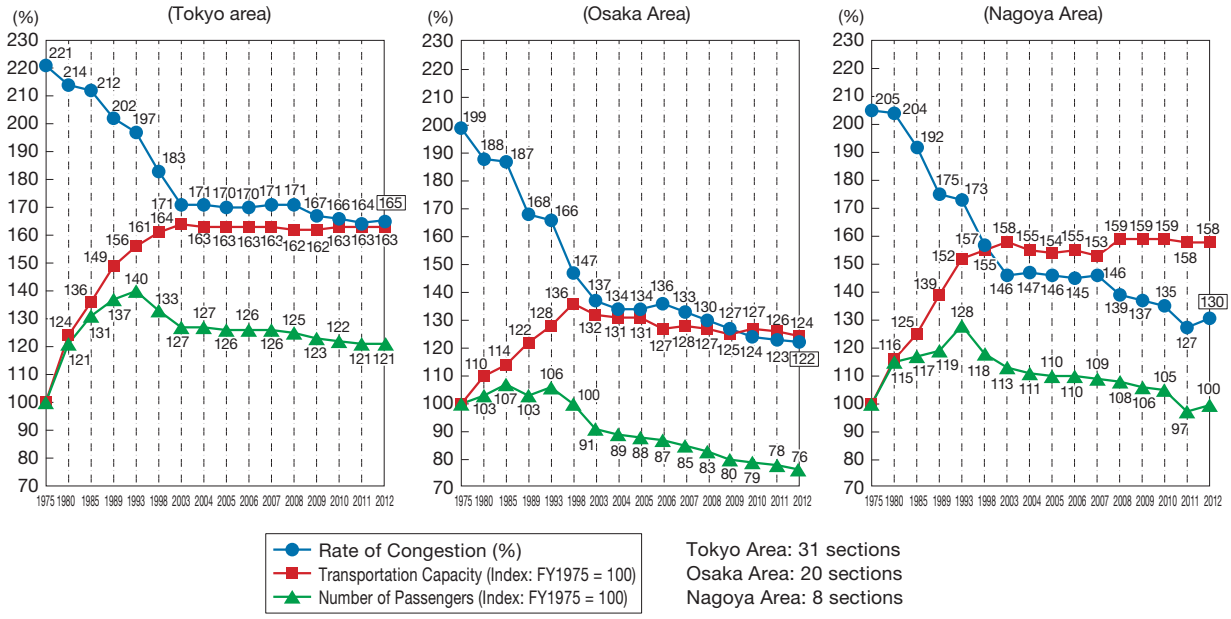
Note 4 A traffic policy focusing on communication measures designed to encourage autonomous transition of each individual's mobility (travel) in a socially acceptable direction (or preferring appropriate use of public transportation facilities, bicycles and the like over excessive car usage).

(4) Upgrading urban railway networks

Urban railway networks have upgraded to a considerable extent to date as they have been refurbished with a primary view to building up their transportation capacities to ease traffic congestion. As a result, traffic congestion in the major metropolitan areas during commuting to and from office or school by train are on the decline, keeping pace with the continuing trends towards an aging population with fewer births. The rate of congestion on some routes, however, remains as high as over 180% and demands continued efforts to mitigate congestion. Efforts in progress include quadruple tracking of Odakyu Electric Railway's Odawara Line and modifications to Tokyu's Toyoko Line, both funded by the Designated Urban Railway Development Reserve Program.

The Kanagawa Eastern lines (Sotetsu - JR/Tokyu Through line) and others have been developed by leveraging the Act on Enhancement of Convenience of Urban Railways, etc. a legislation aimed at upgrading the speediness and traffic node functions of existing urban railway networks, to further enhance the urban railway networks, including added user convenience.

Figure II-5-3-1 Developments in the Average Rate of Congestion, Transportation Capacity and Number of Passengers in the Three Major Metropolitan Areas (Index: FY1975 = 100)



Source) Prepared by the MLIT from "Urban Transport Annual Report" compiled by the Institution for Transport Policy Studies and other relevant literature.

(5) Development of urban monorails, new transport systems and LRTs

The MLIT promotes the development of LRTs, etc. to encourage users' migration to public transport facilities from viewpoints of streamlining urban traffic flow, lightening environmental loads and reactivating central urban areas while keeping vulnerable road users assured of mobility in a period of an aging population with falling birthrates. In FY2013, in order to enhance functionality of the main transportation terminal that is nodal to the JR Hokuriku line, Jyohana line, Himi line, and Manyo tram line (Manyo Line Co., Ltd.), the Takaoka Station Peripheral Area Development Project (Takaoka City) is working to expand the Manyo line business, including the construction of a new station building.

Takaoka Station Peripheral Area Development Project (Takaoka City)

Source) MLIT

(6) Augmenting the convenience of bus usage

The convenience of bus usage has been augmented by improving the punctuality and speediness features of bus services by using a Public Transportation Priority System (PTPS) and bus lanes, introducing bus location systems that provide information about the location of buses in service, and IC card systems that facilitate smooth boarding and disembarking.

(7) Effective utilization and functional enhancement of existing expressways

a. Basic policy for new expressway toll

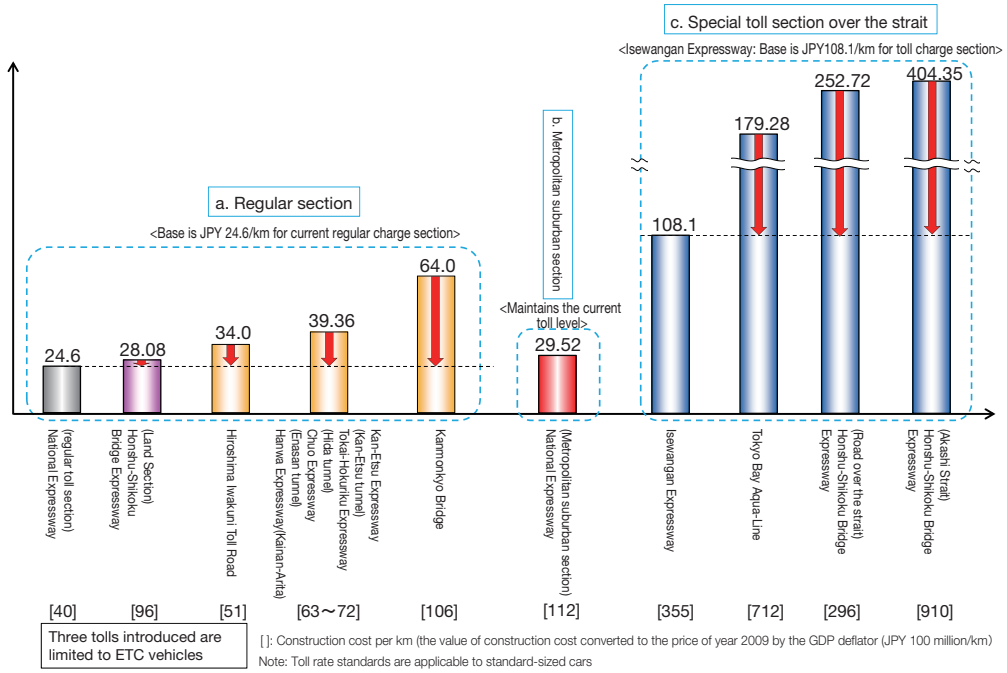
Regarding the expressway toll, we have decided to transition from the previous, "development-focused fee" to the "usage-focused fee," in accordance with the Arterial Highways Workshop, Road Subcommittee, the Panel on Infrastructure Development's interim report (June 25, 2013), and based on this policy, we are implementing the following initiatives that make expressways even more convenient and useful, as the network of roadways advance:

- ·Rectify the differences in fees for each interval caused by differences in the past construction work, and organize the toll amount levels for the three types of sections: regular toll section, metropolitan suburban section, and special toll section like areas over the strait.
- ·In order to optimize the utilization rate of the road network, for tolls in the metropolitan areas—depending on the progress of the beltway development—we are planning to use ITS technology and construct a seamless toll system that is the "world's most efficiently used" system.

We will review the toll discount that was implemented in 2008 as part of the emergency economic stimulus package, and restructure the entire discount toll system for expressways. The restructuring will take into account the interim report from the Arterial Highways Workshop, Road Subcommittee, the Panel on Infrastructure Development (Head of Panel: Jitsuro Terashima, Director of Japan Research Institute),

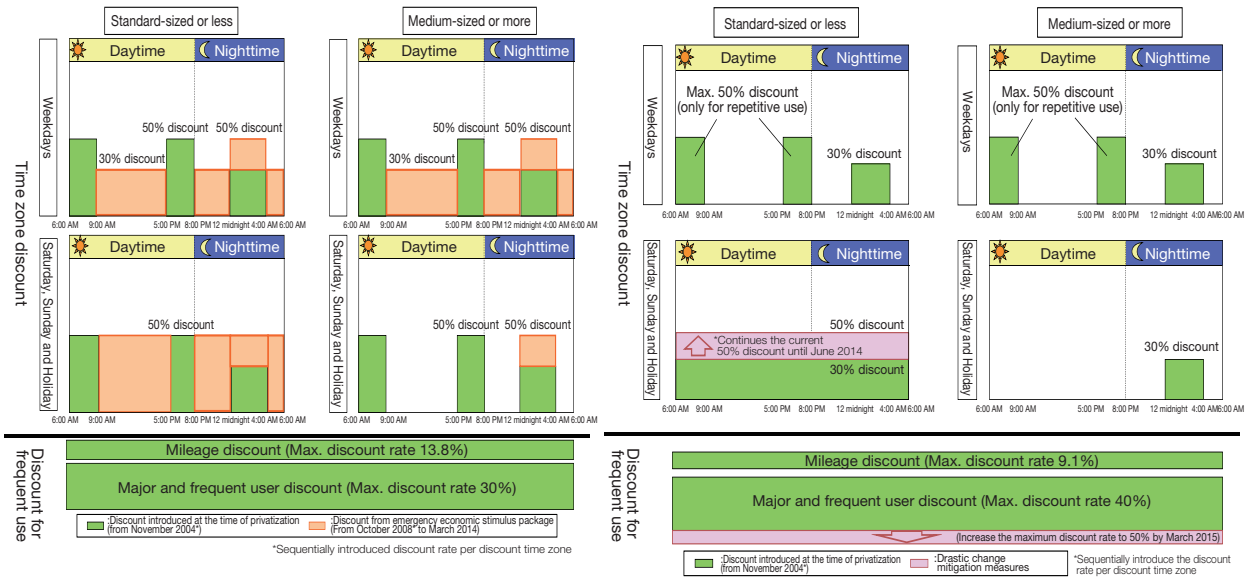
- ·to review discounts so that the system is highly efficient without duplication or waste,
- ·with the basic thinking being to give consideration to vehicles that use the expressways often, while emphasizing the aspects of lifestyle measures, tourism promotion, and logistics measures.

Figure II-5-3-2 Introduction of Three Toll Levels



Source) MLIT

Figure II-5-3-3 Current and New Toll Discounts and Financial Resources (Examples of Regional Divisions of NEXCO)



Source) MLIT

b. Advancing the development of smart ICs

The MLIT is advancing the development of smart interchanges (ICs) in its effort to help revitalize regional economies and mitigate traffic congestion and other problems by making effective use of existing networks of expressways.

·Japan's expressway ICs are spaced about 10 km apart from each other, about twice as far apart as the toll-free expressways on flatlands in the U.S. and European nations.

·About 50 percent of factory plants that are of a certain scale [Note] or larger are located within 5 km from an expressway IC.

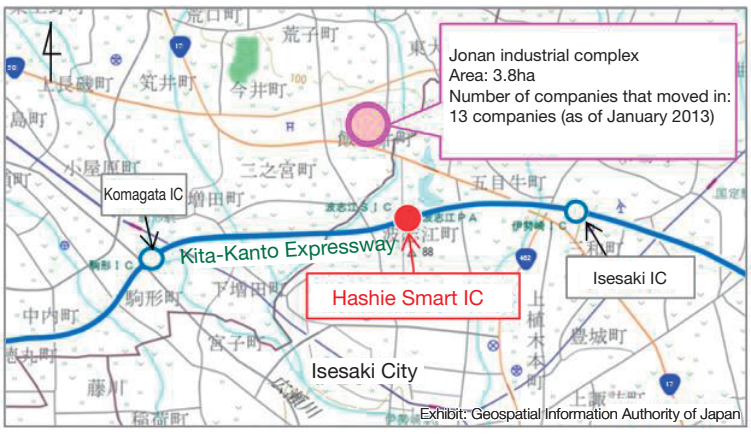
·At present, smart ICs are in commercial service at 70 locations and under development at 59 locations (as of the end of March 2014).

In FY2014, we will create a system to subsidize part of the project cost by government-sponsorship for businesses that are located within the expressway peripheral areas that are being developed by expressway companies.

Figure II-5-3-4 Example of Smart IC Peripheral Areas Development

After the Hashie Smart IC opened to traffic, the number of companies in the neighboring industrial complexes increased by 30%.
The number of employed manufacturing workers in the Hashie Smart IC peripheral areas increased as well.

Hashie Smart IC
Opened to traffic in March 2008
Traffic volume in 2012: about 2,800 cars/day



Source) MLIT

Note A site covering 1,000 square meters or larger purchased for building a factory plant or laboratory (based on an industrial location trend survey).

Chapter 6 Building a Competitive Economic Society

Section 1 Constructing Traffic Networks

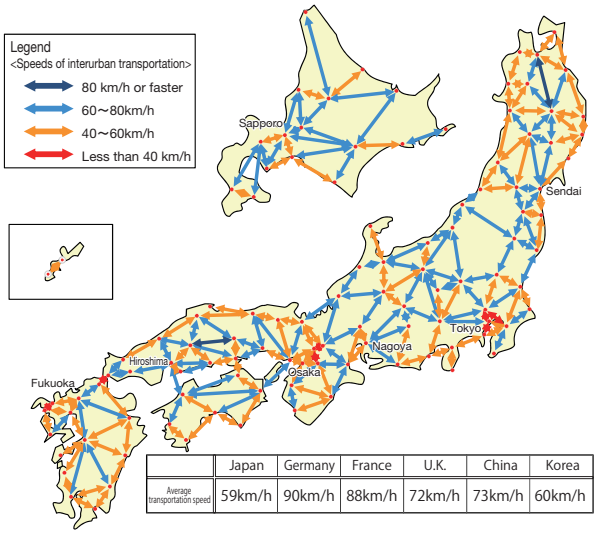
1 Constructing Highways

Since the First Five-Year Road Construction Plan formulated in 1954, Japanese highways have been constructed steadily to date. For example, the construction of national networks of highways, including expressways, has not only provided a major impetus in the rejuvenation of regional economies, as by encouraging plant location in the vicinity of expressway interchanges, but helped enhance the quality and safety of national life by making broad-area medical services accessible to rural areas, and allowing broad rerouting to avert highways disrupted by natural disasters.

In the meantime, the speed of interurban transportation, an indicator of the speediness of interurban travel, tends to lag in the areas in which expressways are underdeveloped. The speediness of interurban travel remains lower as a whole than in foreign nations. Since China opened its first expressway back in 1988, 26 years later than Japan, the nation has already laid 84,946 km of expressways, at a pace 62 times higher than Japan. While European and U.S. freeways have at least four lanes each on the average, freeways having only one lane in either direction account for 30% or more of all freeways in Japan.

Fatal and injury accident ratio on expressways is one-tenth of those on general roads. CO_2 emission from travel on expressways are two-thirds of that on general roads, while there are 7 times more traffic per lane on expressways than on general roads. Expressways are not only “safe and clean” but serve as “lifelines” in times of disasters. The MLIT is committed to completing expressway networks and promoting “Smart Use of Roads”.

Figure II-6-1-1 Speeds of Interurban Transportation

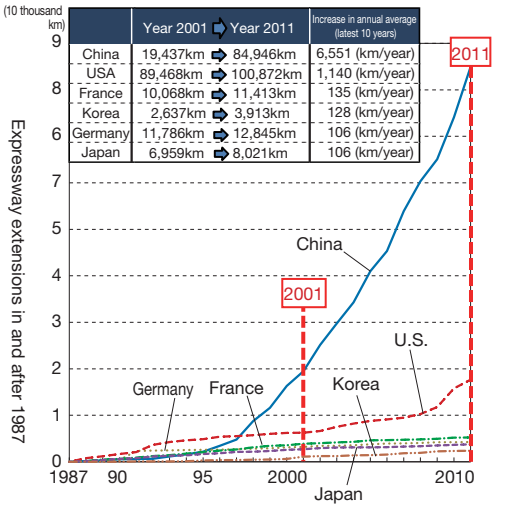


	Japan	Germany	France	U.K.	China	Korea
Average transportation speed	59km/h	90km/h	88km/h	72km/h	73km/h	60km/h

Speed of interurban transportation: The shortest distance of the road between cities divided by the shortest time required.
Target cities: Core cities, and cities housing a population of 50,000 or more remote from a core city by a certain distance or more and key ports.
Japan: Prefectural capital (former subprefectural office in Hokkaido)
Germany: Provincial capital France: Regional capital U.K: Regional Development Authority (RDA)
China: Provincial capital, municipality Korea: Special City, Metropolitan City
Required time: Based on the required time path finding system (Google Maps)(for Japan and Korea, based on real speeds, such as private probe data).

Source: MLIT

Figure II-6-1-2 Changes in Developments of Expressway Extensions in Other Countries



	Year 2001 ⇨ Year 2011	Increase in annual average (latest 10 years)
China	19,437km ⇨ 84,946km	6,551 (km/year)
USA	89,468km ⇨ 100,872km	1,140 (km/year)
France	10,068km ⇨ 11,413km	135 (km/year)
Korea	2,637km ⇨ 3,913km	128 (km/year)
Germany	11,786km ⇨ 12,845km	106 (km/year)
Japan	6,959km ⇨ 8,021km	106 (km/year)

(Note) Comparisons of expressways built by nations after 1987 as a reference year (zero)
Japan: Fiscal year-end data China, France, U.S., Germany: Year-end data
Sources) U.S.: Highway Statistics, France: Memento de transport, Germany: Verkehr in Zahlen, Japan: Ministry of Land, Infrastructure, Transport and Tourism literature (National Expressways), China: China Statistical Yearbook, Korea: Statistical Yearbook of MLTM

Source) MLIT

2 Constructing Arterial Railway Networks

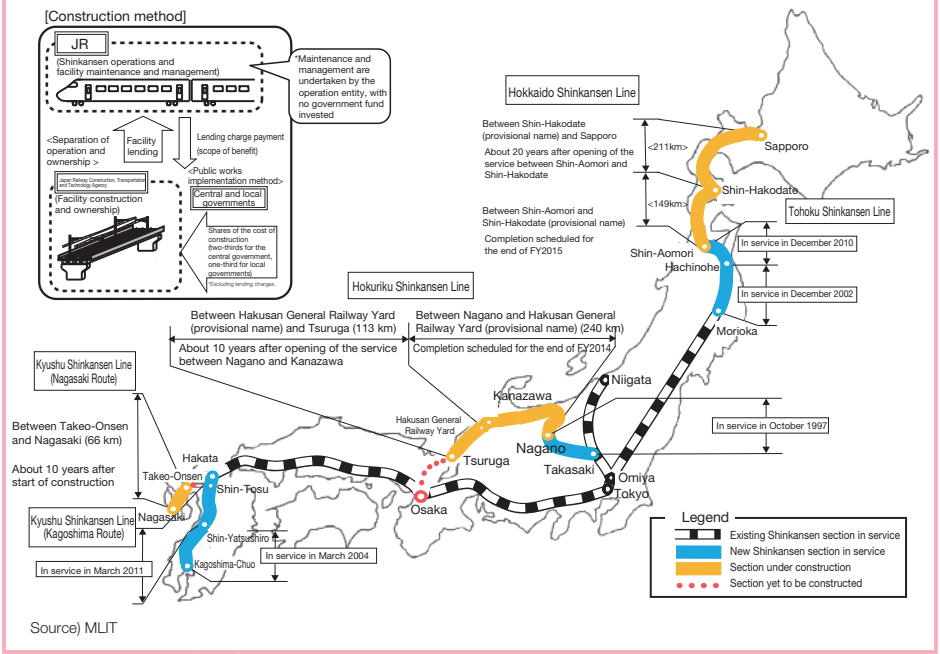
(1) Constructing Shinkansen railways

A rapid transit system of vital value to Japan, Shinkansen [bullet train] Lines significantly cut the time spent moving from region to region and help greatly boost regional activities and rejuvenate local economies. Shinkansen Lines feature safety (no record of passenger death accidents since opening of the Tokaido Shinkansen Line in 1964) and eco-friendliness (the railway CO_2 emissions per unit of energy (g-CO_2/passenger-kilometer being one fifth of aircraft and one eighth of automobiles). As New Shinkansen Lines [Note], the Tohoku Shinkansen Line (between Hachinohe and Shin-Aomori) opened in December 2010 and the Kagoshima Route (between Hakata and Shin-Yatsushiro) of Kyushyu Shinkansen opened in March 2011. The construction of the Hokkaido Shinkansen Line (between Shin-Aomori and Shin-Hakodate (provisional name)) and the Hokuriku Shinkansen Line (between Nagano and Kanazawa) is in steady progress to near completion and inauguration as scheduled.

Pending plans to launch the construction of the Hokkaido Shinkansen Line (between Shin-Hakodate(provisional name) and Sapporo), the Hokuriku Shinkansen Line (between Kanazawa and Tsuruga) and the Nagasaki Route (between Takeo-Onsen and Nagasaki) of Kyushu Shinkansen were authorized on June 29, 2012 after due procedures in accordance with "Handling of New Shinkansen" (a matter confirmed between the government and ruling parties on December 26, 2011) since all the requirements for the commencement of the works were fulfilled.

The Transport Policy Council, which had debated Chuo Shinkansen since March 2010, came up with recommendations in May 2011 to affirm the appropriateness of Central Japan Railway Company as an entity of its operation and construction, the superconducting maglev method of train operation and the Southern Alps of Japan route. The Minister of Land, Infrastructure, Transport and Tourism responded to name Central Japan Railway Company as an entity of operation and construction for Chuo Shinkansen in accordance with the National Shinkansen Railway Development Act, and decided on the Development Plan and directed Central Japan Railway Company to embark on construction. Central Japan Railway Company expects to open its Shinkansen railways between Tokyo and Nagoya in 2027 and between Nagoya and Osaka in 2045. Procedural actions pursuant to the Environmental Effect Assessment Act are underway with regard to the railway between Tokyo and Nagoya.

Figure II-6-1-3 Present Status of New Shinkansen Development



Source) MLIT

(2) Driving technical development

a. Superconducting maglev trains

Running tests for superconducting maglev trains which had been carried out on the Yamanashi Test Line since 1997. The Superconducting Magnetic Levitation Technological Practicality Evaluation Committee that met in July 2009 concluded that the "development of the technologies prerequisite to driving superconducting maglev trains to the stage of practical usefulness, including their operation as super-fast mass transit system, are in sight. Since August 2013, a running test has been in progress on the entire Yamanashi Test Line to make a final verification of the practical specifications of

Note Five routes that are stipulated in the Development Plan approved in 1973 pursuant to the National Shinkansen Railway Development Act.

the cars, propulsion coils and more.

b. Gauge changeable trains (Freegauge trains)

Technological construction of gauge changeable trains capable of through operation from Shinkansen railways to convention railways and vice versa is underway for completion scheduled for service on Kyushu Shinkansen and Hokuriku Shinkansen. In FY2013, testing facilities, including a Shin-Yatsushiro connecting line, were developed. Three-mode traveling durability testing is scheduled for FY2014, which will subject newly built test vehicles to iterative cycles of traveling on Shinkansen railways, gauge conversion equipment and traveling on conventional railways to verify their durability.

3 Constructing Aviation Networks

(1) Expanding aviation networks

a. Enhancing metropolitan airports functionalities

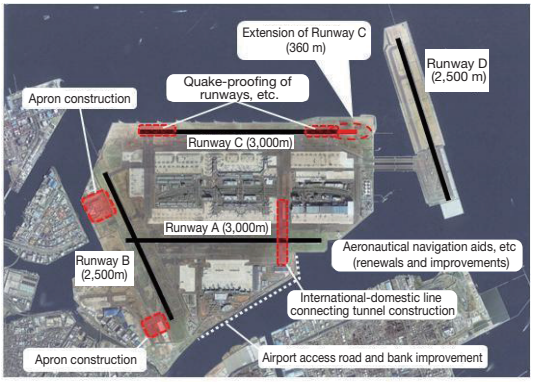
To beef up Japan's competitiveness in the global arenas of business and tourism, enhancements to the functions of the metropolitan airports, a prime impetus to propel Japane's growth, are contemplated. Raising the number of arrival and departure slots at Tokyo International Airpoirt and Narita International Airport to 750,000 during FY2014 is being pursued as a top-priority task.

Tokyo International Airport (Haneda) had the number of annual arrival and depature slots expanded to 447,000 at the end of FY2013 by making additions to its international passenger terminal and building aprons and the like, making for around-the-clock availability of high-demand business routes, including long-haul Asian and European and U.S. roues. Efforts will also be carried on to stretch Runway C to boost the transport capacity for long-haul international flights and augment the international and domestic transfer capability by constructing a new international-domestic line connection tunnel.

Narita International Airport, on the other hand, is slated to raise the number of annual arrival and depature slots to 300,000 during FY2014 as a main international airport responsive to buoyant metropolitan demand for international aviation. Keeping in pace with the launch of the Open Skies Initiative in March 2013, the flexible application of restrictions on takeoff and landing (curfew) has been initiated to allow airlines to take off and land until 24 when they cannot reasonably hold down their takeoff and landing within the current operating period of 6 to 23. Efforts continue further to get Narita consolidated as an Aisan hub airport by reinforcing the network of international flights, expanding domestic feeder flights, enhancing responses to needs as for LCCs and business jets.

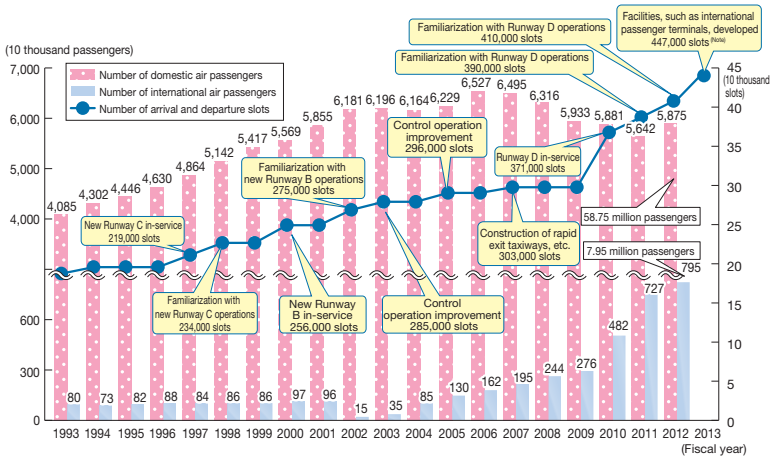
Search for more clues to augmenting the functionalities of the metropolitan airports further, after their attainment of

Figure II-6-1-4 Major Development Projects at Tokyo International Airport (Haneda)



Source) MLIT

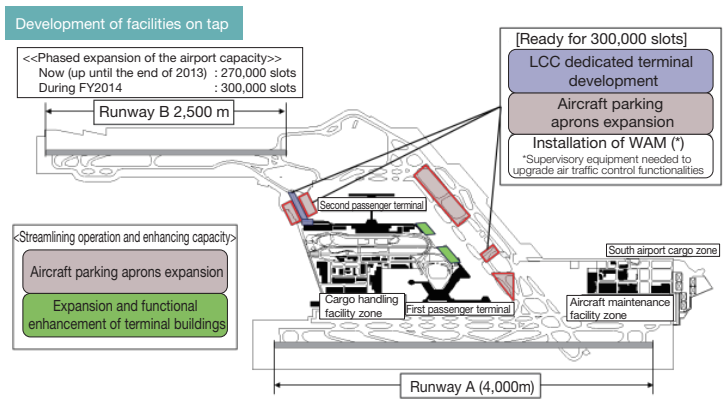
Figure II-6-1-5 Trends in Number of Passengers and Number of Arrival and Departure Slots at Tokyo International Airport (Haneda)



(Note) At the end of FY2013
Source) MLIT

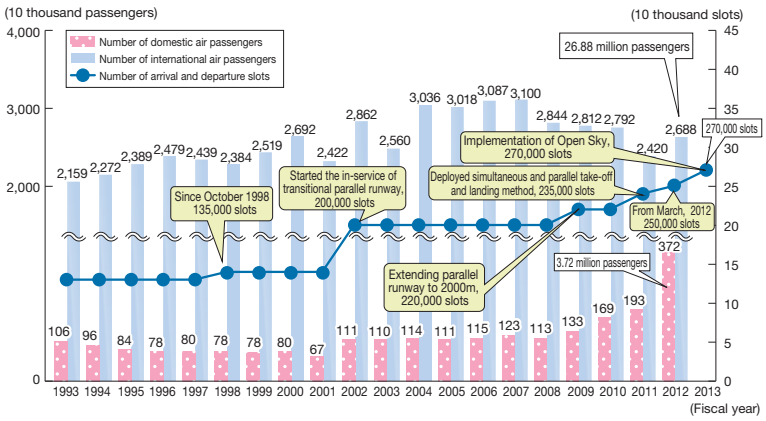
750,000 arrivals and departures a year, continues to target the 2020 Tokyo Olympic and Paralympic Games and the days beyond. As an example, the Subcommittee for Review of Metropolitan Airport Facility Enhancement Technologies organized under the Basic Policy Workshop, Arivation Workgroup, Transport Policy Council is slated to start compiling technical alternatives in November 2013 before a new forum is formed for exploring and reviewing specific approaches to enhancing the facilities of the metropolitan airports with the participation of the local governments concerned, airliners and so on.

Figure II-6-1-6 Overview of Narita International Airport Facilities



Source) MLIT

Figure II-6-1-7 Trend in Number of Passengers and Number of Arrival and Departure Slots at Narita International Airport



Source) MLIT

b. Driving the Open Sky Initiative strategically

The Ministry has strategically pursued the Open Sky Initiative [Note 1], including metropolitan airports, to respond to changes in the competitive climate resulting from global trends towards aircraft deregulation while accommodating vigorous economic leaps in Asian and other overseas nations. During fiscal 2013, agreements were newly reached with Switzerland, the Phillipines, Myanmar and Austria, envisioning the realization of Open Sky with a total of 27 nations and regions [Note 2] by March 2014.

c. Realizing concessions related to Kansai International Airport and Osaka International Airport

On July, 2012, Kansai International Airport and Osaka International Airport merged into a New Kansai International Airport Co., Ltd. with a view to rejuvenating and reinforcing Kansai International Airport as an international core airport and expanding the demand for air transportation in the Kansai district through appropriate and effective utilization of the two airports. The New Kansai International Airport Co., Ltd. is now operating in an integrated manner.

The newborn company has moved ahead with positive measures, such as expanding its passenger networks, turning into a cargo hub airport and acquiring all shares of Osaka International Airport Terminal Co., Ltd. on December 27, 2013 to place terminal buildings under consolidated management, in its bid to augment the corporate value of these two airports and set rights of administration for public facilities, etc. (concession-based PFI project) at the earliest possible opportunity.

Note 1 An agreement on mutually removing bilateral constraints on the number of operators, that of routes and that of flights in international air transportation to enhance the quality of services, such as cutting airfares by encouraging the entry of new airlines, increasing the number of flights and stimulating competition between airlines. In recent years, many countries in the world pursue its implementation.

Note 2 The number of passengers flying to and from the 27 nations and regions accounts for about 94% of the total number of passengers departing from and arriving at Japan.

d. Present status of airport development

Emphasis has been shifted to achieving qualitative enhancement to the construction of general airports, etc. mainly by implementing mixes of hardware and software measures and leveraging existing airports. New projects relating to the construction of new runway and extension of existing runways will be conducted only if they are truly needed.

In FY2013, an extension to the runway at Naha Airport then nearing its handling capacity limit was started. At Fukuoka Airport, an environmental assessment relevant to an extension to its runway for the sake of a dramatically enhanced airport capacity was conducted. Facilities in an advance stage of aging have also been renewed or renovated to ensure aircraft flight safety. The airport facilities have been progressively made quake-resistant at a steady pace to keep the Airport functions unaffected in times of earthquakes or other disasters simultaneously. Further, functional upgrades, such as restructuring of the terminal areas, have been promoted by leveraging existing stocks to boost Japan's international competitiveness and the regional competitiveness of the airport hinterlands.

(2) Enhancement and optimization of airport operations

a. Driving airport management reforms

Specific studies are presently underway towards outsourcing of the management of Sendai Airport and others to private sectors, subject to coordination with the stakeholders, in accordance with the Act on Operation of National Airports Utilizing Skills of the Private Sector that came into effect in June 2013.

Future efforts will be directed at driving airport management reforms through integrated management of aviation business and non-aviation business, utilization of private knowledge and funds, etc. regarding actual circumstances of its neighboring region under the Act on Operation of National Airports Utilizing Skills of the Private Sector. Regional revitalization will be conducted through expanding numbers of population engaging in domestic and foreign interaction by way of airports in close association and collaboration with locals.

b. Encouraging LCC entry

Since Japan's first LCC came into service in March 2012, Peach Aviation now covers a network of 10 domestic and six international flights at the end of FY2013, when compared with a network of 14 domestic flights by Jetstar Japan and two domestic and two international flights by Vanilla Air.

On December 17, 2013, Spring Airlines Japan Co., Ltd. was granted a license to provide air services. The Narita-based airline expects to start operating at the end of May 2014.

The accelerating entry of LCCs could create new demand for aviation by attracting more tourists visiting Japan, expanding domestic tourism and so on. The government is geared at stimulating new demand to for aviation to allow "LCCs to command a U.S. or European equivalent share (20 to 30%) of the total volume of domestic and international passenger trafffic" by 2020. The nation and its airports have staged various measures to this end.

Figure II-6-1-8 Summary of Japan's LCCs

Peach Aviation started flight operation at Kansai International Airport as the core airport in March 2012, and entered into international flight business in May as well.
Jetstar Japan and AirAsia Japan started flight operation at Narita on July 3, 2013 and August 1, 2012, respectively.
AirAsia Japan was renamed "Vanilla Air" on November 1, 2013, which started flight operation on December 20.
On December 17, 2013, Spring Airlines Japan Co., Ltd. was licensed to provide air services and expects to start flight operation at the end of May 2014.

Company name	Peach Aviation, Ltd.	Vanilla Air Inc.	Jetstar Japan Co., Ltd.	Spring Airlines Japan Co., Ltd.
Major shareholders	・ANA Holdings Inc. 38.7%, ・First Eastern-Aviation Holding Limited 33.3% ・Innovation Network Corporation of Japan 28.0%	・ANA Holdings Inc. 100%	・Qantas Group 33.3% ・JAL 33.3% ・Mitsubishi Corp. 16.7% ・Century Tokyo Leasing Corp. 16.7% ※Ratios based on the voting rights.	・Spring Airlines Company Limited 33.0%, and others
Core airport	Kansai International Airport, Naha Airport	Narita International Airport	Narita International Airport	Narita International Airport
Equipment used	Airbus Model A320-200	Airbus Model A320-200	Airbus Model A320-200	Boeing 737-800 airliners
Service route	(Domestic flight) Kansai = Sapporo, Fukuoka, Nagasaki, Kagoshima, Naha, Sendai, New Ishigaki, Narita Naha = New Ishigaki Kansai = Matsuyama (February 1, 2014) Naha = Fukuoka (July 19, 2014) (International flights) Kansai = Incheon, Hong Kong, Taoyuan, Busan Naha = Taoyuan Kansai = Kaohsiung (January 18, 2014)	Flight to leisure and resourt routes at home and abroad started on December 20 (Domestic flight) Narita = Naha Narita = Sapporo(January 29, 2014) (International flights) Narita = Taoyuan Narita = Incheon (March 1, 2014)	(Domestic flight) Narita = Sapporo, Fukuoka, Naha, Kansai, Oita, Kagoshima, Matsuyama, Takamatsu Kansai = Sapporo, Fukuoka, Naha Chubu = Sapporo, Fukuoka, Kagoshima (International flights) Short-haul international flights to China, Korea and else scheduled	Start flight service in May 2014 Narita = Takamatsu, Hiroshima, Saga
Characteristics of corporate structure	Business operations independent of ANA	A consolidated subsidiary of ANA, whose business operations are coordinated with ANA.	Business operations independent of JAL	Business operations leveraging the Spring Airlines' networks

Source) MLIT

Two principal governmental measures being implemented or explored are summarized below.

The first measure is the lowering of the landing fees during FY2013 with regard to mainly used equipment (up to 100 tons) aimed at revitalizing local communities by maintaining local routes and supporting LCCs.

The second is the promotion of airport management reforms. Many of Japan's airports are managed by the central and local governments, contemplating the keep their runways and airport buildings under integrated management and launching strategic airfare plans and sales campaigns in conjunction with private businesses in a bid to attract LCCs. The Act on Management of Privatized Airports enforced in July 2013 is expected to stimulate aviation demand by leveraging the resources of private sectors.

In addition to these measures, each individual airport has also taken two key steps to create an environment for hosting LCCs.

One is the construction of LCC terminals. Year 2012 witnessed the launch of an interim LCC receiving facility at Narita International Airport, Japan's first LCC terminal at Kansai International Airport and an interim LCC terminal leveraging existing facilities at Naha Airport. In addition, the construction of LCC terminals is being contemplated for Narita International Airport for completion by the end of FY2014 and for Kansai International Airport for completion by the end of FY2016. The feasibility of constructing a low-cost terminal is being explored at Chubu International Airport as well.

The second is the reducton of the airport facility fees, including landing fees. Efforts that began in FY2012 continued into FY2013 to mark down or review the airport facility fees, including landing fees at Narita International Airport and Kansai International Airport.

c. Accelerating the reception of business aviations

A business jet is a small aircraft with the capacity to hold a few to more than a dozen passengers at the most. Business aviations are typically used by businesspersons valuing time because they are able to adjust times according to their schedules or utilize the plane as a secure space to carry on business meetings and such on board.

Business aviations have become a means of global corporate activity in the U.S. and Europe. As Japan's economy goes on global, the need to attract investment from overseas is beginning to win wider recognition than before, instead of conducting a one-sided exchanges, such as building a plant overseas. Hence, the importance and potentials of business aviations in Japan will grow from a viewpoint of consolidating economic growths in the Asian regions from now on.

Comparisons of the status of business jet ownership by country, however, show that only 55 business aviations are registered in Japan (in 2013), against the largest owner U.S. with about 19,000 business aviations registered in the same year. Business aviations are, thus, yet to be popular in Japan.

Hardware has been developed and regulations eased to get better prepared for hosting business aviations flying into Japan as explained below.

Ongoing efforts made at the metropolitan airports in pursuit of better user convenience include constructing new routes to trim the time and distance business jet passengers take to complete arrival/departure procedures and to gain access to the terminal buildings.

In October 2013, a step was taken to hasten the entry of business aviations into Japan by authorizing foreign-registered business chartered planes flying into Japan to conduct air services between the domestic flight sectors that connect to their routes if they meet a certain set of conditions. Further, a comprehensive review standard relating to flight operations was enforced in December 2013.

The Ministry will consider phasing in measures designed to accelerate the reception of business aviations at the airports nationwide, as they are practicable, with reference to the measures taken in overseas while exploring measures to consolidate the usage of business aviations, such as disseminating information proactively and easing regulations relevant to business aviations.

(3) Constructing air traffic system

a. Developing new air traffic systems

A long-term vision for the future air traffic systems for 2025 was formulated as CARATS (Collaborative Actions for Renovation of Air Traffic Systems) to correspond to increasing demand for air traffic capacity and responses to diversified needs. At the same time, long-term plans for an interoperable global air traffic management (ATM) system has been developed by the International Civil Aviation Organization (ICAO), the U.S, and EU. CARATS is built to mainly achieve a highly integrated ATM system that manages the flight paths of aircraft from departure to arrival. A roadmap for measures to realize CARATS has been established to monitor implementation status continuously. In FY2013, issues such as implementation plans for individual measures defined in the roadmap and indicators that represent the status of achievement of CARATS were discussed among industrial-government-academia joint members.

Specifically, the possible installation and deployment of high-standard area navigation (RNAV)and RNAV for small aircraft have been debated in order to cut flight duration and fuel consumption by shortening flight path and to reduce the number of cancelled flight through improving airport's operation level. In addition, studies have been launched with a view to creating high-altitude airspace sectors mainly occupied by cruising aircrafts to increase the air traffic control capacity, introducing routine and non-urgent Air/Ground communications utilized by data link technologies over the domestic airspace, providing electronic terrain and obstacle data to prevent collisions and so on.

b. Pursuing enhancing metropolitan airport capacities

Operation of parallel-crossed four runways was installed at Tokyo International Airport (Haneda) in October 2010 to expand the capacities of airports and airspaces in the metripolitan area for providingt of better air transportation services. After a period of familiarization with a new method of operation using these runways, an annual capacity of 447,000 arrivals/departures was achieved in March 2014. Examination will be continued to probe into specific measures to consolidate the airport facilities.

At Narita International Airport, simultaneous parallel departure procedure has been introduced since October 2011 to realize a yearly capacity of 300,000 arrivals/departures within FY2014 without expanding noise-impacted zone, and familiarization with this operation has been steadily proceeded with.

(4) Strategic promotion of international aviation measures

International aviation measures are many and diverse, ranging from air talks, through safety and security, such that they need to be put into practice from strategic, comprehensive perspectives.

According to estimates by the International Civil Aviation Organization (ICAO), the volume of air transportation in the Asia-Pacific region is projected to rise at 6.2% per annum on the average over the 20-year period from 2010, suggesting that the region will grow into the world's largest aviation market in the near future. In the circumstances, what is of strategic importance to Japan is not only to contribute to strengthening of the aviation networks in the region but also to actively capture the impetus of the region in which numerous aviation projects are in progress.

As part of the strategic impetus for driving international aviation measures, the Council on the International Deployment of Aviation Infrastructures was inaugurated in April 2013 to broaden the scope of approaches to the global deployment of aviation infrastructures in a public-private partnership. The Council has since hosted sales and other campaigns with public and private sectors working in accord.

4 Facilitating Traffic Access to Airports

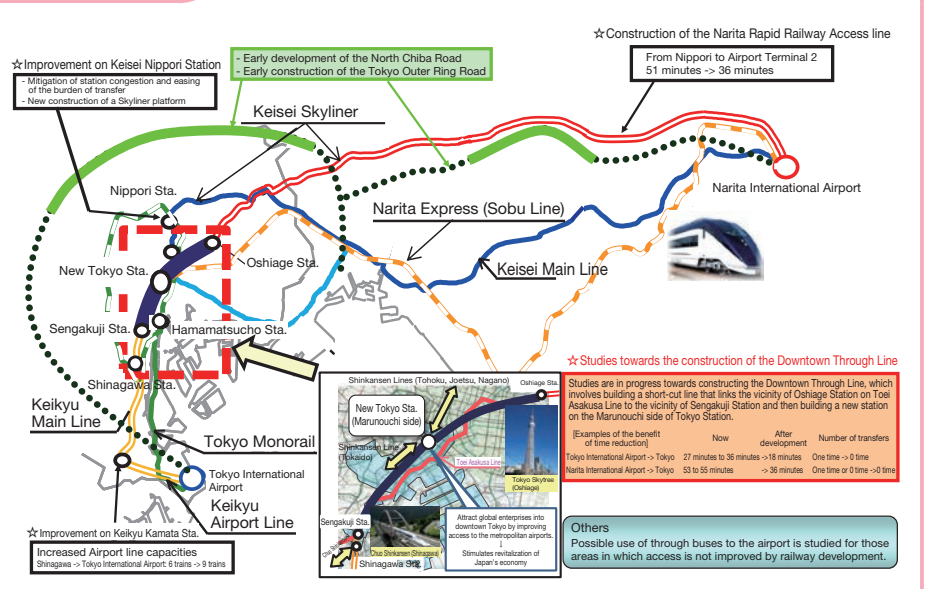
The world's major airports (London, Paris, Hong Kong and else)are located within a railway reach of about 30 minutes from downtown. In contrast, Japan's Narita International Airport used to take about a 50-minute train ride to reach from downtown Tokyo. With the opening of the Narita Rapid Railway Access Line in July 2010, which connects Hokuso Railway trains to Narita International Airport, the time required to travel from downtown Tokyo was reduced to around 30 minutes. In parallel with this, Keisei Electric Railway Nippori Station was improved to augment the convenience of transferring passengers. To reinforce car access to the airport, the development of an expressway network has been driven, including the development of the area on the eastern side of the Tokyo Outer Ring Road.

An improvement to Keikyu Kamata Station completed in October 2012 boosted the capacity of the Keikyu Airport Line, reinforcing railway access to Tokyo International Airport, coupled with the addition of extra through trains from Shinagawa and Yokohama.

Plans are presently being pursued to construct the Downtown Through Line to directly connect the center of Tokyo to the metropolitan airports to allow transfer-free swift travel, which will make Tokyo International Airport (Haneda) and Narita International Airport more readily accessible to downtown Tokyo and consolidate the location competitiveness of the center of Tokyo, thereby facilitating the attraction of global businesses into Tokyo and revitalizing Japan's economy.

In addition, ways to improve access to Kansai International Airport have been surveyed and explored.

Figure II-6-1-9 Bolstering Traffic Access to Metropolitan Airports



Source) MLIT

Section 2 Implementing Comprehensive and Integrated Logistics Policies

In June 2013, the Framework for General Measures for Logistics (2013-2017) was approved at a Cabinet meeting to offer a quick, precise solution to the prevailing conditins of logistics, such as deepening global supply chains, growing urges to combat global warming and assuring safety and security. Pursuant to this framework, the implementation of logistics Measures has been driven in a comprehensive, integrated manner in a public-private partnership. In addition, the Logistics Concilor and the International Logistics Division were inaugurated in July 2013 to build efficient logistics systems both at home and abroad that help boost the international competitiveness of Japan's industries and also to fortify an inter-ministry framework for driving implementation of the logistics measures.

1 Implementing Logistic Policies to Correspond with Deepening Global Supply Chains

To keep up with deepening global supply chains, efforts directed at reinforcing Japan's international logistic facilities are under way, including driving overseas deployment of the nation's logistic systems.

(1) Promoting overseas deployment of Japan's logistics systems

As supply chains continue to get globalized at a deeper level than ever, grabbing the evolving Asian markets would be essential to sustaining and enhancing the international competitiveness of Japan's industries. The formation of a sophisticated international logistics system should be of prerequisite importance to meet this urge. Capturing the Asian markets has become an urgent task for Japanese logistics companies that support the business expansion of the nation's industries in Asia.

While the urge for Japanese logistics companies to expand into global markets mounts, certain problems need to be resolved, including institutional constraints placed in the partner countries, before high-quality logistics systems, in which Japanese logistics companies have strengths, can be deployed in the Asian nations. The development of an environment for overseas deployment of Japan's logistics systems has been pursued through the implementation of demonstrations of the schemes of fully integrated land-sea transportation on RORO ships, policy dialogs at the government level and so on.

(2) Consolidating capabilities of the international maritime transportation network

As the globalization of economy progresses, the volume of international marine transportation continues to grow year to year. From the perspective of optimizing maritime transportation through large bundle shipments, container and bulk freight liners continue to grow in size. In the meantime, key Asian ports have successfully increased their volumes of freight handling, resulting in concentrated ports of call, international key sea routes making fewer calls at Japan. Further, slow responses to larger vessels to carry bulk cargo [Note] raise concerns over diminishing competitiveness in domestic industries forced into a mutually disadvantageous business environment.

In light of such conditions, Japan carries on its effort to streamline the flow of logistics that supports economic activity in Japan and life of citizens, improving the shipping entities at their location at home, which would in turn augment Japan's industrial competitiveness and realize economic reconstruction by maintaining and expanding the calls of international key routes at Japanese ports and simplifying and stabilizing imports of lifeblood materials, such as resources and energies.

In parallel with these approaches, efforts to shape an efficient network of marine transportation in which international and domestic transport services are integrated will be carried on, and relevant measures will be enhanced and developed at a deeper level of refinement.

a. Enhancing the facilities of International Container Hub

To support Japan's industrial activities and the people's lives in terms of logistics, the key international routes of marine container transportation that link Japan to North America, Europe and else need to be consistently maintained and even expanded.

To address this need, Hanshin Port and Keihin Port were selected to be International Container Hub each in August 2010 to implement a fully package of hardware and software measures, including the construction of deepwater quays and efficient port management taking advantage of "private" viewpoints. As for port management, Special Port Operation Companies have been appointed at Tokyo Port, Kawasaki Port, Yokohama Port, Osaka Port and Kobe Port.

In the meantime, the conditions surrounding Japan's shipping and ports and habors have been changing rapidly and with increasing toughness, keeping pace with a restructuring of the European line alliances (G6 Alliance), formation of a new alliance of mega-carriers (P3 network) and the commissioning of supergiant container ships represented by Triple E (18,000TEU class).

Under the circumstances, the International Container Hub Policy Promotion Committee has met since July 2013, publicizing its final conclusions in January 2014 focusing on the three key principles of "concentration," as by picking up cargoes at International Container Hub from sources over a broad area, "creation," as by integrating industries in the hinterlands of strategic ports, and "increased competitiveness," as by reinforcing the functionalities of deepwater container terminals or creating a government system of investment into port management companies.

Reflecting disucssions at the committee, the Law for Making Partial Amendments to the Port and Harbor Law was enforced in April 2014, allowing governmental investment into the port management companies at international container strategic ports, adding warehouses that involve distribution and processing in the vicinity of piers at international container strategic ports to a list of facilities eligible for the interest-free loan program and so on.

From now on, these measures will be set into full motion to deepen the evolution of the international container strategic port and harbor policies and also to accelerate the pace of approach to their implementation.

Note A generic term covering cargoes that ship in bulk, such as grains, iron ores, coal, oils and timber.

b. Forming a marine transportation network for moving resources, energy sources and so on with stability and efficiency

In a globally tight supply and demand climate for resources, energies and so on, importing these materials with stability and at low cost has become an pressing issue for Japan, because the nation depends on imports for virtually all of her requirements for these materials.

Japan is, therefore, committed to forging a marine transportation network to move resources, energy sources, etc. with stability and efficiency by building large vessel-ready port and harbor facilities of core importance, by encouraging inter-business collaboration and so on. To expedite this move, Specified Cargo Import Hub Ports have been specified by the Minister of Land, Infrastructure and Transport as import hubs for bulk cargoes, such as coal. At the same time, the Amended Port and Harbor Law, which stipulates measures, etc. for supporting such ports and harbors and associated ministerial ordinances came into effect on December 1, 2013. Responsive to this move, Onahama Port, which had been chosen as one of the International Bulk Hub on December 19, 2013, has been designated Japan's first Specified Cargo Import Hub Port (Coal). The goal is to realize a stabel, low-cost supply of imports and thus build up Japan's industrial competitiveness, create more employment and prevent outflow of earnings abroad.

c. Building functionally Major Japan-Sea Coast Ports

Among the ports located along the shore of the Japan Sea that are geographically close to the fast economically growing nations across the sea, Major Japan-Sea Coast Ports were selected in November 2011 in an effort to capture the economic booms in these nations into Japan's growth through selection of functions and concentration of measures and through port-to-port linkage and to build a disaster-resistant logistics network following the Great East Japan Earthquake. The progress and other aspects of the plans formulated by port management bodies will be followed up from now on.

d. Fabricating an integrated logistics information platform

Efforts are underway to fabricate an integrated logistics information platform that combines the functions of Nippon Automated Cargo Consolidated System (NACCS) with Container Logistics Information Service (Colins) to augment the efficiency of system administration and user convenience.

e. Enhancing functionalities of international ports

To address increasingly sophisticated and diversified needs for East Asian logistics, which is not much different from domestic logistics in both terms of time and distance and build a low-cost logistics system, the Ministry pushes ahead with functional enhancements to unit loading terminals [Note] and with the construction of facilities designed to smooth the flow of cargo transshipment. To catch up with rising volumes of container and bulk freights, the Ministry also promotes the construction of international marine container terminals and international logistics terminals in an international marine transportation network or at regional core ports, and the approaches designed to enhance user convenience such as the implementation of ICTs.

Note A unit loading terminal is a terminal ready for the scheme of transportation in which freights are loaded and unloaded, unitized, in chasses, containers or the like, to make their physical distribution faster and more efficient.

f. Developing a marine transportation environment

Among all international trunk routes, those that could interfere with bay navigation because of shallow waters, etc. have been improved and Aids to Navigation have been renovated to develop a marine transportation environment that combines the safety of ship traffic with the efficiency of marine transportation.

(3) Developing advanced aviation logistics facilities to pursue increased international competitiveness

In recognition of the sluggish growth of Japan's international airfreight transport business under the influence of domestic businesses seeking relocation overseas, the recent European sovereign debt crisis, etc., , the Ministry has been driving efforts to turn Japan's core airports, such as Kansai International Airport and Chubu International Airport, into freight hubs and streamlining the transport process, as well as upgrade the capacities and facilities of metropolitan airports, to take freight arriving at and departing from Asian nations, which promises further leaps.

(4) Strategic development and utilization of a logistically important road network

Building an efficient logistics network is of crucial importance to motor truck transportation that accounts for about 80% of domestic transportation. From this point of view, the construction of ring roads in the three major metropolitan areas, access roads to airports and ports, etc. is underway. Pursuant to the Law for Making Partial Amendments to the Road Act, etc. promulgated in June 2013, roads of vital importance were designated "road network for vehicles exceeding the weight and size limits" to speed up the procedures for the traffic of large-sized vehicles on such roads and to improve the sections which have difficulty with large-sized vehicle traffic on a planned basis. Efforts are also underway to utilize and upgrade existing road networks, including the construction of smart ICs.

(5) Other measures that help consolidate the facilities of international logistics

While the urgent formation of a logistics in which international logistics is efficiently combined with the domestic transport modes of land, sea and air is sought, the realization of the interoperation of chasses (trailers which have no power drive) to and from Korea and China and the use of a sea & rail scheme under which marine transportation is coupled with railway transportation are propelled.

The development or redevelopment of international container-ready logistics centers in and around the international ports or the like, or nodal points of global logistics, in the metropolitan areas will be driven to reinforce international competitiveness, as wel as enhance disaster preparedness in times of large-scale disasters and improve the urban environment.

2 Measures Aimed at Building an Efficient Logistics System at Home

Additional approaches are underway to build an efficient logistics system at home to toughen Japan's industrial competitiveness while easing environmental loads.

(1) Streamlining the flow of interregional logistics

The Ministry proceeds to develop nodal points of logistics, such as ports and freight stations, to drive combined multimodal transportation. The new construction of the Suita Freight Terminal Station in March 2013, coupled with the completion of modifications to Kudara Station and a railway freight transport capacity enhancement project at Sumidagawa Station, is expected to streamline the work flow of freight railway transportation further. The construction of combined multimodal transport terminals is also underway at Tokyo Port and elsewhere to consolidate coordination between marine transportation and other modes of transport.

Key road networks will also be refurbished to streamline the flow of truck transportation.

(2) Streamlining the flow of inner-city physical distribution

Suburban areas designed for physical distribution [Note 1] had been developed in 20 cities and 29 locations (27 of which are already in service) by the end of March, 2014 in accordance with the Act on the Improvement of Urban Distribution Centers to enhance the urban functions of logistics and streamline road traffic through intensive location of distribution facilities.

To prevent roadside parking for cargo handling, the Ministry has encouraged local governments to include the installation of parking spaces for cargo handling in their municipal parking ordinances. As of the end of March 2013, municipal ordinances were amended in 90 cities to dictate the installation of parking spaces for cargo handling at commercial instillations having a certain scale or larger.

Measures that have been taken to streamline traffic flow include intensive actions directed at congestion bottlenecks,multi-layerization of traffic intersection and resolution of railway crossings nearly closed at all times. In parallel, software measures, such as those aimed at driving joint transportation and delivery pursuant to the Low Carbon City Promotion Act and encouraging migration the use of private trucks to the use of commercial trucks [Note 2] to boost load efficiency, have been driven.

(3) Further efforts to implement logistic services that are more sophisticated and that deliver better total efficiency

To accelerate the implementation of the 3PL business [Note 3] further, the Ministry not only arranges for the environment in which logistic companies find it easier to make inroads into the 3PL business easier, by hosting human resources development and training sessions, publicizing regional business models and so on, but also seeks to generalize and simplify the logistic flow through a system of accreditation for total efficiency plans [Note 4] in accordance with the Act on the Improvement of Urban Distribution Centers. As of the end of March 2014, 221 total efficiency plans were accredited in accordance with the Act.

Section 3 Reactivating Industries

1 Trends in Railway Industries and Measures

(1) Railway business

a. Trends and measures in the railway business

The number of railway passengers carried in FY2012 increased from its year earlier level. At Japan Railway, transportation on Shinkansen increased while transportation on conventional railway lines transitioned sideways, with transportation on private railways on the increase.

The volume of railway freight transportation during FY2012 rose slightly from its year earlier level in both the number of tons and that of kilograms carried a year for reasons, such as rehabilitating the production sites that had been damaged by the Great East Japan Earthquake.

Railway operators, particularly urban operators, aim to keep comfortable and secure railway spaces, as by adding alphanumeric sequences along with route or station names. The introduction of transport e-money IC cards has progressed in the wake of Suica launched by JR East in 2001. Starting from March 2013, 10 kinds of such IC cards that had previously been used in the areas covered by JR and key private railways and the like have been made interoperable. Subsequently, IC cards have penetrated a growing number of railway operators and areas, promising added user convenience and regional revitalization.

Note 1 A large-scale urban distribution center intensively equipped with distribution facilities, such as truck terminals and warehouses,which is conveniently located for ready access to an expressway interchange, for example.

Note 2 A scheme of converting private motor trucks (used to their owners to carry private cargoes on their own) to commercial motor trucks (used to carry cargoes for fee on request from others) to enhance transport efficiency, as by moving mixed cargoes from multiple cargo owners, and thus curtain the shipping costs.

Note 3 Third-party logistics: An outsourcing service that undertakes a fully ingrated flow of physical distribution of cargoes from the cargo owners.

Note 4 A plan that is committed to integrating and expediting physical distribution mainly at a physical facility located in the vicinity of a social infrastructure, such as an expressway interchange or port, as by installing automated warehouses, information systems and the like while seeking concentrate transportation networks and share shipping and delivery operations.

b. Initiatives towards the complete privatization of Japan Railways

The individual companies of Japan Railways incorporated upon breakup and privatization of Japan National Railways in April 1987 have carried on their respective management efforts to meet their own regional conditions and management climates over the following more than 25 years. In the meantime, East Japan Railway Company, Central Japan Railway Company and West Japan Railway Company were completely privatized when the sale of the capital holdings of Japan Railway Construction, Transport and Technology Agency (JRTT) completed, but measures have been taken for the time being to keep the Japan Railways companies in mutual partnership and collaboration, assure user convenience, care for smaller enterprises and so on in consideration of the background of the Japan Railways reform.

Hokkaido Railway Company, Shikoku Railway Company, Kyushu Railway Company and Japan Freight Railway Company, on the other hand, carry on their respective efforts to increase revenues and cut costs. In the light of the social significance of the roles these companies play, such as securing means of local transportation and driving railway freight transportation having low environmental loads, necessary aids have been extended to them to reinforce their management structure and thus make them economically viable by leveraging funds from the JRTT Special Services Account since FY2011 in accordance with the Act on Treatment of Debt, etc. of JNR Settlement Corporation, in addition to the fixed property tax breaks already in effect.

(2) Railway vehicle industry

The volume of newly built railway vehicles by value moved flatwise for domestic shipment and varied depending on the status of orders for overseas shipment. Production by value in FY2012 stood at 168.4 billion yen (1,589 vehicles), with domestic shipments accounting for 89.0% (149.9 billion yen) and exports 11.0% (18.5 billion yen), down 12.5% and up 281.2% from a year earlier, respectively.

Production of railway vehicle parts (such as power generators and boggies) was 235.1 billion yen by value, that of signalling systems (such as automatic train control devices and electrical interlocking systems) was 130.5 billion yen.

Rolling stock builders and others are working to develop rolling stocks that fill diverse social needs, such as speed, safety, passenger comfort, low noise and being barrier-free, by partnering with railway operators and also to set up and even expand local production and service sites in the U.S., U.K. and elsewhere with the recent order taking for overseas projects as an impetus.

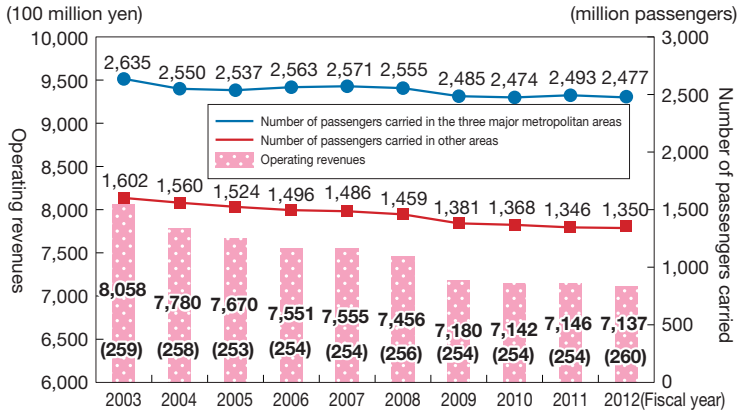
2 Trends in Motor Truck Transport Business and Measures

(1) Passenger vehicle transport business

a. Motor bus business

Demand for motor bus transportation, which is represented by the number of passengers carried and operating revenues, remained on the decline in pace with changes in the urban structure, such as a hollowing of the central area of a city, and increased ownership of private cars with the progress of motorization. While business activity remains sluggish, the climate surrounding the motor bus business remains extremely harsh.

Figure II-6-3-1 Changes in the Number of Passengers Carried by Motor Buses and Operating Revenues



(Notes) 1 Numeric data above has been collected from the bus operators who own a fleet at least 30 motor buses. The parenthesized value for each fiscal year denotes the total number of bus operators who own a fleet at least 30 buses for that fiscal year.
2 The number of passengers carried in the three major metropolitan areas is an aggregate total for Saitama, Chiba, Tokyo, Kanagawa, Aichi, Mie, Gifu, Osaka, Kyoto and Hyogo.

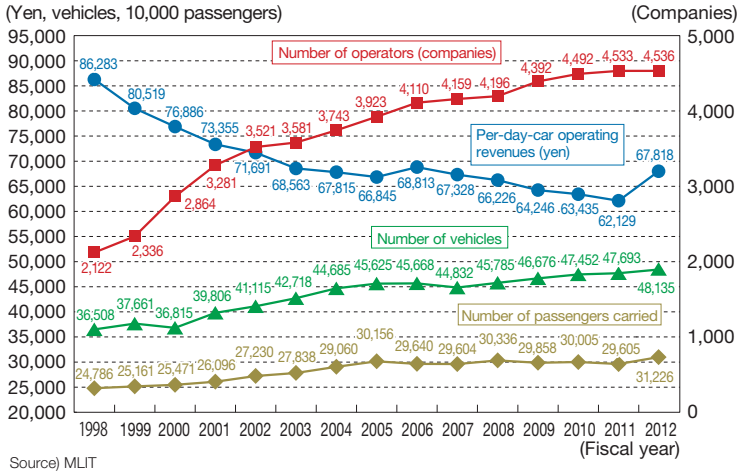
Source) MLIT

b. Chartered bus business

Since deregulations in February 2000, the chartered bus business has sponsored low-cost, diversified bus tours in its effort to deliver better user services, but competition is stiffening with increase in the population of operators in play. Further, as group tours continue to get downsized and travel goods are lower-priced, transportation revenues have been declining. In addition, upsurges in the fuel charges continue to toughen the business climate surrounding the chartered bus business.

On the basis of the discussions at the Review Panel on the Future of the Bus Service that met in the wake of the April 2012 Kanetsu Expressway rapid tour bus accident, the Rapid and Charered Bus Safety and Confidence Recovery Plan was worked out to carry on two-year efforts intended to add to the safety of rapid and chartered buses in FY2013 and FY2014.

Figure II-6-3-2 Changes in the Number of Chartered Bus Operators, Number of Passengers Carried, Number of Vehicles and Operating Revenues

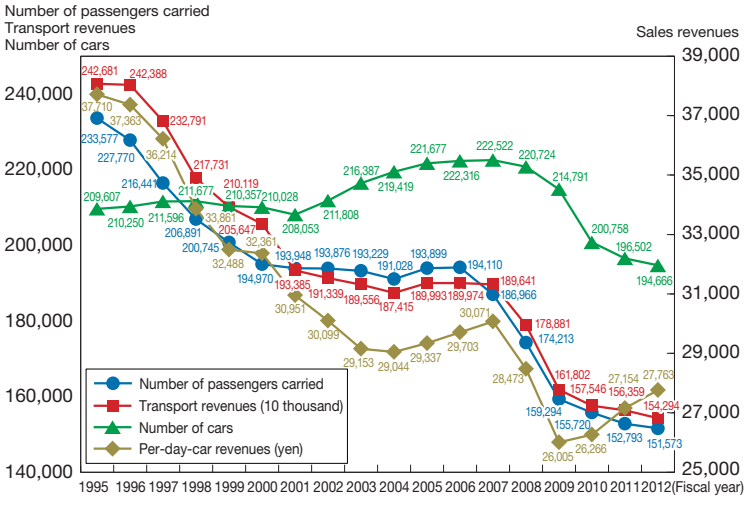


Source) MLIT

c. Taxi business

The taxi business is faced with a deteriorating revenue base, worsening driver working conditions and along with other problems in some areas due to increases in the fleet of taxi vehicles while the demand follows a long-term path of reduction, making it difficult for the taxi business to fully demonstrate its utilities of regional public transportation. The Act on Special Measures Concerning the Normalization and Reactivation of the General Passenger Transport Business in Special Regions was enroced in October 2009. A little more than four years on, the legislation offered certain effects, such as drivers' wages turning for the better, but the problems of oversupplies of taxes in many regions remain yet to be resolved. On November 2, 2013, the Act for Making Partial Amendments to the Act on Special Measures Concerning the Normalization and Reactivation of the General Passenger Transport Business in Special Regins was approved in the 185th extraordinary Diet session as a lawmaker-initiated legislation focusing on a scheme of elevating the levels of taxi service quality by effectively resolving the problems of oversupplies of taxes in certain regions, toughning driver qualifications and so on.

Figure II-6-3-3 Developments in Per Day-Vehicle Reviews of Hires and Taxes



(Note) Sales revenues: Revenues from transport per car per day worked
Source) MLIT

The Act came into effect at the end of January 2014. The Ministry of Land, Infrastructure and Transport contemplates to come up with an early solution to the problems of oversupplies of taxes and to enhance the quality of service and safety by applying the Act properly in accordance with the purport of the lawmaker-initiated legistlation pusaunt to various standards that have been established on the basis of additional resolutons passed at both Houses, as well as the provisions of the Act.

(2) Replacement driver service

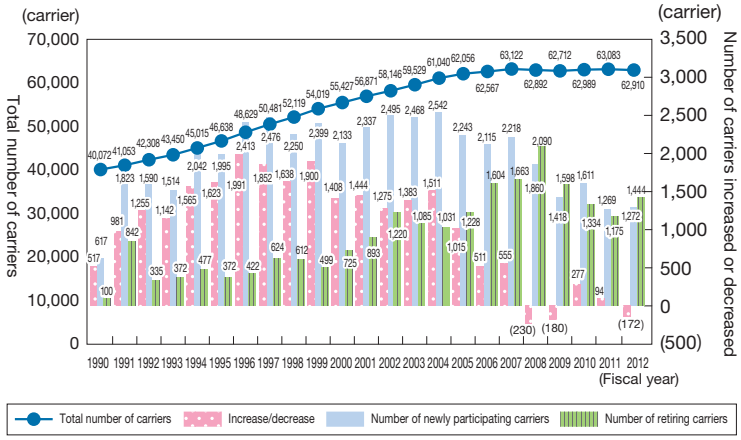
The replacement driver service is expected as a workaround means of transport for drinkers. The Ministry of Land, Infrastructure, Transport and Tourism is driving the implementation of measures aimed at normalizing the replacement driver service and add to users convenience and ease of mind. As of the end of December 2012, a total of 8,848 replacement service driver service operators are accredited and in service.

(3) Motor truck transport business

The number of motor truck carriers had been on the rise for long, but the number of newcomers and that of retirees have equaled since 2008, with the number of carriers moving crabwise at about 63,000.

While the management climate in which the carriers are placed continues increasingly hostile under the influence of the light oil price and others, various countermeasures are in progress, including encouraging the introduction of fuel surcharges to pass on light oil price hikes to the freight charges and saving energy requirements in motor truck transpotation to back up the carriers in their effort to improve fuel efficiency.

Figure II-6-3-4 Developments in the Number of Motor Truck Carriers



(Note) The number of retiring carriers includes that of carriers that have terminated as a result of a merger or transfer.
Source) MLIT

On the basis of discussions made at the Workgroup on Measures Relating to the Trucking Industry, various measures have just been taken, including reviews of the entry authorization criteria, updates to the Motor Truck Transport business Transportation Safety Regulatins, formulation of documentation promotion guidelines, toughened enforcement of the freight owner recommendation program and tightened partnership with normalized business implementation bodies, to ensure market integrity and legitimate fare and fee collection while drivng measures to keep transporation safe.

3 Trends of Maritime Industries and Measures

(1) Achieving stable marine transportation

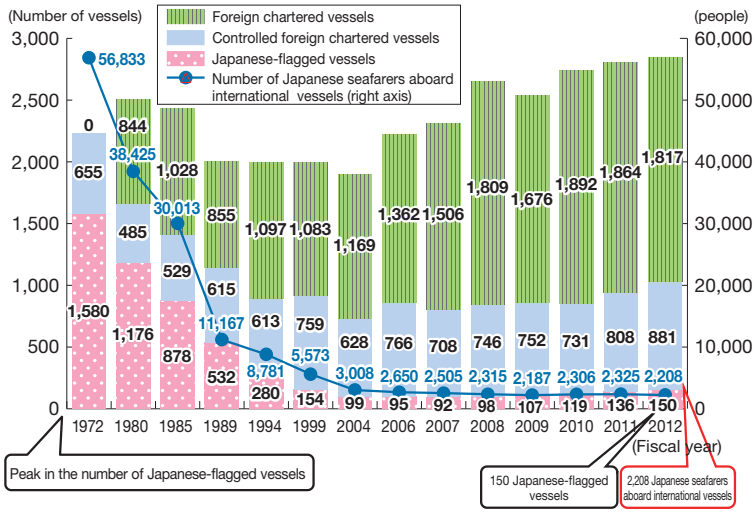
a. Achieving Japanese-flagged vessels and Japanese seafarers

As Japan is a nation with no sufficient natural resources, being surrounded by seas on all its sides, international shipping plays an extremely significant role in an industrial infrastructure or lifeline of vital importance to Japanese economy and national life. It accounts for 99.7% of the nation's trade volume. The Government of Japan has regal jurisdiction over and is responsible for securing Japanese-flagged vessels and seafarers in support of international shipping. Keeping up with a certain number of Japanese-flagged vessels and seafarers at ordinary times is required from a viewpoint of economic security, but both Japanese-flagged vessels and seafarers are on a considerable decline due to losing of its competitiveness.

In 2008, a tonnage tax system [Note] was introduced to increase the number of Japanese-flagged vessels and Japanese seafarers, the core of Japanese merchant fleet, on a planned basis. Ten firms whose Japanese-flagged vessels and Japanese seafarers Securing Plan had been approved by the MLIT in accordance with the Maritime Transport Low have been applied to this tonnage tax and are now working to increase Japanese-flagged vessels and Japanese seafarers on a planned basis.

As a result of these efforts, Japanese-flagged vessels and Japanese seafarers have been increased steadily, but since Foreign-flagged vessels have opted to avoid calling at Japanese ports in the wake of the Great East Japan Earthquake and the nuclear power plant accident, the significance of economic security assurance by Japanese merchant fleet has been more pronounced. In the circumstances, the amended Maritime Transport Low came into force in September 2012, establishing a "deemed-Japanese-flagged vessel" system. The deemed-Japanese-flagged vessel means a Foreign-flagged vessel operated by Japanese shipping firm and owned by their overseas subsidiaries which can change its flag to Japan immediately in case of issuing order of navigation in accordance with Maritime Transport Low. Furthermore, the FY2013 Tax System Reform Plan has expanded the target of the tonnage tax system to deemed-Japanese-flagged vessels as applicable vessels, to support the increased Japanese-flagged vessels and promote to secure the deemed Japanese-flagged vessels to perform a complementary role of Japanese-flagged vessels.

Figure II-6-3-5 Number of Japanese seafarers aboard international vessels, Japanese merchant fleet



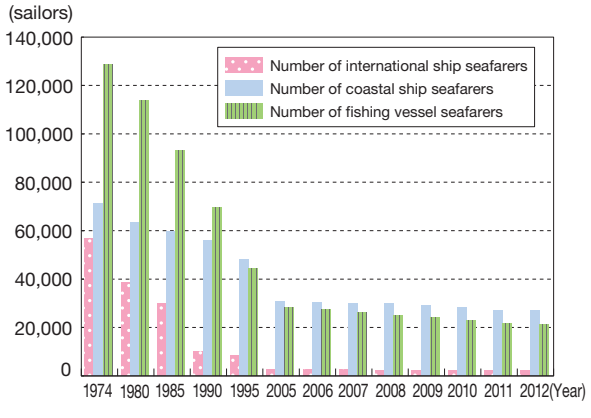
Source) MLIT

Japan will pursue to consolidate stable maritime transport that is functional in times of emergencies, as well as at ordinary times, by measures and other approaches as mentioned below.

b. Acquiring and fostering seafarers

Acquiring and fostering Japanese ship seafarer, human resources of maritime transportation, is of essential importance to boosting Japan's economy and maintaining and upgrading national life. Yet, the number of Japanese international ship seafarers has fallen to about 2,400 after peaking at about 57,000. In the, concerns over stable marine transportation loom as coastal ship seafarers continues to get aged at a rapid pace (about 50% of the entire crew are 50 years old or more), with the result of a resultant dominant shortage of successors to them.

Figure II-6-3-6 Changes in the Number of Japanese Seafarers



Source) MLIT

Those operators who have their Japanese-flagged vessels and Japanese seafarers Securing Plans accredited and who pursue to acquire and foster ship seafarers in accordance with these plans are supported, therefore, through the tonnage tax system for Japanese international ship seafarers and through the implementation of a planned seafarers employment project for coastal ship seafarers. For the purpose of fostering new seafarers who possess the power of immediate and practical value to fill the needs of the shipping industry,

Note A tax system that calculates the amount of tax payment on the basis of a predetermined deemed profit according to vessel tonnage, rather than yearly profits. Similar tax systems are already introduced in the world's major nautical nations.

specific measures have been implemented in the successive stages of education, recruitment and career development, including expanding the scope of onboard practice (company ship training) using the ships owned by international shipping operators, introducing company ship training for coastal shipping operators, sponsoring job fairs for new graduates and technical training sessions for retired seafarers and providing vocational education at the Marine Technical College.

In addition to these efforts to secure and foster seafarers, continued efforts will be directed at conducting job applicant support training sessions for would-be seafarers, broadening the population of candidates for mariners by staging maritime publicity campaigns, such as awarding those who have rendered distinguished service to the promotion of an oceanic state (Prime Minister's Award) and promoting On-board Occupational Health and Safety Management System and Work Improvement on Board (WIB), a continual approach to reducing mariner accidents to add to the vocational charms of the job of being a seafarer.

The I.A.I. Marine Technical Education Agency and the National Institute for Sea Training are the seafarer training institutions over which the Ministry of Land, Infrastructure, Transport and Tourism hold jurisdiction. The I.A.I. Marine Technical Education Agency not only provides new seafarers' education but also implements reeducation to meet shipping firms' needs or to catch up with technological innovations. The National Institute for Sea Training provides unified on-board practical training on students at the I.A.I. Marine Technical Education Agency and mercantile marine colleges and technical colleges using five training ships. The National Institute for Sea Training has built a small coastal training ship to replace its aged turbine training ship to provide on-board training tailored to the actual needs of coastal vessel operation in an effort to develop young seafarers who are capable of service off hand both effectively and efficiently.

(2) Marine transportation industry

a. International shipping

The volume of cargo movement on ocean in the world for 2012 stood 9,468,000,000 tons (up 4.0% from its year earlier level), with Japan's volume of seaborne trade for the same year at 960,110,000 tons (up 6.4% from its year earlier level).

In FY2012, the business climate for international shipping remained generally harsh as the market trended sluggish, bunker oil prices settled at higher levels and so on while concerns over global economic slowdowns elevated with European financial and banking problems spread to emerging nations.

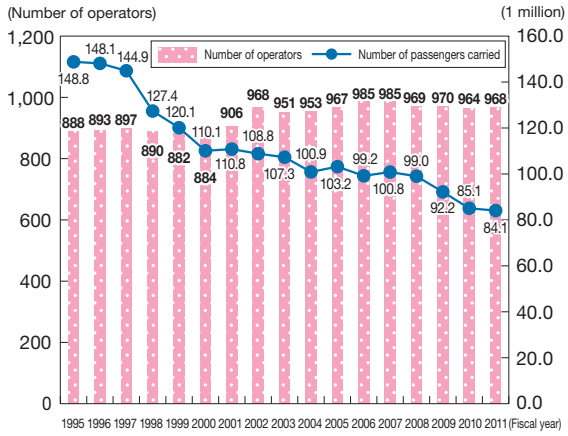
b. Domestic passenger shipping industries

The domestic passenger shipping industries has been continuously caught in a tough management climate due to divers factors such as drastic declines in the volume of transportation after protracted economic recessions. The ferry services, which plays an important role as a means of regional transport and as a modal shift receiver, has reduced the number of service and has even pulled out, threatening continued availability of sea routes.

Accordingly, a variety of support measures have been advanced in collaboration with local governments and operators, including making ships more energy-efficient through the introduction of energy-saving equipment, enhancing the charms of voyage by sea and improving user convenience in with the tourism industry.

On April 1, 2011, there were 968 operators, who carried 84,070,000 passengers during FY2010 (down 1.2% from a year earlier).

Figure II-6-3-7 Developments in the Number of Domestic Passenger Ship Operators and Number of Passengers Carried



(Notes) 1 Sum total for general passenger liner routes, specified passenger liner routes and passenger non-liner routes.
2 Number of operators as of April 1 of each year.
Source) MLIT

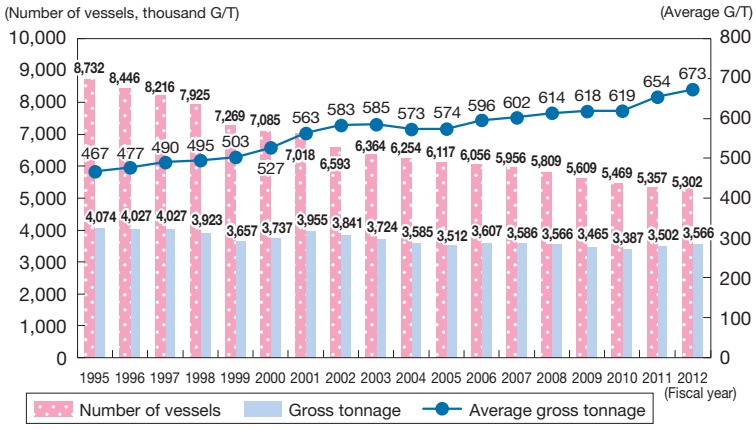
c. Coastal shipping

Coastal shipping offers high economic efficiency and excellent shipping characteristics in terms of environmental preservation. Coastal shipping is a key means of transportation supporting Japan's economic activity and national life, as

it accounts for about 40% of domestic distribution and about 80% of industrial basic material transport.

Under the influence of accelerating globalization of the world's economy and changes in the domestic industrial structure from relocation of production bases to overseas, the volume of transportation demand remains stagnant for long, lasting to severity of the management environment. As ships continue to get aged rapidly, promotion of substitutional shipbuilding while steadily further improving transport efficiency would be essential in order to keep up with stable transportation while responding precisely to demand changes. To adress this task, the Ministry supports with the reduction in the usage fee for substitutional shipbuilding that makes for better environmental prfomance through joint ownership scheme and promotes the enhancement of competitiveness by making ships more energy-efficient. In addition, the study Council on Substitutional Shipbuilding Measures for Coastal Shiping compiles guidelines for the measures designed to pomote Substitutional shipbuilding for coastal shipping,such as reinforcing competitiveness, expanding into environmetally adaptive industries and responding to an evolving demand structure. In July 2012, approaches to activating coastal shiping through leveraging ship management companies were compiled and published as "Guidelines Relating to Ship Management Activities in Coastal Shipping." In April 2013, a technique for assessing conformance with ship management companies' Guidelines in coastal shipping was introduced to visualize the quality of the ship management companies' management service offerings. Further, the smooth and steady implementation of Transitional Business for coastal shipping [Note] is also supported.

Figure II-6-3-8 Developments in Coastal shipping



(Note) As of the end of each fiscal year
Source) MLIT

(3) Shipbuilding industry

a. Present status of the shipbuilding industry

Japan's shipbuilding industry is an extremely important industry that contributes to regional economy and employment by providing a stable supply of quality vessels tailored to ship owner's varied needs. Japan possesses a clustered integration of maritime industries in which the marine transport business, shipbuilding business and ship machinery business are closely linked to one another.

d. Port and harbor transportation business

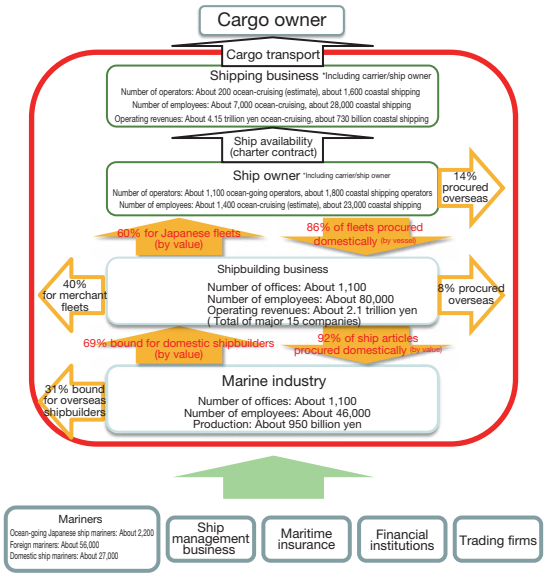
The port and harbor transportation business plays a vital role as a nodal point between marine transportation and land transportation. From viewpoints of streamlining business workflow and offering diverse services, the port and harbor transportation business has been deregulated by converting the entry procedures from a licensing system to a permit system and by converting the freightage and charges from an approval system to a prior notification system since November 2000 for nine major ports and May 2006 for other ports. (As of April 1, 2013, 42 new permits had been granted, with 269 revisions of the scope of business and 1,309 freightage and charge notifications submitted).

Note A system that grants a certain amount of subsidy to those who have dismantled and removed their ships and that demands the shipbuilders to pay fees after having resolved the owned tonnage adjustment program based on a scrap and build principle.

In the shipbuilding industry, China and Korea have rapidly built up their building capacities on the support of increases in marine transportation, etc. resulting from a booming global economy, boosting the world's volume of new shipbuilding for 2013 to 70.48 million gross tons (when compared with 14.59 gross tons for Japan, commanding 21% of the world's market). While the volume of orders taken by Japan has turned upward, a tough international competition goes on, dampening the ship prices.

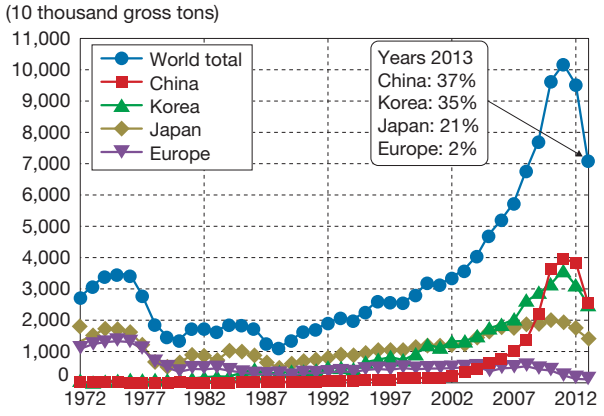
The production of ship machinery products (except for outboard motors) for 2012 was valued at 79.91 billion yen (down about 15.3% from its year earlier level), with an export amount of 19.31 billion yen (down about 18.1% from its year earlier level). The climate surrounding the ship machinery business is predicted to become harsher than ever, with stiffening global competition and increasingly aged employees.

Figure II-6-3-9 Japan's Maritime Industry Cluster



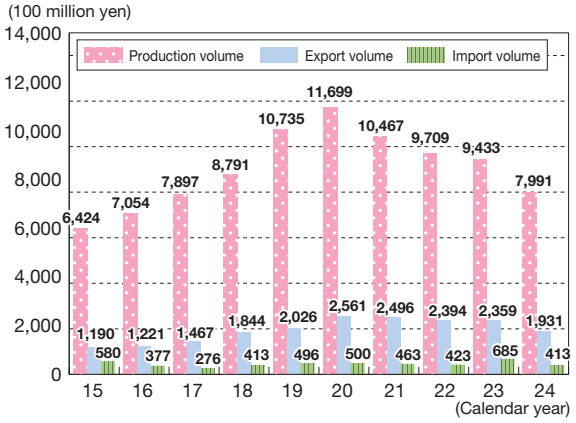
Source) MLIT

Figure II-6-3-10 Developments in the Volume of Newly Built Ships in the World



(Note) Ships having a gross tonnage of 100 tons or more
Source) Prepared by MLIT from IHS (former Lloyd's Register of Shipping)

Figure II-6-3-11 Developments in Japan's Production, Export and Import of Marine Industrial Products



(Note) Import volumesare those of import by shipbuilders.
Excluding outboard engines and spark-ignited engines.
Source) MLIT

b. Approaches to consolidating the international competitiveness of the shipbuilding industry

To consolidate the international competitiveness of Japan's shipbuilding industry and allow Japan to stay a first-class shipbuilding nation, the implementation of a policy package focusing on boosting Japan's order-taking capacities and deployment into new markets and new segments of business, need to be propelled.

Starting from FY2013, support has been extended to shipbuilders, shipping operators and the like in their efforts to develop next-generation marine environment technologies that help enhance fuel efficiencies for their vessels with a view to reinforce Japan's order-taking capacities. An environmental improvement project aimed at speeding the practical usefulness and installation of low-environmental-impact, natural gas-fueled ships has also been launched since FY2013. The Ministry is committed to realizing a desirable framework of international collaboration under cooperation between the public and private sectors and exploring, and promoting the diffusion of, energy-saving technologies for ships, natural gas-fueled ships and so on.

Approaches to the promising growth fields of marine resources development, renewable marine energy sources

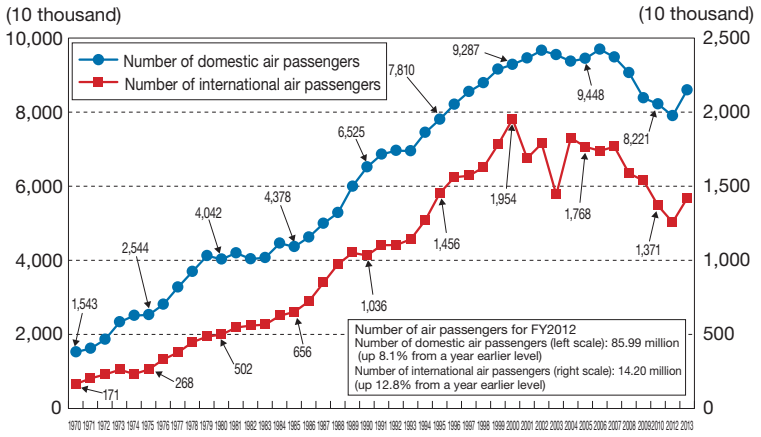
deployment and so on and to establishing a system of marine transportation on new routes of energy transportation will also be impelled. Specifically, the Ministry plots to broaden the sphere of business activity in the fields of marine development by supporting the launches of marine resources development projects that may take advantage of Japan's strengths, such as offshore logistics hubs [Note 1], and the development of marine resources development technologies and encouraging research studies for the formulatino of safety requirements for floating liquefied natural gas facilities (FLNG) and also to maintain technologies for proceeding with marine development activity within Japan's EEZ in the future. For floating offshore wind power generation facilities, safety guidelines have been compiled.

The Ministry has also embarked on deals to combat fake ship machinery products and works to consolidate the engineering capabilities of smaller shipbuilders through the promotion of Super Eco-Ships (SES [Note 2]) by Japan Railway Construction, Transport and Technology Agency (JRTT), the commercialization support of evolving technologies and so on.

4 Trends in Air Transport business and Measures

The climate in which the airline industry is placed stays hard on airlines for FY2012 as the demand for aviation has weakened temporarily under the influence of disputes over the Senkaku Islands that broke out in September and others, soaring fuel costs and more. After peaking in FY2006, the volume of passenger transportation in Japan's aviation industry sloped downward because of global business recessions, the aftermath of the Great East Japan Earthquake and so on until it turned for the first time in six years for the better to reach 85.99 million (up about 8.1% from a year earlier), with prime impetus coming from the reconstruction demand sparked by the Great East Japan Earthquake and rising demand fueled by the entry of LCCs. The number of international passegers also turned for the first increase in five years, reaching 14.2 million (up 12.8 from a year earlier level).

Figure II-6-3-12 Developments in the Number of Air Passengers (Japan-Based Airlines)



Source) Prepared from the "Air Transportation Statistical Yearbook" by the MLIT.

Since Peach Aviation, Japan's first full-scale LCC, came into service in March 2012, Jetstar Japan and AirAsia Japan followed suit in July and August, respectively.

AirAsia Japan became a 100% wholly owned subsidiary of ANA on June 25, 2013 when AirAsia (Malaysia) and ANA Holdings Inc. broke up their business ties. On November 1 of the same year, the company was renamed "Vanilla Air," coming into operation as a new airline on December 20. On December 17 of the same year, Spring Japan was granted a license to provide air services, expecting to start operating at the end of May 2014 as Japan's fourth LCC.

5 Trends in the Consigned Freight Forwarding Business and Measures

The consigned freight forwarding business [Note 3] is combined with multiple means of transport to provide services

Note 1 Large-sized floating structures that transport personnel and equipment to and from many offshore facilities on a hub and spoke basis.

Note 2 Next-generation domestic vessels, driven by an electric propulsion system, which combines excellent environmental performance to cut CO_2 and NO_x emissions and boost fuel efficiency with economics.

Note 3 A business that transports cargoes by the means of transport (motor trucks, railways, aircrafts, ships) owned by real carriers (who undertake transportation by themselves) in a fully integrated, complex flow of door-to-door transportation, from picking up cargoes to delivering them.

specific to varied user needs. Recent years have witnessed growing entry into the aircraft- and ship-based segments of international shipment to reflect the cargo owners' needs for globalization.

Further, as internal trade takes on an increasingly important tone, global shipment gets more streamlined than before, urging safety assurance during transportation. The Ministry of Land, Infrastructure, Transport and Tourism works to ensure the availability of safe and secure logistics services, as by conducting audits, etc. to consolidate thorough operator code compliance.

6 Trends in the Warehousing Business and Measures

Commercial warehouses play a vital role as nodes of physical distribution. After the requirements for entry into the warehousing business were eased to a registration system, the number of newcomers has steadily increased, with the number of warehouse operators reaching 6,059 as of the end of FY2012 (up 1,004 over the end of FY2001).

In recent years, the construction of large, intelligent physical distribution facilities by foreign or domestic real estate entities or funds has been activated, giving birth to warehouse operators who rent such facilities to develop their businesses. To fulfill sophisticated and diversified needs for physical distribution, warehouse operators tend to combine other multiple physical distribution businesses, such as a consigned freight forwarding business.

The introduction of equipment that makes for a lower-carbon implementation of logistics facilities is underway, as well as the introduction of emergency power supplies and telecommuniations equipment that help build a disaster-tolerant truck warehouse.

7 Trends in the Truck Terminal Business and Measures

The truck terminal business plays a significant role in streamlining the flow of transport, mitigating congestion and so on as a nodal point of trucking between a trunk line and a terminal. In recent years, the construction of facilities that provide the functionality of a distribution center (sorting, processing for distribution and so on), as well as loading and unloading, is in progress to meet the sophisticated and diversified needs for logistics.

The introduction of equipment that makes for a lower-carbon implementation of physical distribution facilities is underway, as well as the introduction of emergency power supplies and telecommuniations equipment that help build a disaster-tolerant truck terminal.

8 Trends in the Real Estate Business and Measures

(1) Conditions surrounding the real estate business

The real estate business is one of the key industries that command 2.4% of the total sales of all industries and 11.1% of the total number of corporations (FY2012).

Land prices had followed a declining trend nationwide until 2013, when they started to turn upward in urban areas, particular, in the three major metropolitan areas, with signs of recovery being noticeable in the rural areas as well. The number of new housing starts, after plumbing to 780,000 in FY2009, soared to top 890,000 in FY2012 and still could to top 950,000 in FY2013 at the presence rate of growth.

In the existing housing circulation market, the number of successful deals has followed a steady trend with 151,000 in FY2012 according to the Real Estate Information Network System (REINS) [Note].

Since December 2011, a voluntary "system of rental housing management entity registration" that places a certain set of rules on the fulfillment of rental housing management services has been put into effect since December 2011 to foster and develop a good-quality rental housing business. As of the end of March 2013, 2,767 rental housing management entities were registered.

Note Registered building lots and buildings dealers have property information loaded on REINS for them to exchange. As property deals are concluded successfully, the relevant information, including the transaction prices, is stacked on REINS.

(2) Precise application of the Building Lots and Buildings Transaction Business Act

The Ministry endeavors to ensure precise administration of the Building Lots and Buildings Transaction Business Act to protect consumer interest involved in housing land and building deals and to expedite distribution. There were 122,510 registered building lots and buildings dealers (as of the end of 2013). This number is on a slight decline in recent years.

The Ministry of Land, Infrastructure, Transport and Tourism, along with prefectural and municipal governments, endeavor to prevent complaints and disputes by working in conjunction with the bodies concerned while imposing severe supervisory dispositions on those entities that have breached the law. In FY2012, 258 supervisory dispositions were imposed (including 129 revocations of licenses, 51 suspensions of business and 78 order).

To combat the problems of malicious soliciting at the time of condominium sale, the Act was amended in August 2011 to define the acts that are prohibited in soliciting in connection with building lots and buildings transactions. The Ministry will continue to alert consumers through its Website or other means and work together with the agencies concerned to provide relevant supervision and guidance.

(3) Securing proper management by condominium management service firms

To ensure proper management of growing stocks of condominium, a system of registration for condominium management services entities and service regulations have been enforced to ensure their proper management in accordance with the Act on Advancement of Proper Condominium Management. As of the end of 2012, 2,252 condominium management services entities were registered, with no significant changes in their number of the last couple of years.

From a viewpoint of promoting the code compliance of condominium management services entities, on-the-spot inspections have been conducted on condominium management services entities.

(4) Revitalizing the real estate market

a. Status quo of the real estate market

Japan's real estate had a total asset value of about 2,400 trillion yen as of the end of FY2012 [Note].

The asset amount of the real estate or the beneficial interest in trust on the real estate that were acquired by J-REIT (real estate Investment Corporations), real estate specified joint enterprise operators, Specific Purpose Companies and so on as objects of securitization during FY2012 stood at about 3.3 trillion yen.

While J-REITs play a central role in the real-estate investment market, five new brands were listed for one year in FY2013. As of the end of March 2014, 44 brands were listed on the Tokyo Stock Exchange, with the target real estate having a total value of about 11.6 trillion yen and the real-estate investment securities carrying an aggregate market price of about 7.6 trillion yen.

The Tokyo Stock Exchange REIT Index, an indicator of the price movement of the whole J-REIT market, soared to record 1700.91 on March 27 as the long-term interest rate fell sharply from 0.8% to 0.4% mainly amid hopes for the so-called Abenomics aimed at exiting deflation and expectations for the Bank of Japan taking additional steps to ease money, but plunged down to 1246.28 on June 13 under the influence of a hike in the long-term interest rate from 0.4% to 0.9% and others. Subsequently, the index seesawed until September when Tokyo was nominated to host the 2020 Olympic Games. It regained strength to reach 1500 towards the end of September and transitioned from 1400 to 1500 from October to the end of year amid hopes for further pickups in domestic business confidence and rising real-estate prices, moving at a relatively stable pace.

The amount of J-REIT assets acquisition in 2013 topped the approximately 2 trillion level for 2006, reaching a record high of approximately 2.2 trillion yen.

Note A sum total of the values of the buildins, structures and land calculated on the basis of National Accounts.

b. Conditioning the real estate market

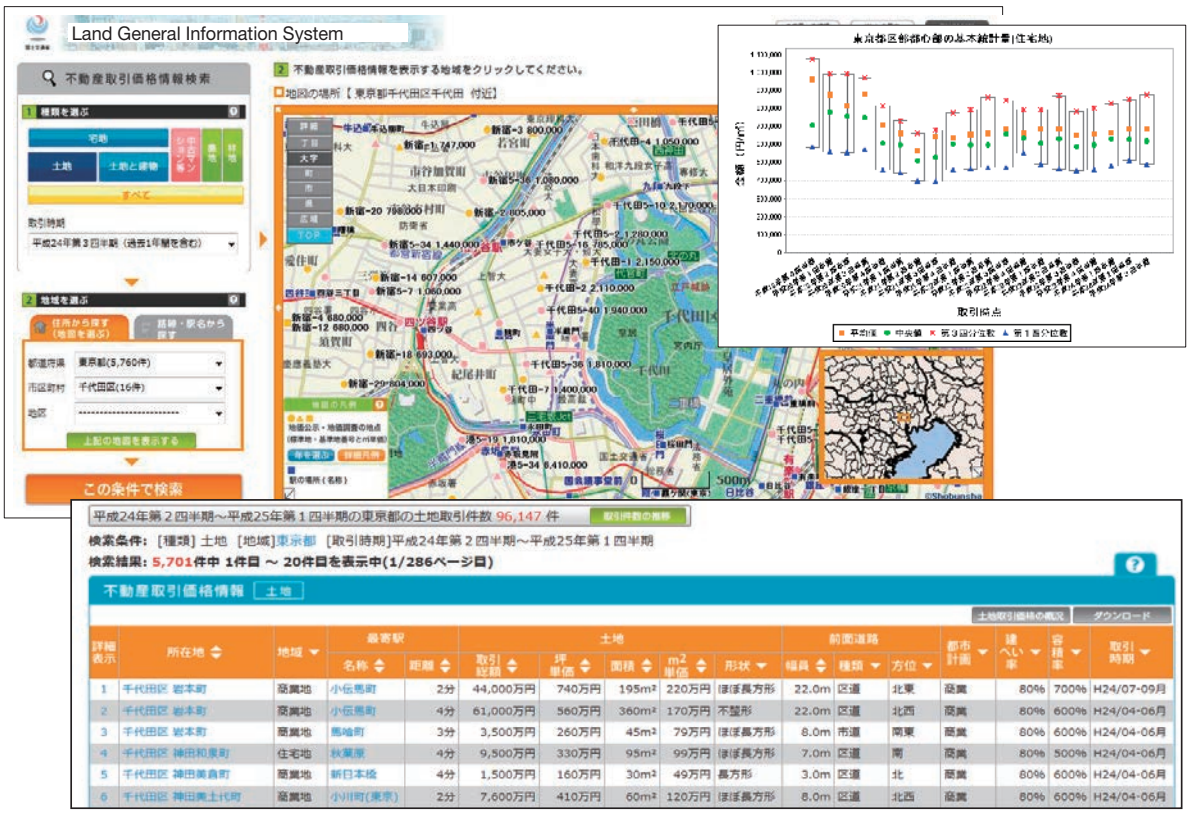
The Ministry of Land, Infrastructure, Transport and Tourism surveys real estate trade prices, etc. nationwide in a bid to make the real estate market more transparent and streamline and reactivate deals. Information thus collected from such surveys, including locations, areas and prices of real properties traded, is uploaded at a Website on the Internet (Land General Information System [Note])with due care taken to prevent identification of the individual properties (as of March 2014, information on 1,935,344 properties was posted, attracting a total of about 430 million accesses).

International agencies have worked together to draft Handbook on Residential Property Price Indices (RPPI Handbook) to build an Early Warning Signal System by taking lessons from the subprime and other crises. The Ministry of Land, Infrastructure, Transport and Tourism responded to RPPI Handbook to prepare Japan Residential Property Price Index and put them into trial service in August 2012. It now debates their full-scale implementation. These indices have also been specified as the IMF's Financial Soundness Indicators (FSIs).

In addition, efforts to refurbish the secondhand house trading environment are underway to promote the circulation of secondhand housing that commands a smaller share of the entire volume of housing in circulation than in Europe and the U.S. Those made during FY2013 include exploring a scheme of concentrating records of housing transactions completed in the past and information relevant to real-estate dealing, such as urban planning information, and making them accessible to Registered Building Lots and Buildings Dealers and the like, supporting the development of one-stop services in collaboration with specialized contractors in the fields of real-estate dealing, such as house remodeling and formulating guidelines aimed at improving the assessment of buildings relevant to secondhand detached houses.

Figure II-6-3-13 Land General Information System

○Since April 2006, trade price information based on questionnaires conducted among parties to real-estate deals has been posted every quarter at a Ministry of Land, Infrastructure and Transport Website with care to protect the properties in question from being identified easily.
○A total of 1,935,344 records are available, which attracted about 430 million Web accesses (averaging 7.25 million a month [FY2013 results]).



Source) MLIT

Note http://www.land.mlit.go.jp/webland/

c. Tax system utilization

The FY2014 Tax Reform has implemented extensions, etc. of the applicable periods of the preferential measure for taxing the long-term transfer income from the transfer of land, etc. for reclamation, etc. of superior housing lots (income taxes, etc.) and the measure for terminating the scheme of additional taxation for the gains on the transfer of land, etc. (corporate taxes, etc.).

d. Pursuing the emergence of a new real estate market tailored to the needs of a new era

Real-estate appraisal standards, etc. have been updated after discussions at the Real-Estate Appraisal Work Shop, Land Policy Workgroup, National Land Development Council in the light of the needs for for real-estate appraisal, such as a globalized real-estate market, an advancing stop-type society and an evolving real-estate securitization market.

On-site inspections of real-estate appraisers and appraisal monitoring surveys concerned mainly with facts about securitized real-estate appraisals have been conducted to enhance appraisal reliability.

The presence of many seismically inadequate buildings and concerns over tight power supplies, such as those triggered by the Great East Japan Earthquake, dictate the formation of good-quality aseismic and eco-friendly real estate. To accelerate the introduction of private funds to finance the quake-proofing of buildings and the renewal of urban facilities, a Bill on Partial Amendments to the Real Estate Specified Joint Enterprise Act was just submitted to the 183rd session of the Diet, which authorizes special-purpose companies (SPC) fulfilling a certain set of requirements to conduct real estate specified joint enterprises.

The Japan Is Back initiative (decided at a Cabinet meeting on June 14, 2013) calls for "Development, Promotion and Dissemination of Guidelines Relating to Acquisition and Operation of Housing, etc. for the Elderly to Utilize Healthcare REITs (during FY2014)" to take advantage of private funds. "Economic Measures for Virtuous Cycling" (decided at a Cabinet meeting on December 5, 2013) also recommends "Promotion of Financing for Healthcare Facilities through Promoted Listing of Healthcare REITs on the First Section of the Tokyo Stock Exchange, etc. <other than budgetary steps> (Financial Services Agency, Ministry of Land, Infrastructure and Transport, Ministry of Health, Labour and Welfare)."

Moreover, the Green Building Promotion Review Committee and its working group were established in order to expand and popuralize "Green Building" in Japan. The MLIT publicized information about their discussions of the measures and approaches that had been recommended in the past proposals, through Green Building Online Portal [Note].

9 Building a Sustainable Construction Industry

(1) Conditions surrounding the real estate business

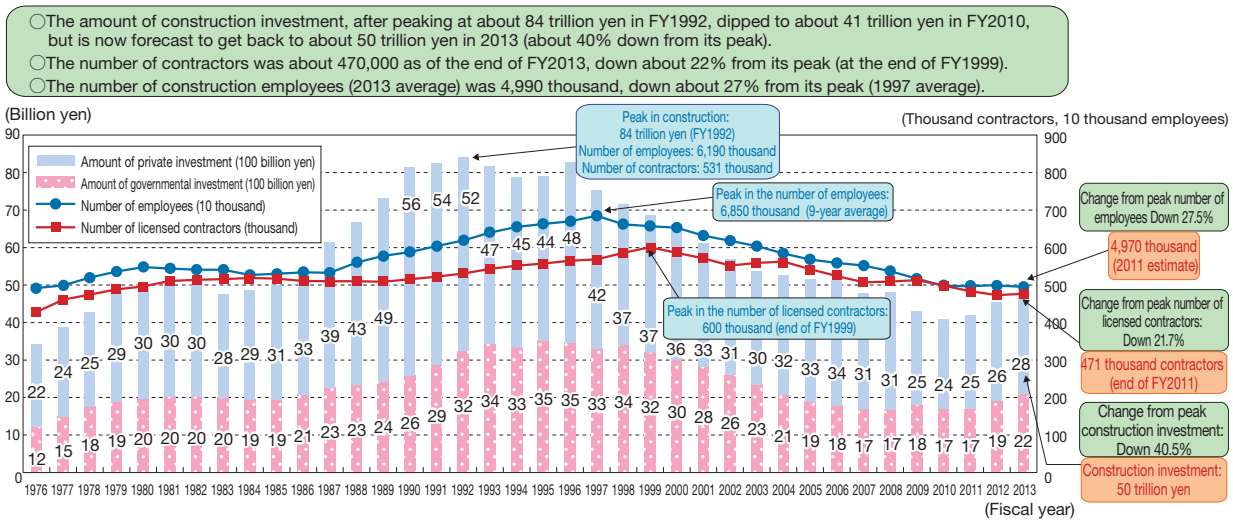
The construction industry not only takes charge of the development, maintenance, management, etc. of local infrastructures but underpins local economies and employment, keeping local communities safe and secure on the front line in support of the national life and social economy.

In the meantime, various problems, such as the diminishing population of skilled labor in the field, the declining number of young workers employed and aging workforces, have emerged as a consequnece of dumped order taking and resultant constraints on the subcontractors amind rapidly shrinking construction investment. Building a sustainable construction industry from a mid- and long-term viewpoint should be essential to fully addressing the urges to get prepared for disasters, mitigate their effects when they occur, combat aging facilities, maintain infrastructures, keep buildings quake-resistant and so on.

Figure II-6-3-14 shows the trends in construction investment and the number of licensed contractors and employees.

Note http://tochi.mlit.go.jp/kankyo/index.html

Figure II-6-3-14 Trends in Construction Investment (Nominal), Number of Licensed Contractors and Number of Employees



(Notes) 1 The amount of investment is results up to FY2010, estimates for FY2011 and FY2012 and a forecast for FY2013.
2 Number of licensed contractors at the end of each fiscal year (end of March of the next year)
3 The number of employees is a yearly average. Supplementary estimates for the three quake-stricken prefectures (Iwate, Miyagi, Fukushima) in 2011 have been calculated by retrospectively correcting the estimated populatin based on the findings of the 2010 National Census.
Source) "Construction Investment Forecasts" and "Licensed Constructor Count Survey" by the MLIT and "Labor Force Survey" by the Ministry of Internal Affairs and Communications

(2) Securing and fostering humand resources to work for the construction industry

Because the construction industry is underpinned by human resources in the sense that success or failure in its production depends on the capabilities of technicians and skilled labor at work, encouragng young workers to join in the industry and creating an environment in which these young workers can proudly concentrate on their assignments while acquiring expertise and skills should be necessary for the industry to fulfill its vital obligations, as for forging a safe and secure national land over an extended period of time to come.

To this end, the government and the construction industry are working in accord to upgrade the work environment, as by keeping appropriate wage levels for skilled labor and enforcing thorough subscription to social insurance programs, and also to drive enhancement and consolidaton of the functions of the Fuji Education Training Center, the strongpoint of human resources development for the construction indutry, to foster technicians and skilled labor.

Qualifications for taking technical certification tests have been reviewed to give incentives for acquiring qualifications at an early stage of one's career and to foster a population of competent young techynicians.

Strategic publicity campaings have also been promoted to improve the image of the consturction industry cherished by the general public and also to appeal to younger people who might choose to join in the industry.

In addition, the acquisition, development and utilization of registered technicians who are furnished with work management, modulatory and other relevant capacities to qualify themselves to work in key operations have been promoted. As of 31.03.14, 41,951 technicians (in 32 different kinds of jobs)were registered. The availability of registered key technicians is taken into account at point addition scoring during the Ministry's management reviews or contractor bidding assessment for public works projects (trial works).

(3) Establishing a framework of fair competition

As the construction industry takes charge of the jobs of keeping local communities safe and secure, as through the development, maintenance, management, etc. of local infrastructures, it needs to establish a framework of fair competition among contractors, including thorough legal compliance, to enable those of them who are superior in their technical strength, construction capability and management power to keep up with their growth. To this end, the Ministry has been working to normalize the practice of deals between prime contractors and subcontractors in the construction business by conducting subcontracting transaction status surveys, on-the-spot surveys, etc., opening a desk for consultation services on troubles, complaints and other problems encountered in concluding construction work contracts as "Construction Business Transaction Normalization Center" and collaborating with prefectural and municipal governments during the Construction Business Normalization Promotion Month (November).

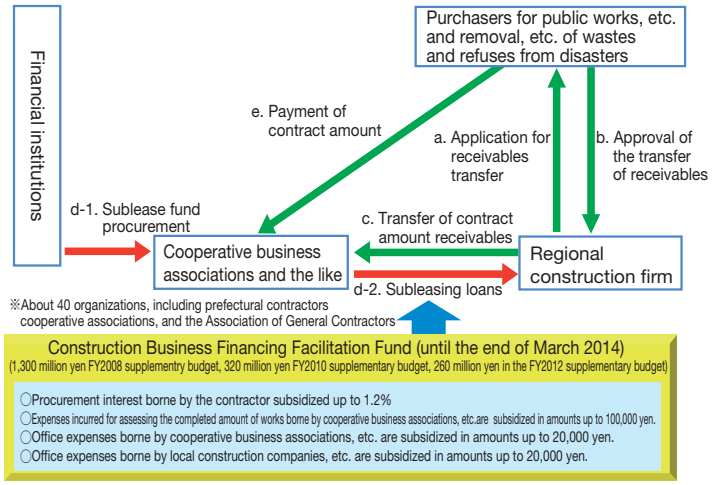
(4) Measures aimed at supporting construction companies

a. Regional construction business management-incentive finance program

The regional construction business management-incentive finance program allows prime contractors to acquire loans from a cooperative association or a certain private entity on security of the public works contract price credit obligations, according to the completed amount of works. Its purpose is to smooth their cash flow and ease their burden of interest payment.

Effective since November 2008, this program will be carried forward through FY2014.

Figure II-6-3-15 Regional Construction Business Management-Incentive Reinforcement Finance Program



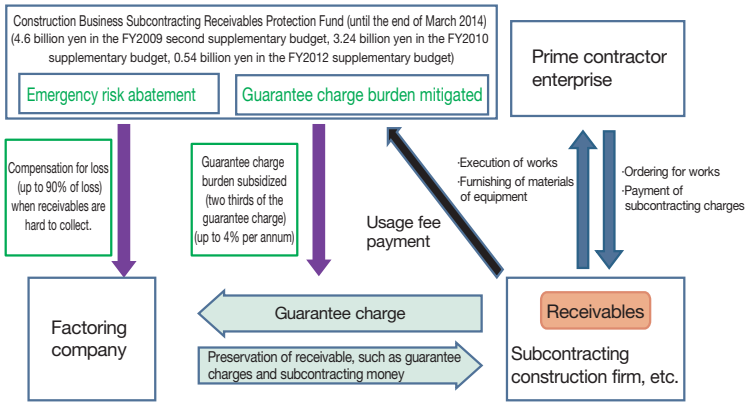
Source) MLIT

b. Subcontracting receivables preservation support program

The subcontracting receivables preservation project proactively promotes the guaranteed payment of the account-receivables for contract prices subcontractors, etc. have for their primary contractors when the payment of such receivables is guaranteed by a factoring company [Note] by easing the guarantee charge burden of the subcontractors, etc. and indemnifying the factoring company for the loss it may suffer upon fulfillment of the guaranteed obligations.

This program has been implemented since March 2010 and will be carried on through FY2014.

Figure II-6-3-16 Subcontracting Receivables Preservation Support Program



Source) MLIT

c. Disaster-responsive construction business financial support program

The Disaster-Responsive Construction Business Financial Support Program extends financial support to smaller and medium-size construction companies for purchasing typical construction machinery to use to respond to disasters as they occur or to smaller and medium-size construction companies that have been struck by the Great East Japan Earthquake for bearing interests accrued on their loans relating to the purchasing of construction machinery.

This program has been implemented since March 2013 and will be carried on through FY2014, with the number of models eligible for financial support being increased from three to 41.

d. Construction company management strategy advisory program

The Construction Company Management Strategy Advisory Program supports the resolution of management tasks, such as launching a new project, or technical tasks, such as construction management, facing smaller and medium-sized

Note A financial enterprise that collects receivables owned by others by guranteeing or purchasing them. At present, 10 factoring companies,including bank subsidiaries, prepayment gurantee companies and leasing companies, run this service.

construction companies by offering them advice from Certified Small and Medium Enterprise Management Consultants or other experts. For issues of common concern to other enterprises as well, the program provides continual support (team advice support) until the attainment of defined goals, such as formulation of a management improvement plan by a support expert team or subsidizes in part the expenditures incurred to implement those projects that could help resolve local problems by leveraging construction companies' know-how (step-up support). During FY2013, 23 instances of team advice support and 20 instances of step-up support were selected.

This program has been implemented since April 2011 and will be carried on through FY2014, with construction-related businesses (surveying, construction consulting and geological surveying) being added to the scope of this program.

(5) Promoting construction-related businesses

Information about registered contractors across the construction-related businesses (surveying, construction consulting and geological surveying) for each month is publicized at the end of the next month, analyses of industry-classified management status based on that information at the end of the next fiscal year and findings of a survey into the status of utilization of the contractor registration system by local governments in November 2013, each at a website.

(6) Present status of construction machinery and growth of construction production technologies

In FY2011, about 810,000 units of construction machinery [Note] were owned in Japan. By industry, about 54% of the construction machinery was purchased by the leasing and rental business and about 18% by the construction business.

Since, of all death accidents occurring in the construction industry, those caused by construction machinery, etc. account for about 15%, safety assurance in mechanized construction has been promoted by taking such measures as disseminating Technical Guide to Construction Mechanization and Construction Mechanization Safety Manual.

Widespread practice of computer-aided construction, or an ICT-based innovative technology, has also been sought. During FY2013, the use of work progress management technologies on total stations was enforced in part pursuant to the second-phase Computer-Aided construction Promotion Strategy (formulated in March 2013). At the same time,the positive use of machine control/machine guidance technologies has been pursued by positioning them as generalization promotion technologies..

(7) Settling disputes arising from the execution of construction works

To promptly resolve disputes arising from the execution of construction work contracts, the Construction Works Dispute Review Panel implements dispute settlement procedures. In FY2012, the Panel received 50 applications (seven of arbitration, 40 for conciliation and three for mediation) at the central level and 105 applications (31 for arbitration, 67 for conciliation and 7 for mediation) at the prefectural level.

Note Major models: about 582,000 hydraulic shovels, about 132,000 wheel type tractor shovels, about 34,000 bulldozers

Chapter 7 Building a Safe and Comfortable Society

Section 1 Realizing a Universal Society

1 Realizing Accessibility through a Universal Design Concept

The "Act on Promotion of Smooth Transportation, etc. of Elderly Persons, Disabled Persons, etc. " embodies the universal design concept of "freedom and convenience for anywhere and anyone", making it mandatory to comply with " Accessibility Standards " when newly establishing various facilities (passenger facilities, various vehicles, roads, off-street parking facilities, city parks, buildings, etc.), mandatory best effort for existing facilities as well as defining a development target for the end of FY2020 under the "Basic Policy on Accessibility" to promote accessibility.

Also, in accordance with the local accessibility plan created by municipalities, focused and integrated promotion of accessibility is carried out in priority development district; to increase "caring for accessibility", by deepening the national public's understanding and seek cooperation for the promotion of accessibility, "accessibility workshops" are hosted in which you learn to assist as well as virtually experience being elderly, disabled, etc.; these efforts serve to accelerate accessibility measures (sustained development in stages).

(1) Accessibility of Public Transportation

In accordance with the " Act on Promotion of Smooth Transportation, etc. of Elderly Persons, Disabled Persons, etc. ", public transportation administrators are required to comply with "Accessibility Standards for Public Transportation "when carrying out new development of passenger facilities or large-scale improvements as well as introducing new vehicles and for existing facilities. Efforts must be made to comply with these standards and staff must be educated and trained as needed to strive for accessibility as part of the stipulated requirements for mandatory efforts. In addition, assistance measures are available to support the accessibility of passenger ships as well as train stations and other passenger terminals along with the implementation of non-step (low-floor) busses, lift-equipped busses, welfare taxis, and other initiatives.

Figure II-7-1-1 Current Accessibility of Public Transportation

(as of 3/ 31, 2013)

Passenger Facilities (over 3,000 persons/day using on average)

	Total Facilities	Passenger Facilities Compliant with Accessibility Standards for Public Transportation (No Grade Barriers) (Note 1)	Share of Total
Railway stations	3,457	2,829	81.8%
Bus terminals	52	43	82.7%
Passenger ship terminals	16	14	87.5%
Airport passenger terminals	33	28	84.8% (100%) (Note 2)

(Notes) 1 Regarding the "elimination of steps", it is calculated based on compliance with Article 4 (covering the width of the travel path, ramps, elevators, escalators, etc.) of the " Accessibility Standards for Public Transportation " based on Act on Promotion of Smooth Transportation, etc. of Elderly Persons, Disabled Persons, etc..
2 Installation of elevators, escalators, and slopes that the disabled and others can use (practical relief of grade barriers).

Vehicles

	Total Vehicles	Vehicles Compliant with Accessibility Standards for Public Transportation (Note)	Share of Total
Railway carriages	52,669	29,385	55.8%
Low-floor busses	45,495	18,672	41.0%
Lift-equipped busses	13,499	485	3.6%
Welfare taxis	-	13,856	-
Passenger ships	706	173	24.5%
Airplanes	537	479	89.2%

(Note) "Compliance with Accessibility of transport vehicles" is calculated based on each vehicle's compliance with the Accessibility Standards for Public Transportation.
Source) MLIT

(2) Accessibility of Living and Housing Environments

a. Accessibility of Housing and Architecture

In order for those such as the elderly and disabled to be able to lead a secure, safe, and comfortable housing life within the region, the barrier-free reform is supported by measures such as lowering the financing interest of the Japan Housing Finance Agency's (Incorporated Administrative Agency) "Flat 35 S Loan" for obtaining housing that fulfills a certain

barrier-free level as well as support for barrier-free renovations; public housing and Urban Renaissance Agency rental housing are barrier-free by standard specification; and assistance and other options are available for the development of serviced housing for the elderly by private sector businesses and others.

Also for buildings structures used by the general public, including those such as the elderly and disabled, built to be over a certain scale are required to be accessible in accordance with the "Barrier-free Law" and approved specific buildings that meet certain requirements are eligible for support measures such as subsidy programs. For government buildings, to ensure that people can use the facility comfortably and smoothly, facilities that are used by unspecified but many users will achieve the development standards stipulated by the standards for encouraging smooth travel for buildings based on the "Barrier-Free Law" along with other criteria to promote development for more advanced barrier-free levels. In addition, initiatives are being carried out to reflect the opinions of facility users such as the elderly and disabled in facilities development.

Figure II-7-1-2 Approvals of building construction for Specified Designated Building in Accordance with the "Barrier-Free Law"

Fiscal Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of certified plans (Fiscal year)	11	120	229	320	382	366	332	232	280	367	386	348	331	289	255	184	208	130	196
Number of certified plans (Total)	11	131	360	680	1,062	1,428	1,760	1,992	2,272	2,639	3,025	3,373	3,704	3,993	4,348	4,432	4,640	4,770	4,966

Source) MLIT

b. A Universal Design of Pedestrian Spaces

In accordance with the "Barrier-Free Law", areas such as roads and stations squares that connect to facilities such as stations, government facilities, and hospitals must ensure that everyone including the elderly and disabled should be able to pass through comfortably by promoting the universal design of pedestrian spaces through measures such as creating wide sidewalks; lessening unevenness, slopes, and grades; eliminating utility poles; and guiding blocks for the visually impaired.

c. Accessibility of Urban Parks and Other Areas

For the development of urban parks, there are standards and subsidies under the "Barrier-free Law" for safe and comfortable usage, like eliminating grade disparities at entrances, exits, and passages as well as ensuring facilities such as restrooms are usable by those such as the elderly and disabled. Also, to ensure that anyone can enjoy natural spaces such as rivers and ports, there are supporting measures for waterfront development as an integral part of town planning and ensuring the accessibility of passenger ship terminals for ports.

2 Creating an Environment that Supports Child-rearing Under an Low Birthrate Society

(1) Supporting the Balance of Work and Child-rearing

a. Supporting the Supply of Housing Suitable for Child-rearing Households

In order to secure housing and living environments suitable for child-rearing households, a relocation system that allows comparatively spacious housing owned by those such as the elderly to be provided as rental housing to those such as child-rearing households and for this the Japan Trans-housing Institute's (General Incorporated Association) owned home leasing program is being promoted. Also, support is provided through local government for the development and reduced rent of rental housing (high-quality regional rental housing) for child-rearing households as well as integrated development of public rental housing with child care support and other facilities.

b. Promotion Teleworking

Teleworking is a flexible work style that uses information communication technology for the freedom to work any place or time and promises to reduce the burden of commutes by combining work and living arrangements, realize

harmony of livelihood and living (work-life balance), and ensuring business continuity during disasters and other events among other benefits.

The "Declaration to be the World's Most Advanced IT Nation" decided by Cabinet on June 14, 2013, states, "To these ends, government will collaborate with industry to support employment models for teleworking from home that allow workers to spend at least one full workday per week at home targeting women engaged in child raising, who find it particularly difficult to continue working, as well as men participating in childcare, and caregivers. The target is full development and widespread adoption of such models by 2016 to encourage greater social participation by women, secure labor during a time of low birth rates and an again population, support greater participation by men in childcare, and achieve balance between work and care giving" and teleworking will be promoted even more through initiatives.

Relevant ministries and agencies are coordinating to promote the further adoption of teleworking through initiatives such as creating a facilitating environment and raising awareness in the belief that teleworking will create employment opportunities for people seeking alternative working arrangements and also vitalize regions among other effects.

The Ministry of Land, Infrastructure, Transport and Tourism evaluated policies (Promotion Teleworking) to realize diverse working arrangements that contribute to benefits including the assessment of the current situation of teleworking, quantitative assessment of the current teleworking population, productivity improvements through increased work efficiency and high value-added, strengthening of international competitiveness, and the improvement of business continuity in times of disaster.

(2) Creating a Relaxed and Safe Environment for Children to Grow

To ensure the safety and comfort of children and other park users, various facility administrators are made aware of "Guidelines Regarding Safety Requirements for Playground Equipment at Urban Parks (Revised)" and "Pool Safety Standards Guidelines" and programs such as the Social Capital Development Integrated Grant provide focused support to local governments for safety and comfort measures of park facilities.

3 Ageing Society Measures

(1) Creating a Living Environment for the Elderly to Live Comfortably

The Silver Housing Project provides a package including the supply of public housing and other accessible facilities, life support advisors to counsel daily living needs, and emergency response services and as of 2012 is implemented at 891 housing projects (23,813 housing units).

Also, promotion projects for the stabilization of elderly housing support include the development of serviced housing for seniors, pioneering living and town planning measures for the elderly as well as redeveloping public rental housing projects as the center of regional welfare among other measures. In addition to this public rental housing is being utilized to support coordination with group homes [Note 1], welfare, caring, and other services.

(2) Providing Transport Services that Meet the Needs of an Ageing Society

In order to respond to the demand for the transportation disadvantaged such as the elderly and disabled to use hospitals and other care facilities, the implementation of welfare taxis [Note 2] is being promoted and as of the end of fiscal year 2012, 16,025 vehicles are being operated. Also, the Investment Subsidy to Ensure the Procurement, Maintenance and Improvement Regional Public Transportation is being utilized to support the implementation of welfare taxis needed in regional areas and from fiscal year 2012, universal design taxis that are easy for the elderly and various people are granted preferential measures regarding motor vehicle tonnage tax and vehicle excise tax if the vehicle meets standard specifications and is certified by government. Also, under the revised "Road Transportation Act", to ensure transportation means necessary for the daily living of regional residents, if services by bus or taxi companies are deemed difficult to provide and the parties of the regional residents agree to the need for private fee-based passenger transport, prefectural governments can operate prefectural fee-based transport or NPOs and other organizations can provide fee-based welfare transport or

Note 1 Communal dwelling for those such as the elderly and disabled to live independently within regional society
Note 2 Taxi vehicles with lifts and other facilities so that those using wheelchairs or beds (stretchers) can board and disembark as is or taxi vehicles serviced by those with various qualifications such as home care worker.

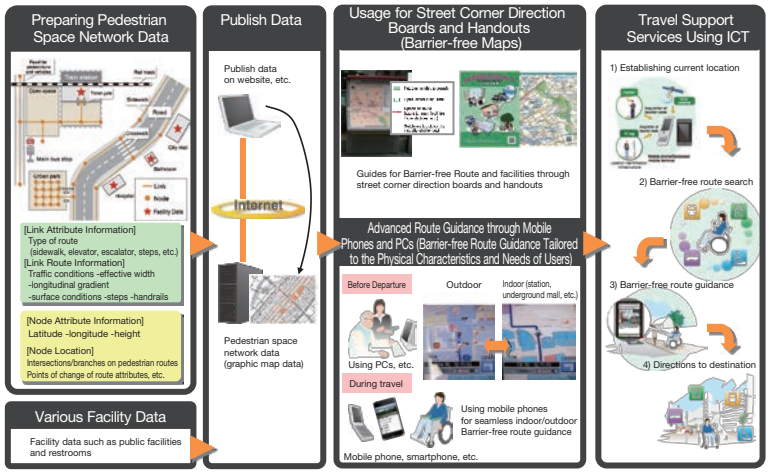
fee-based transport to isolated areas based on registration and as of the end of fiscal year 2011, 2,959 organizations are implementing such services.

4 Promoting the Support of Pedestrian Travel

To create an accessible environment where everyone including the elderly and disabled can readily take part in activities toward a universal society, it is important to promote things from the perspective of soft measures and study groups including outside experts are used to utilize Information and Communication Technology (ICT) that can be used for accessible routing assistance to promote the support of pedestrian travel.

For this reason, a draft guideline implementable by local governments is being prepared for issues such as the maintenance and renewal of services to support pedestrian travel and rules for the distribution of costs between the public and private sector based on the knowledge gained from demonstration experiment projects carried out in five locations nationwide starting with Fukushima City, Fukushima Prefecture.

Figure II-7-1-3 Pedestrian Travel Support System Mechanism



Source) MLIT

Section 2 Natural Disaster Measures

Japan's national land is subject to severe conditions including climate, geography, and geology; almost every year natural disasters such as earthquakes, tsunamis, floods, and sediment disasters occur. Even in 2013, heavy disasters occurred due to Typhoon Man-yi, Wipha, and others leading to massive damages several locations. Also, the importance of natural disaster measures is more urgent in consideration of increase of external force due to climate change and the experience of the Great East Japan Earthquake, dilapidation measures and proactive disaster prevention and reduction measures must be fundamentally bolstered by appropriately combining soft measures to solidly further infrastructure development urgently needed to protect the lives and living. There is an urgent need for the Ministry of Land, Infrastructure, Transport and Tourism to compile actions to be implemented, especially for the great earthquake along the Nankai Trough and Tokyo metropolitan earthquake.

1 Shaping National Land that is Safe and Resilient to Disasters, Enhancing and Strengthening the Framework of Preparedness for Emergency Management

(1) Responding to the great earthquake along the Nankai Trough and Tokyo Metropolitan Direct Earthquake

It is predicted that as the result of the great earthquake along the Nankai Trough, a wide area from the Kanto region to Kyushu will experience strong shaking and a huge tsunami will attack the coastal area within a short period of time. Deaths will reach a maximum of 320,000 people and create a critical situation including the interruption of transport infrastructure and paralysis of urban functions along the coast. Also, the Tokyo Metropolitan Direct Earthquake is expected to cause strong shaking along the entirety of the Tokyo Metropolitan area. Buildings will collapse, fires will occur, and there will be great human casualties in dense urban areas and it will drastically effect citizen's lives and economic activities due to the central functions of politics, economics, and administration being struck by disaster. As the authority in charge of handling the disaster site, the Ministry of Land, Infrastructure, Transport and Tourism established the Ministry of Land, Infrastructure, Transport and Tourism great earthquake along the Nankai Trough and Tokyo

Metropolitan Direct Earthquake Response task force in July 2013 to enable the ministry to make a concentrated effort to respond to such a situation and formulated the Tokyo Metropolitan Direct Earthquake Response Plan and the great earthquake along the Nankai Trough Response Plan. Also, regarding the great earthquake along the Nankai Trough, more specific and practical regional response plans were developed for each regional block.

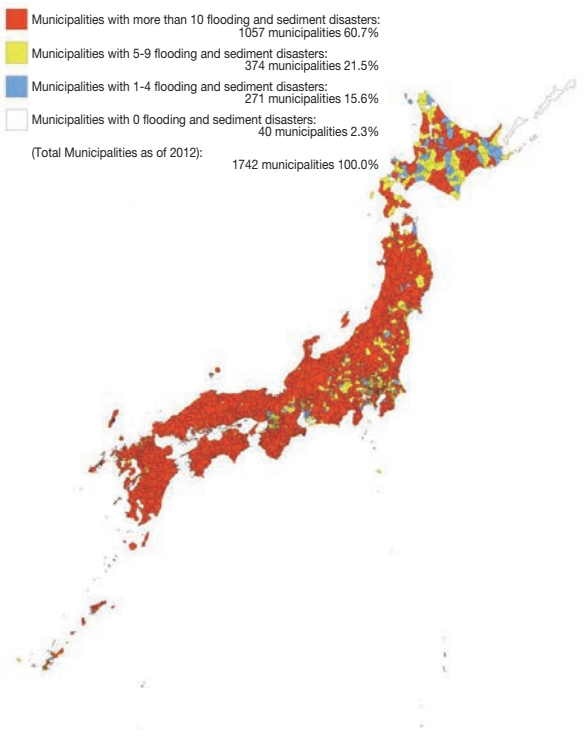
(2) Responding to Climate Change

Following the ongoing global warming, sea-level rise, increased frequency of heavy rains, and more strong typhoons are projected, and in addition to the increased frequency and intensified water, sediment and storm surge disasters, there are concerns about the increased frequency and severity of droughts due to an expanded range of variability in rainfall volume. Also, in recent years, disasters are occurring more frequently due to external forces that exceed the current safety level of flood control or planned scale. In response to such factors as the recent disasters with a diversity of disaster forms and new insights regarding global warming, the "Panel on Infrastructure Development River Subcommittee's Subcommission to Evaluate Flood Control Measures for Climate Change" deliberates on the nature of adaptive measures suitable for future initiatives in order for relevant authorities to coordinate and promote initiatives.

(3) Flood Measures

Many of Japan's major cities are positioned on low-lying districts that are lower than the river level during flooding, making the latent danger of flood inundation quite high. Flood control measures such as expanding the river channel to safely flush away floods, embankments, development of discharge channels, dams to temporarily hold back floods, and artificial ponds have steadily improved the degree of flood control safety. However, water disasters in various locations have occurred such as the flooding of Yura River and Katsura River due to Typhoon Man-yi as well as disasters due to torrential rain in Yamaguchi Prefecture and Shimane Prefecture. In order to mitigate and reduce damage caused by torrential rains and other factors, preventative flood control measures as well as measures to prevent re-occurrence will continue to be promoted and the "Ministry of Land, Infrastructure, Transport and Tourism Water Disaster Prevention and Mitigation Task Force" will strengthen anti-inundation measures for underground malls and subways as well as flood defense systems, create timelines (disaster prevention action plans) to further advance disaster prevention and mitigation measures that appropriately combine hard and soft measures.

Figure II-7-2-1 Flooding and Sediment Disaster Occurrences 2003-2012



Source) Water Disaster Statistical Study, Ministry of Land, Infrastructure, Transport and Tourism

a. Preventative Water Control Measures

The occurrence of large scale floods leads to human and economic losses, greatly affecting socioeconomic activities and because the recovery and reconstruction requires a great amount of time and resources, preventative water control measures are important to keep disaster from occurring. For this reason, water control facilities such as levees, excavating river channels, dams, and discharge channels are developed systematically. Also, existing facilities are being maximized with dam renovation technology such as the redevelopment of existing dams as well as restructuring the capacity of several existing dams as part of measures to effectively utilize existing facilities. In addition, existing levees that are not sufficiently safe from permeative destruction or erosion due to floods are being strengthened.

Additionally, for "areas with a high likelihood of grave human casualties due to levee collapses in densely populated areas", in coordination with town planning projects, a safe and pleasant living environment that protects the human lives of local residents will be formed and to increase the safety of areas away from rivers, the development of high-standard levees that do not collapse in the face of flooding that exceeds the planned capacity of facilities is being carried out.

Figure II-7-2-2 International Comparison of Flood Control Safety

Country	River Name	Flood Control Safety Goals (Note)1	Coverage (Note) 2
United States of America	Mississippi River Downstream	Around 1/500 (Note) 3	Approximately 94% (Note)4
United Kingdom	Thames River	1/1,000 (Note) 5	100% (Note) 5
Nether-lands	The coast including the center of the nation	1/10,000 (Note) 6	Around 94% (Note) 7
Japan	Arakawa River	1/200	Approx. 54%

(Notes) 1 Flood control safety goals: annual exceedance probability set as the development goal of the flood control facility
2 Development coverage: percentage of levees developed compared to the levees deemed necessary based on river improvement plans
3 "Sharing the Challenge :Floodplain Management into the 21st Century", Report of the Interagency Floodplain Management Review Committee to the Administration Floodplain Management Task Force, p.60, 1993.
4 "Report of the secretary of the army on civil works activities for FY 2008", Department of the Army
5 "Strategic Environmental Assessment Environmental Report Summary", Environment Agency, p.2, 2009.4.
6 "Flood Defence Act 1996" (http://www.safecoast.org/editor/databank/File/Flood%20Defence%20Act%201996.pdf)
7 "Water in Focus 2004 Annual report on water management in the Netherland", Ministry of Transport, Public Works and Water Management in co-operation with the partners of the National Administrative Consultation on Water. (http://www.rijkswaterstaat.nl/rws/riza/waterinbeeld/wib2004e/index.html)
Source) MLIT

b. Preventing the Reoccurrence of Flood Disasters

In recent years, within regions that experienced flooding, river channels are excavated and levees are being built to improve the flow capacity of rivers, drainage pump stations are developed to prevent inside water flooding among other measures are being implemented intensively in a short time span to prevent or mitigate flooding.

c. Flood Control Measures Tailored to River Basin Characteristics

For rivers that experience a significant decline in flood control safety due to river basin development or existing urban areas regularly subject to flood damages, it is important to ensure the water retention and flood dissipation functions of the river basin. Rivers such as these require the promotion of river basin measures and a variety of methods that taken into consideration regional characteristics to ensure safety and comfort.

Column

"Dam Regeneration" -Utilization through the Redevelopment of Existing Dams-

Dams fulfill their role in a variety of ways. From the viewpoint of effectively utilizing existing facilities, there is an increased demand for further utilizing existing dams and the Ministry of Land, Infrastructure, Transport and Tourism is promoting "dam regeneration". Dam regeneration involves the enhancement of existing dams such as expanding the dam's capacity, increasing discharge capacity, improving operations, sedimentation measures, and water quality measures in order to better utilize existing dams.

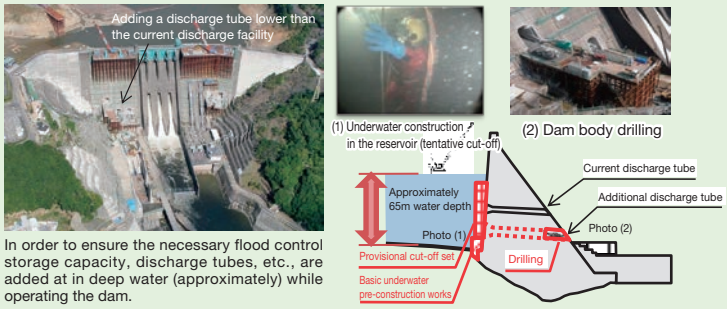
As one example of dam regeneration, the Tsuruta Dam redevelopment project is reaching the mature stage. This project is to strengthen the flood control functions of the existing Tsuruta Dam following the torrential rain disaster that occurred in the

Sendaigawa basin in northern part of Kagoshima Prefecture during July 2006 by implementing the expansion of flood control capacity and enhancement of discharge capacity among others. To improve the flood control function, new discharge tube with a hole of diameter 6m would be opened on the dam body but there was a need to implement the construction while maintaining the existing dam's flood control and water utilization functions. This would involve measures such as performing underwater construction up to a maximum water depth of 65m, creating difficulties completely different from constructing a new dam. Drilling construction on a dam body at such a great depth over a long period is a first for Japan and currently the project is progressing in earnest for completion in fiscal 2017.

"Dam regeneration" holds great promise not only for dams in Japan but dams located overseas and it is being actively promoted for this. For example, at the International Commission on Large Dams Annual Meeting held in August 2013 in Seattle, US, a panel exhibition and other activities were carried out. Also, at the International Commission on Large Dams Annual Meeting to be held in Norway in 2015, Japan's proposal for a theme on the effective utilization of existing dams was incorporated into the agenda. Japan will continue to utilize its advanced technology to actively pursue international expansion.

Also, the Ministry of Land, Infrastructure, Transport and Tourism is working with private sector tour companies to incorporate dam inspections into sightseeing tours to promote "dam tourism". Such dam tours not only include dams under management but also dams such as the aforementioned Tsuruta Dam which is currently going through "dam regeneration" construction so that people can see the daily progress of concrete placement and other aspects that can only be seen at the current site and will be actively promoted for publicity.

Tsuruta Dam redevelopment (Sendaigawa water system)



In order to ensure the necessary flood control storage capacity, discharge tubes, etc., are added at in deep water (approximately) while operating the dam.

Dam Tourism and PR brochures

Brochure cover

Dam tourism PR brochure, "Let's go see the dam"
http://www.mlit.go.jp/river/dam/main/dam/dam_tourism.html

Source) MLIT

(a) Comprehensive Flood Control Measures

With factors such as the concentration of population following the development of urban areas and peripheral areas as well as increased discharge from flooding rivers, for urban rivers where flood control safety is significantly compromised it is important to carry out comprehensive flood control measures, in addition to river development, such as securing the

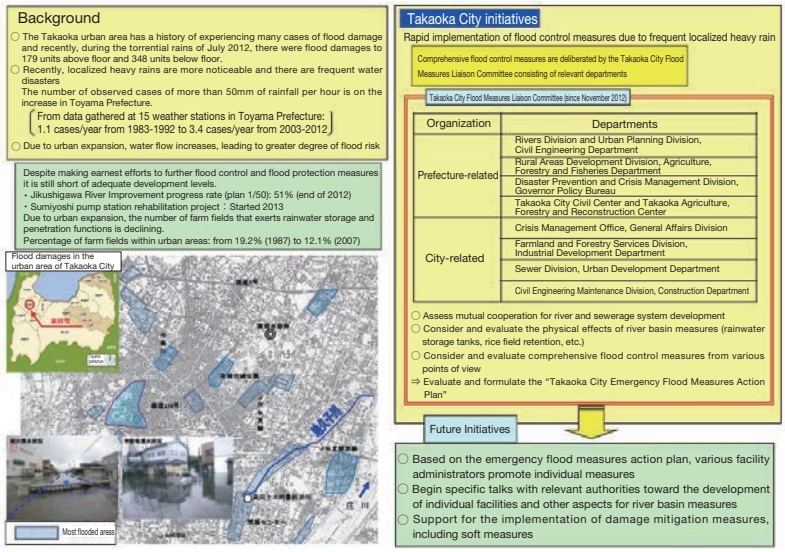
water retention and flood dissipation functions of the river basin, directing land use in regions at risk of disasters occurring, and establishing a precautionary evacuation framework. As part of these efforts, the development of rainwater harvesting facilities is being promoted through measures such as river basin storage and infiltration projects and tax breaks so that the relevant local authorities can cooperate to further suppress rainwater drainage and measures to reduce civil damages.

In addition, to prevent the disruption of urban functions due to flooding as well as the flooding of underground malls in accordance with the "Act on Countermeasures against Flood Damage of Specified Rivers Running Across Cities", river administrators, sewage system administrators, and local government are working together to promote river basin flood damage countermeasures such as developing rainwater harvesting and infiltration facilities as well as regulations to suppress the drainage of rainwater.

(b) Localized Downpours (Guerilla Rainstorm) Measures

In recent years, due to flood damage caused by phenomenon such as concentrated heavy rains in localized areas, to ensure that residents can live safely even during localized heavy rains exceeding planned levels, a plan created with the support of residents (groups), private sector companies, and others that stipulates a comprehensive approach implemented to reduce flood damages known as the "100mm/h safe plan" is registered and initiatives to promote mitigation measures against flood damages are being implemented in addition to the development of rivers and sewerage.

Figure II-7-2-3 Example Measures Based on the 100mm/h Safe Plan for Takaoka City, Toyama Prefecture



Source) MLIT

(c) Integrating Land Use Measures with Flood Mitigation

In accordance with land use conditions, if it is an area prone to flood disasters and more efficient and effective than developing a consecutive levee, integrated land use that combines the development of a circle levee [Note] and the regulation of land use through measures such as designation of disaster risk areas is combined in cooperation with local authorities to promote disaster mitigation measures.

Column

Flood Control Projects Demonstrate Effectiveness Against Floods Caused by Typhoon Man-yi

With the approach and passage of Typhoon Man-yi, a wide area from Hokkaido to Shikoku experienced record levels of heavy rain from September 15 to 16, 2013, resulting in disasters including inundation damages, river flooding, and sediment disasters causing six deaths and one missing person nationwide and also in a wide area from Hokkaido to Shikoku, there were over 10,000 housing units inundated, resulting in great damage.

On the other hand, the 174 dams nationwide under the Ministry of Land, Infrastructure, Transport and Tourism carried out flood control, demonstrating the effectiveness of flood control projects all over the nation.

Note A levee that surrounds districts with housing and other structures

Preventing the Occurrence of Extensive Flood Damage in Kyoto Using a Dam's Flood Control

At the Katsura River of the Yodo River System in Kyoto Prefecture, a large-scale flood occurred and the Hiyoshi Dam experienced the greatest inflow recorded since operation but by using the dams flood control, the water volume released downstream was reduced by approximately 90 percent.

It is estimated that this flood control prevented the spread of damage to the Togetsukyo Bridge in the Arashiyama District in Kyoto City (near Togetsukyo) and also virtually halved the number of houses flooded.

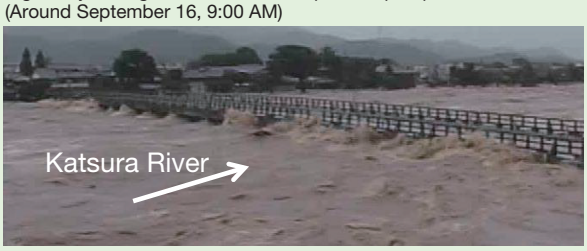
In addition, near the Kamo River confluence in downstream Kyoto, the water level rose to the levee crest and there was overflow on the right bank side but thanks to the Hiyoshi Dam's flood control and flood fighting activities by flood control brigades and Japan Self-Defense Force, and others, a levee collapse was avoided. If the Hiyoshi Dam did not exist, and the levee broke near the right cost side, approximately 13,000 housing unites would be inundated and damages amounting to approximately 1.2 trillion yen are estimated to have occurred.

Prevent Flooding Damages through Levee Development

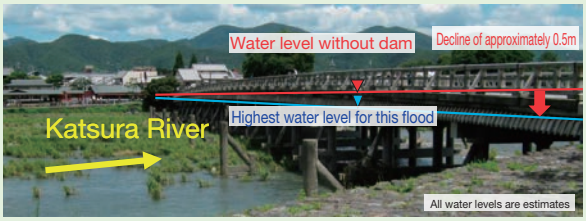
The Itayanagi district on the right bank of Iwakigawa River in Aomori prefecture was an area without a levee but levee development and river channel dredging was started from 1999 and in March 2013 a levee with a total length of 8.1km was completed.

In the floods caused by Typhoon Man-yi, although the water level exceeded high water level, actions such as flood fighting activities prevented the levee from collapsing. Thanks to the levee's development, it is estimated that approximately 3,100 ha (approximately 5,900 units) were protected from flood damage.

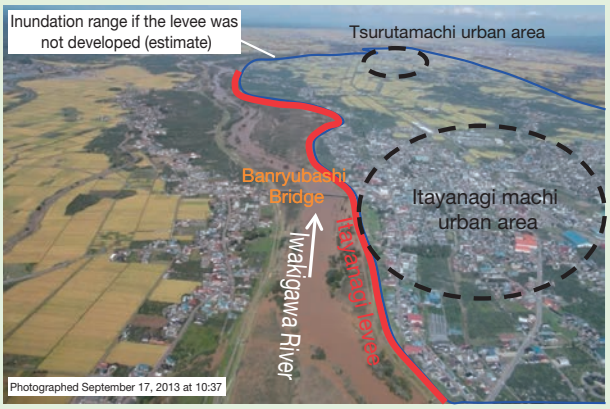
<Case Study of Hiyoshi Dam>
Togetsukyo Bridge soaked in water up to the parapet
(Around September 16, 9:00 AM)



The water level reduction effect of the dam



<Case Study of Itayanagi Levee>
The Itayanagi levee that protected the city from flooding



Source) MLIT

(d) Inner Water Measures

To prevent flooding through inner water inundation and strive for the healthy development of cities, the improvement of facilities such as sewer pipes and drainage pump stations are being promoted. However, in recent years, the frequency of concentrated downpours that far exceed planned scales increased rainwater drainage due to the advancement of urbanization, the increased complexity of the urban landscape including the concentration of population and wealth as well as the increased use of underground spaces make the risk of damage due to inner water inundation even greater. For this reason, measures such as integrated projects for the reduction of sewer flooding damages and integrated projects for inner water emergency measures are being utilized with the cooperation of relevant parties including regional authorities and affected residents to carry out hard measures such as proactively implement rainwater drainage reduction facilities; soft measures such as providing rainfall information, land use regulations, and creation of inner water hazard maps; and self-help initiatives such as the placement of water stops and sandbags as well as evacuation activities in combination for the promotion of integrated flood measures.

d. Strengthening the Flood Prevention Framework

Coordination with prefectures and flood prevention administration bodies for joint inspections of levees before flooding season and training exercises for communicating information, seminars for flood prevention technology, and flood prevention drills are carried out to ensure that areas requiring special attention and flood prevention technology is mastered from the perspective of flood prevention to protect lives and assets, to assist the creation of a flood prevention framework that minimizes damages.

Aside from the increased frequency of heavy rainfall disasters throughout the country, the flood fighting readiness of local communities are weakening due to the decrease in flood defense personnel among other factors, so to strengthen regional flood fighting capabilities through the participation of various entities, the "Flood Control Act" was revised in June 2013 to: 1) strengthen the coordination of river administrator and flood fighting, 2) promote initiatives to voluntarily secure evacuation and create inundation protection plans in facilities such as underground malls in areas vulnerable to inundation, facilities for people with special needs, and large-scale factories, and 3) expand the range allowed for the designation and scope of responsibilities for flood defense cooperating entities.

e. Publicizing Forecasts and Warnings of Flooding and Providing River Information

The Minister of Land, Infrastructure, Transport and Tourism or Prefectural Governor designate rivers with large river basins that are at risk of causing great damages to the nation's economy or other great losses as flood forecast rivers and during floods issue flood forecasts (including flood warnings, cautions, dangers, and occurence information) indicating the water level or flood volume jointly with the Director-General of the Japan Meteorological Agency. Also, aside from flood forecast rivers, important middle to small rivers are designated as water level alert rivers and during floods, when the water level reaches evacuation levels (special caution water levels) when evacuation calls are issued, this information is also disseminated. Currently as of the end of March 2014, there are 417 flood forecast rivers and 1,555 water level alert rivers.

The water level, rainfall volume, flood forecasts, flood prevention alarms and other river information is collected, processed, and edited in real-time and made available to river administrators, municipalities, residents, and others on the website "River Disaster Prevention Information [Note 1]" to be utilized in issuing warnings and evacuation during floods.

Also, the data broadcast function of digital terrestrial television is being used in cooperation with broadcasters for efforts to provide river water levels and rainfall volume information and by March 2014, 50 broadcast stations nationwide are providing such services. For the observation of rainfall volume, to deal with floods and sediment disasters due to the increased frequency of concentrated downpours and localized heavy rainfall (so called sudden showers) in recent years, XRAIN (MLIT X-band MP radar network)[Note 2] is being developed, which makes more detailed and real-time rainfall volume observation possible, for more appropriate river administration and disaster prevention activities in addition to the traditional radar rain gauge (C-band radar) and meteorological observation networks. Rainfall volume information is also available on the Internet and an observation system consisting of 35 stations was established as of the end of March 2014.

f. Designation of Areas Vulnerable to Inundation

To raise awareness of the dangers from flooding, work to ensure the effective evacuation of residents, and guide appropriate land use, districts that are likely to be inundated when the river floods (flood forecast districts) are designated and information such as the depth of flooding is publicized in accordance with the "Flood Control Act".

Also, so that residents can smoothly and rapidly initiate evacuation measures even when flood inundations occur, technical support for the creation and communication of hazard maps is offered to municipalities creating hazard maps designed to give residents necessary information to secure evacuation such as flood information, evacuation areas, and flood forecasts as well as opening a portal site [Note 3] on the MLIT homepage where all domestic hazard maps can be viewed.

Note 1 http://www.river.go.jp [PC version], http://i.river.go.jp [mobile]
Note 2 Compared to existing radars, observation at higher frequency (every minute), and higher resolution (250m mesh) is possible. Also, time needed for information transmission was reduced from 5-10 minutes to 1-2 minutes.
Note 3 http://www1.gsi.go.jp/geowww/disapotal/index.html

Flooding forecast areas are already designated and publicized for roughly 98% of the rivers concerned and 97% of municipalities within flood forecast areas already created flooding hazard maps (as of the end of March 2014).

The revision of the "Flood Control Act" in June 2013 led to the owner or administrator of underground malls designated by municipal regional disaster prevention plans, facilities for people with special needs, large-scale factories, and others to voluntarily create plans for to secure evacuation as well as create inundation prevention plans, implement training, and establish a self-staffed flood defense organization as part of their flood defense efforts. To strengthen the regional flood defense capabilities, the Ministry of Land, Infrastructure, Transport and Tourism not only allows for tax subsidies for inundation prevention facilities obtained in accordance with inundation prevention plans prepared as stipulated by this law but also establish the disaster information dissemination office established within the river-related office of Regional Development Bureaus and others across the nation as a contact point for businesses and others to support voluntary flood defense initiatives.

g. Strategic Maintenance and Management of Rivers

The condition of rivers and facilities are assessed and appropriate maintenance and management is carried out in accordance with any changes to ensure that the river administration facilities developed function as intended during floods and other situations.

In the course of river development carried out, the number of facilities such as levees, weirs, floodgates, and drainage pump stations under management greatly increased and the age degradation of these facilities is also advancing. Also, for river infrastructure, migration to condition-based maintenance is being implemented where degradation conditions and its progress is monitored through inspections so that measures are taken at appropriate moments as well as move to extending facility life cycles and renewal in a planned manner; the Priority Plan for Social Infrastructure Development states that by fiscal year 2016, major river infrastructure administered by the nation will have long lifecycle plans by fiscal 2016. In addition, necessary technological development for extending lifecycles will be furthered as well as deliberate in cooperation with prefectures on the technical standards for middle to small rivers administered by prefectures for appropriate maintenance and management in addition to technical support through permanent consultation services made available by regional development bureaus.

Following the partial revision of the "River Law" in June 2013, clarifies the need for the administrator of river management facilities or permitted structures to maintain river management facilities or permitted structures in good condition through maintenance and repair and also stipulates the absolute minimum technical standards that must be adhered to by all administrators regarding the maintenance and repair of a diverse array of river management facilities and others by decree.

h. Measures Against Illegally Moored Vessels in Rivers

Illegally moored Vessels in rivers hamper flood control measures (interfere with the implementation of river works, obstruction of downward flow during floods, damage to river administration facilities, etc.) and other aspects of river administration (water contamination by fuel leakage, obstruction of river usage, etc.). Such illegally moored vessels are directed to move to legal mooring facilities or removed.

In May 2013, the "Promotion Plan for Comprehensive Measures for the Appropriate Management and Improvement of the Operation Environment of Pleasure Boats" was created to resolve the issue of abandoned vessels (illegally moored vessels). In December 2013 the River Law Enforcement Ordinance was amended to prohibit the act of abandoning vessels and other objects (effective April 1, 2014).

(4) Countermeasures against Sediment-related Disasters

Japan is steep with a geology that is complex and vulnerable over a wide area with approximately 520,000 areas that are in danger of sediment disasters such as debris flow, landslides, and slope failure where sediment-related disasters caused by concentrated heavy rainfall and earthquakes averaged approximately 1,000 cases per year over the past ten years (2004-2013) resulting in severe damages. Also, sediment-related disasters claim a large share of victims amongst natural disasters. For this reason, developing sediment control facilities in priority areas with an acute need for measures; creating a safe and appropriate warning and evacuation frameworks consisting of self, mutual, and government assistance; efficient sediment-related disaster measures consisting of integrated soft and hard measures are being promoted to reduce the number of victims claimed by sediment-related disasters.

a. Fundamental Countermeasures against Sediment-related Disasters

Rivers with a headstream area in a dilapidated mountain terrain can cause extensive damages to the entire river basin from the sediment discharge it creates. To protect the national land from such sediment disasters and strive to protect human lives, the development of sediment control-related facilities is being promoted.

b. Emergency Countermeasures against Sediment-related Disasters in Sediment Disaster Affected Areas

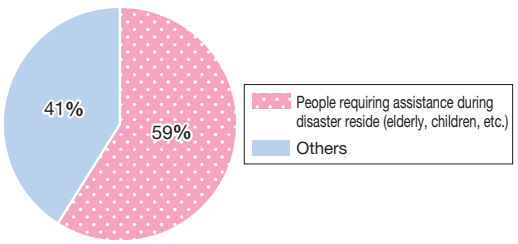
Through the concentrated development of erosion control facilities including areas prone to sediment-related disasters and surrounding regions, in recent years, measures to prevent the re-occurrence of disasters in areas that experienced a large sediment-related disaster are being promoted.

c. Emergency Countermeasures against Sediment-related Disasters for People Requiring Assistance During Disasters

For facilities used by those requiring assistance during disasters such as hospitals, nursing homes, and kindergartens located in areas at risk of sediment-related disasters, the development of sediment-related control dams and other sediment-related disaster mitigation facilities are heavily prioritized.

Also, based on the "Act on Promotion of Sediment Disaster Countermeasures for Sediment Disaster Prone Areas (Sediment Disasters Prevention Act)", the development of facilities used by those requiring assistance during disasters is restricted in sediment disaster prone areas.

Figure II-7-2-4 Proportion of People Requiring Assistance Among Sediment-related Disaster Casualties and Missing Persons (2009-2013)



Source) MLIT

d. Countermeasures against Sediment-related Disasters for Urban Areas Near Mountain Base Slopes

For urban areas at the foot of the mountain prone to sediment-related disasters, the preservation and fostering of forestry bands (green belts) that strive to prevent sediment-related disasters and create a living environment with abundant greenery allow for the creation of a safe and environmentally rich urban space.

e. Countermeasures against Sediment-related Disasters Measures that Improve Regional Disaster Prevention

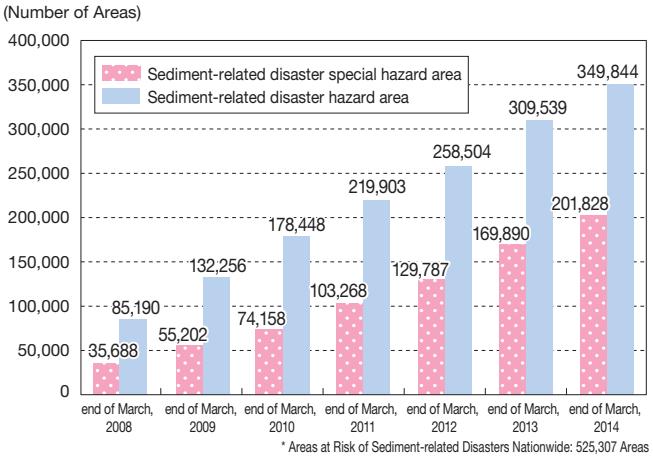
In hilly and mountainous regions where sediment-related disasters can cause devastating damage to the society and economy, the warning and evacuation system of villages are strengthened and the conservation of important facilities and disaster prevention backbone villages are being promoted.

f. Promoting the Sediment Disasters Prevention Act

(a) Promoting the Designation of Sediment-related Disaster hazard areas

In accordance with the "Sediment-related Disasters Prevention Act", sediment-related disaster hazard likely to experience-related sediment disasters that may cause harm to the body of residents are designated and in such districts, warning and evacuation system will be developed and in such areas, soft measures are taken such as the restriction of certain development activities and structural requirements for architecture. Also, guidelines and case studies are provided for the development of warning and evacuation system as well as the creation of hazard maps to further the development of warning and evacuation system as well as hazard maps against sediment-related disasters in the municipalities.

Figure II-7-2-5 Designated of Sediment-related Disaster Hazard Areas Nationwide (March 31, 2014)



Source) MLIT

(b) Prompting the Relocation of Housing at Risk

At risk housing located near cliffs in danger of collapsing are prompted to relocate using the program for relocating at risk housing located near cliffs. In fiscal year 2013, this program was used to eliminate 28 at risk housing units and 18 housing units were created to replace at risk housing.

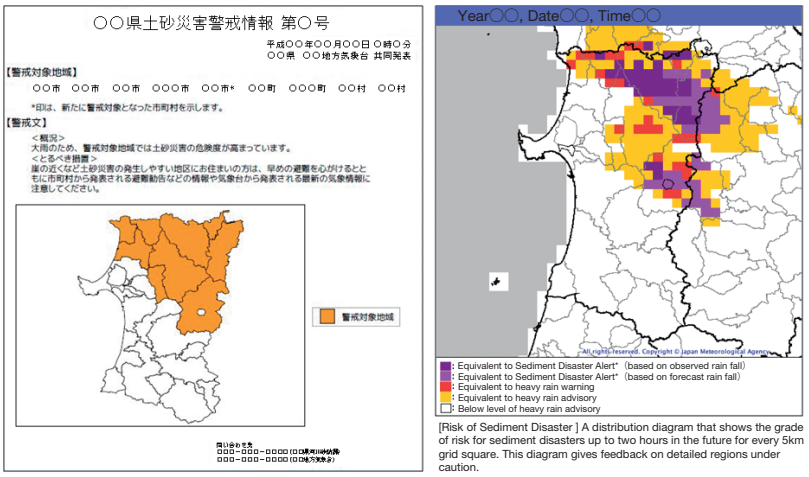
g. Countermeasures for Large Scale Sediment-related Disasters

Once a countermeasures for large scale sediment-related disasters occur, it usually leads to extensive damages so it is important to efficiently implement preventative measures and disaster responses in accordance with the event of a disaster.

For deep catastrophic landslide, the development of monitoring and warning systems that utilize technology such as seismic sensors and satellite images in addition to the evaluation of preventative measures and establishing a warning and evacuation system utilizing slope failure risk evaluation maps are being promoted.

Under urgent disaster conditions such as river channel blockage (natural dams), sediment flows following volcanic eruptions, and landslides, to enable municipalities to appropriately decide on resident evacuation orders, the Ministry of Land, Infrastructure, Transport and Tourism and prefectures must conduct emergency studies and provide municipalities with information on the land areas likely to experience sediment disasters as well as the timing, therefore training and the strengthening of strengthening of coordination with relevant organizations will be carried out. This was implemented in Kirishima and Sakurajima (Shinmoedake), where ash fall from volcanic activity was acute in 2013 and in the Kumanogawa River (Totsukawa River) basin of Nara Prefectures and Hikigawa River basin of Wakayama Prefecture where river channel blockage continued due to heavy rains caused by Typhoon Talas in 2011 where monitoring and observation information was provided on an ongoing basis to relevant organizations.

Figure II-7-2-6 Sediment Disaster Alert and Risk of Sediment Disaster



[Risk of Sediment Disaster] A distribution diagram that shows the grade of risk for sediment disasters up to two hours in the future for every 5km grid square. This diagram gives feedback on detailed regions under caution.

Source) Japan Meteorological Agency

h. Issuing Sediment Disaster Alert

When the risk of sediment disasters occurring increases due to heavy rainfall, sediment disaster alert is jointly issued by prefectures and the Japan Meteorological Agency and disseminated through the fire protection and disaster preparedness section of the prefecture to assist the head of the municipality with deciding on giving evacuation orders as well as allow residents to evacuate on their own.

Column Emergency Warnings Begin Operations

Massive damage is caused by natural phenomena of extraordinary magnitude in Japan, as exemplified by the major tsunami caused by the 2011 Great East Japan Earthquake and heavy rain caused by Typhoon Talas in the same year. In response to these natural hazards, the Japan Meteorological Agency (JMA) issued warnings and various other messages. However, in some cases there was no effective means of informing municipalities and residents of a significant risk if imminent fatal disaster in association with natural phenomena on a scale far exceeding the regular warning criteria, and existing warnings and other information did not prompt residents to evacuate urgently. Based on these experiments, JMA introduced the Emergency Warning System on August 30, 2013, to highlight such hazards.

Emergency Warnings are intended for extraordinary phenomena expected to be of a scale that will far exceed the warning criteria. The criteria for Emergency Warning issuance were determined in response to the views of local governments in charge of disaster management for their own areas. Regarding heavy rain, storm, storm surge, high waves, snowstorms, and heavy snow, when an phenomenon that only occurs once every few decades is forecast, an Emergency Warning capping the name of the phenomenon is issued. On the other hand, for tsunamis, volcanic activity, and seismic motion, Major Tsunami Warnings, Volcanic Warnings (residential areas)[Note], and Earthquake Early Warnings (EEW) incorporating prediction of tremors measuring six-lower or more on JMA's seismic intensity scale are considered Emergency Warnings and are issued in the classification of Emergency Warnings respectively.

Also, regarding Emergency Warnings, to ensure that it is transmitted to as many residents as possible swiftly and surely, measures for notifications from prefectures to municipalities and dissemination to residents by the municipalities are both mandatory.

Furthermore, remember that catastrophes may occur even if no Emergency Warning is in effect. For heavy rain and other events, it is important to take early action with reference to relevant bulletins, Advisories and Warnings, which are updated in response to the latest phenomenon observations or predictions.

Phenomenon	Criteria	
Heavy Rain	·Heavy rainfall with a level of intensity observed only once every few decades is predicted in association with a typhoon or similar. Or: ·Heavy rainfall is predicted in association with a typhoon expected to have a level of intensity observed only once every few decades or an extratropical cyclone with comparable intensity. (Note)	
Storm	A storm is predicted (Note)	in association with a typhoon expected to have a level of intensity observed only once every few decades or an extratropical cyclone with comparable intensity.
Storm Surge	A storm surge is predicted (Note)	
High Waves	High waves are predicted (Note)	
Snowstorm	A snowstorm is predicted in association with an extratropical cyclone expected to have a level of intensity observed only once every few decades. (Note)	
Heavy Snow	Heavy snowfall with a level of intensity observed only once every few decades is predicted. (Note)	
Tsunami	Tsunami height is expected to be greater than 3 meters (Major Tsunami Warnings are issued in the classification of Emergency Warnings)	
Volcanic Eruptions	Eruption or possibility of eruption that may cause serious damage in residential areas and non-residential areas nearer the crater (Volcanic Warning [Level 4 and 5] and Volcanic Warning [residential areas]are issued in the classification of Emergency Warnings)	
Earthquake	Seismic intensity of 6-lower or more is predicted (Earthquake Early Warnings incorporating prediction of tremors measuring 6-lower or more on the Japan Meteorological Agency's seismic intensity scale are issued in the classification of Emergency Warnings)	

(Note) The Japan Meteorological Agency (JMA) issues Emergency Warnings by taking account of the latest phenomenon observations, predictions, and the objective indices for issuance of Emergency Warnings made in light of past catastrophes. JMA's website provides the objective indices for variables such as rainfall amounts used for the definition of a level of intensity observed only once every few decades.
Source) Japan Meteorological Agency

Note When residential areas are not defined, "residential areas" is replaced with "foot-of-mountain areas".

(5) Volcanic Disaster Measures Countermeasures

a. Countermeasures for Sediment-related Disasters Following Heavy Volcanic Activity

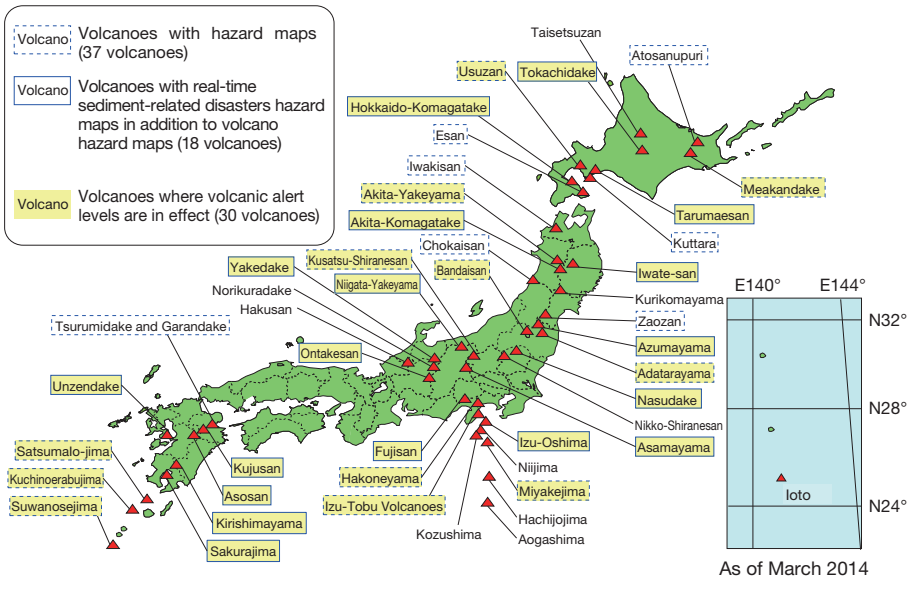
In preparation of volcanic disasters including debris flow caused by volcanic mudflow, pyroclastic flow, and rainfall caused by strong volcanic activities such as eruptions and minimizing damages, erosion control dams and consolidation works to capture or suppress debris flow, mountain maintenance works (training dyke) that safely allow for the down flow of debris flow, and guide walls are being developed. In addition, for facilities that are unable to properly maintain functions due to continued and massive debris flow, descaling and other measures are carried out to maintain functional effectiveness. Also, volcanic regions have fragile geology and like Izu Oshima which experienced great damages due to Typhoon Wipha in 2013 are highly susceptible to sediment disasters caused by rainfall so the development of facilities such as erosion control dams are being promoted.

Volcanic mudflow and such tend to cause sediment-related disasters but it is extremely difficult to predict the eruption position or scale beforehand. For this reason, while utilizing the facilities mentioned above, to reduce disasters when volcanoes erupt, "Volcano Eruption Emergency Mitigation Measure Erosion Control Plans" are being created for 29 volcanoes where volcanic activity is high and has a large social impact to smoothly implement agile responses in accordance with the progression of expected volcanic activities and the scope of impact. Also, to ensure residents and others can smoothly evacuate from volcanic activities, "Volcano Disaster Prevention Maps" to be created by municipalities is being supported.

b. Japan Meteorological Agency Initiatives

To prevent and reduce volcanic eruption disasters, domestic volcanic activity is monitored and volcanic warnings are issued in a timely manner. Especially for the 47 volcanoes in need of more intensive monitoring/observation for volcanic disaster mitigation selected by the Coordinating Committee for Prediction of Volcanic Eruptions, observation facilities are deployed and volcanic activity is being monitored around the clock.

Figure II-7-2-7 Development level of volcanic hazard maps, real-time sediment-related disasters prevention hazard maps and volcanic alert levels of 47 volcanoes specified as "Volcanoes in need of more intensive monitoring and observation for volcanic disaster mitigation" by the Coordinating Committee for Prediction of Volcanic Eruptions



Source) MLIT

Also, volcanic alert levels are being applied and improved through coordination of evacuation planning at local Volcanic Disaster Mitigation Councils (applied to 30 volcanoes as of the end of March 2014).

c. Japan Coast Guard Initiatives

Precursor phenomena to the eruption of submarine volcanoes and volcanic islands such as discolored water in the surrounding sea area are observed and the information is provided to mariners. In addition, to serve as basic data to predict the eruption of submarine volcanoes and volcanic islands, comprehensive surveys are conducted to gather basic information such as sea bottom topography geological structure and so on. Continuous GNSS observations in the Izu Islands sea area are also conducted to monitor crustal movements.

Regarding the Nishinoshima volcano which began eruption for the first time in 39 years in November 2013, volcanic

activity of the island are being continuously monitored by aircraft.

Column

First Eruption in 39 Years Near Nishi-no-shima of the Ogasawara Islands

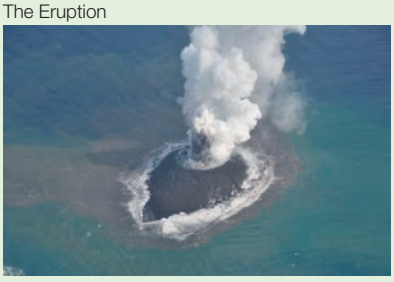
On November 20, 2013, based on a report from Japan Maritime Self-Defense Force aircraft that a volcanic plume was visible offshore of Nishi-no-shima which belongs to the Ogasawara islands, the Japan Coast Guard immediately dispatched an aircraft to the scene confirming that eruptions were occuring off the southeast coast of Nishi-no-shima and a new island approximately 100m in diameter was being formed. This is the first eruption in 39 years experienced by Nishi-no-shima since the eruptions between 1973-74.

In order to secure navigation safety, the Japan Coast Guard immediately issued a navigation warning and advised caution to vessels navigating nearby and also reported their observation results to the Coordinating Committee for Prediction of Volcanic Eruptions in their efforts to prevent eruption disasters. Afterwards, the new island continued to actively spew lava, reclaiming the sea around it and as a result, by December 26, 2013 it was confirmed that the diameter of the new island reached 500m and connected to Nishi-no-shima. Currently, as of March 24, 2014, the Nishi-no-shima volcano is still active.

When new land is formed due to volcanic activity, it may increase new land territory and new territorial sea. The range of territorial waters and exclusive economic zone is base on the low-tide line[Note] shown on the large scale nautical chart, which serves as the territorial sea baseline, published by the Japan Coast Guard. In the future, once volcanic activities subside and safety is ensured, a precise hydrographic survey will be carried out and once the newly formed land is recorded on the nautical chart, the new range of territorial sea and exclusive economic zone will be established.

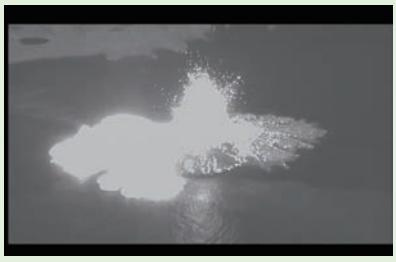
After World War II, there were four cases of submarine volcanic activities leading to the creation of new islands. Although, aside from the volcanic eruption of 1973 in Nishi-no-shima that created new island Nishi-no-shima-Shin To, they all disappeared shortly due to the effect of volcanic explosions and wave erosions. Although newly formed land in this case consisits of mostly consolidated lava so it is considered resistant to erosion, the fate of this new land is unpredictable. Japan Coast Guard will continue the surveillance and observation of the Nishi-no-shima volcano.

The Eruption



H25.11.21

H25.11.22



H25.12.13

H26.01.12

Source) Japan Coast Guard

Note Refers to the boundary between the land and water at the lowest tide.

d. Geospatial Information Authority of Japan Initiatives

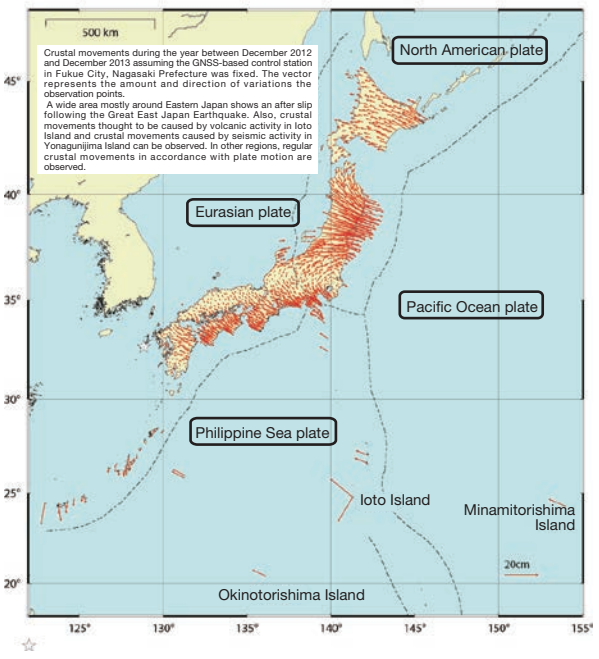
(a) Improved Observation and Monitoring of Volcanic Activities

At active domestic volcanoes, observation system such as GNSS-based control station (GNSS Note 1 continuous observation facility), automatic distance and angle measurement devices to survey distance changes around volcanos, and Remote GNSS Monitoring System (REGMOS) is implemented to continuously monitor three-dimensional crustal movements. Also, the GNSS data observed by other organizations are combined and analyzed for more detailed monitoring of crustal movements in the surrounding area of volcanoes.

(b) Research on Natural Disasters caused by Volcanic Eruptions

In addition to observations of crustal movements by GNSS and SAR Note 2 interferometry to elucidate mechanics of volcanic activities, research is being conducted to improve observation and analysis.

Figure II-7-2-8 Crustal Movements of Japan Archipelago Captured by Continuous Observation with GNSS



Source) Geospatial Information Authority of Japan

(6) Storm Surge and Denudation Measures

a. Promoting Storm Surge and High Wave Measures

To protect human lives and assets from storm surges and high waves caused by frequently occurring storm surges, a combination of hard and soft measures are being promoted such as the development and repair of coastal levees and the issuing of flood prevention warnings.

b. Promoting Coastal Erosion Measures

Since a variety of factors contribute to coastal erosion across the nation, the administrators of rivers, coasts, shipping ports, and fishing ports are coordinating to implement measures such as sand bypasses Note 3 and sand recycling Note 4.

c. Providing Disaster Prevention Information Regarding Strorm Surge and High Tides

To enhance of disaster prevention activities at municipalities, the Japan Meteorological Agency provides each municipality with Storm Surge Warnings and Advisories for individual municipalities.

Also, to assist victims and aid restoration efforts in regions that ground subsidence occurred following the Great East Japan Earthquake, an "Hourly Tide Level Calendar" consolidating astronomical tide level (forecast values for tide level) is published along with other information regarding storm surges.

(7) Tsunami Measures

a. Promoting Tsunami Measures

In preparation for the largest scale tsunami disasters following great earthquakes along the Nankai Trough, building regional tsunami disaster prevention through multiple defenses combining hard and soft measures against the biggest tsunami is being advanced and regional authorities are being supported for measures such as establishing tsunami flooding

Note 1 Global Navigation Satellite Systems
Note 2 Technology that monitors changes in the earth's surface from artificial satellites in space.
Note 3 When the transport of sand is cut off by coastal structures, this construction method takes the sediment accumulated on the upper hand side to move and supply it to the lower hand side coast to restore sands.
Note 4 This construction method takes the sand accumulated on the coast along lower hand side of the flow and restores it to the upper hand side of the coast subject to erosion to restore sands.

projections, and drafting evacuation plans.

Also, as a lesson from the Great East Japan Earthquake, relevant ministries and agencies are working closely to reevaluate the hazard map creation manual.

For tsunamis with a comparatively high rate of occurrence, coastal levees are being developed along with earthquake resistant measures. In case of occurrence, coastal levees and breakwaters with a structure that steadfastly maintains effectiveness even when the tsunami flows over the levee crown will be developed and at the three major ports where population and functions are concentrated, protection standards reflecting the likelihood of high tsunamis with a comparatively high rate of occurring will be evaluated and also the automation and remote controllability of floodgates and land locks will be promoted.

Additionally, to further the strengthening of disaster prevention and mitigation measures and appropriate coastal management, the "Coastal Management Review Committee" was held and in January 2014, the future status of coastal management was compiled.

For ports, to maintain port functions even in the occurrence of large-scale earthquakes, proactive disaster prevention and disaster mitigation measures such as securing refuge areas for large-scale vessels when tsunamis occur and securing navigational routes leading to important locations.

Also, specified ports (86 ports) under the "Act on Port Regulations" have established a "Council on Tsunami Measures for Ships" to further improve tsunami measures for ships at each of the ports with the cooperation of relevant organizations.

For fluvial tsunami measures, in consideration of the liquefaction of levees and tsunami river reversal damages by the Great East Japan Earthquake as well as floodgate operators stricken by disaster, measures such as raising river levees, earthquake resistance and liquefaction measures for levees, automation and remote operation of floodgates will continue to be promoted.

For the four river systems in the Tohoku Region, the lessons learned from the Great East Japan Earthquake will be applied to the formulation of earthquake and tsunami measures, geographic changes to the surrounding river mouth area such as land subsidence following earthquakes will be reflected in changes to the "Basic Policy for River Improvement" and the "River Improvement Plan" that follows the basic policy will be formulated and changed, and initiatives for regional reconstruction and town planning such as the development of river levees in the river mouth area will be promoted in coordination with the region.

Regarding tsunami measures for airports, in preparation for large-scale tsunami disasters caused by events such as the great earthquakes along the Nankai Trough, at airports likely to experience tsunami disasters, tsunami evacuation plans that determine evacuation methods and other matters for airport users and others to protect human life will be drafted and tsunami evacuation training and other matters will continue to be carried out in accordance with these plans. Also, plans will be drafted to rapidly recover airport functions following tsunami disasters and initiatives to build cooperative frameworks with relevant authorities in accordance with the plan and other matters will be promoted.

For the tsunami measures of railways, the conditions of evacuation guidance when tsunamis occurred after the Great East Japan Earthquake will be inspected and fundamental thinking for evacuation (speedy evacuation is the most effective and important measure, etc.) for the largest scale tsunamis following something like the great earthquakes along the Nankai Trough will be reflected in the response guidelines and case studies compiled for passenger railways to secure safety when tsunamis occur to promote initiatives by railway companies.

b. Providing Disaster Preparedness Information Regarding Tsunamis

In order to strive for the prevention and reduction of disasters caused by tsunamis, the Japan Meteorological Agency (JMA) is monitoring earthquake activities across the nation around the clock in order to make speedy and appropriate announcements for tsunami warnings/advisories and information. Taking the issues made apparent by the Great East Japan Earthquake, JMA uses the word "huge" for tsunami warnings in the case of large earthquakes with magnitude 8 or more to emphasize that it is an emergency situation as part of new tsunami warnings and other informational wording beginning in March 2013.

As of the end of March 2014, JMA monitors 36 seabed tsunami gauges including three buoy-type ones placed off the Pacific Coast of Tohoku, 16 GPS wave gauges, and 172 coastal tsunami gauges for updating tsunami warnings/advisories and information.

Additionally, in coordination with relevant agencies, a manual for the creation of tsunami and storm surge hazard map and the compilation of case studies is provided as one of the measures against large-scale disasters such as great earthquakes along the Nankai Trough.

To facilitate tsunami measures for vessels, the Japan Coast Guard creates and publishes Tsunami Information Maps for the expected behavior of tsunamis in port areas based on new assessments of the great earthquakes along the Nankai Trough (Cabinet Office, August 2012).

c. Tsunami Evacuation Measures

Because there are concerns for tsunami disasters caused by large earthquakes such as great earthquakes along the Nankai Trough in the future, a technical guidance was created to compile methods for ensuring the appropriate placement of evacuation and other facilities utilizing the basic data of urban plans which was released in June 2013.

Regarding tsunami evacuation measures for ports, tsunami evacuation measures that account for the special characteristics of ports so that workers and others active on waterside land can safely evacuate and retreat during disasters such as tsunamis were evaluated and the "Guidelines for the Tsunami Evacuation Measures of Ports" was created. Also, for tsunami evacuation facilities developed by local governments, grants for disaster prevention and safety as well as other instruments are utilized to promote development. Initiatives for tsunami evacuation measures for ports will continue to be furthered.

d. Development of Parks and Greenery that Effectively Function to Reduce Tsunami Damages

Taking the lessons learned from the Great East Japan Earthquake, "The Technical Guidelines for Development of Urban Parks Towards Reconstruction from the Great East Japan Earthquake" was put together in March 2012 for utilization by local government in evaluating town building for reconstruction in which parks and greenery is considered to have four functions, that of multi-layered defense; evacuation path and evacuation space; assisting restoration and reconstruction; and disaster prevention education, so the concept of planning and designing parks and greenery to realize disaster mitigation effects is presented.

e. Tsunami Measures for Government Facilities

Government facilities act as the central facility for disaster emergency measure activities as well as temporary evacuation space and is something that contributes to the rescue of human lives, therefore securing necessary functions when tsunamis and other disasters occur is important.

In February 2013, the Panel on Infrastructure Development reported on the "Basics of Ensuring the Function of Government Facilities in Preparation for Tsunamis, etc." and in this report, following the concept of tsunami measures in accordance with the combination of soft and hard measures presented by the report, related technical standards were amended. Comprehensive and effective tsunami measures will be promoted in coordination with authorities in charge of the operation and management of government facilities.

(8) Earthquake Measures

a. Improving the Earthquake Resistance and Safety of Housing and Architecture

Based on the amended "Act on Promotion of Seismic Retrofitting of Buildings" which went into effect in November 2013, established goals of making at least 90 percent of housing and building used by many people earthquake-resistant by 2015 and making 95 percent of houses earthquake-resistant as well as make the reporting of earthquake-resistance diagnosis results for large-scale buildings and others used by an unspecified number of people mandatory along with the creation of display requirements for the earthquake-resistance of buildings among other measures in its aim to promote earthquake-resistance.

Regarding subsidies concerning the earthquake-proofing of housing and buildings, Social Capital Development Integrated Grant and other measures are implemented for support but from fiscal 2013, for architectural structures requiring mandatory diagnosis, a framework for granting intensive and emergency assistance is being implemented in addition to usual subsidies.

b. Promoting the Earthquake Resistance of Residential Land

One of the solutions Japan has adopted for urban disaster management is the revised Act on Regulation of Residential Land Development, which requires more stringent technical standards for newly-developed residential areas in relation to earth filling to reduce damage caused by the sliding and/or collapse of large-scale earth filled structures resulting from large vibration amid a great earthquake. For existing housing land, the Project for the Promotion of the Earthquake Resistance of Housing Land is underway to prevent damage from landslides, earth collapse, and/or liquefaction by, for instance, providing local governments with support for ground deformation forecast surveys and prevention measures.

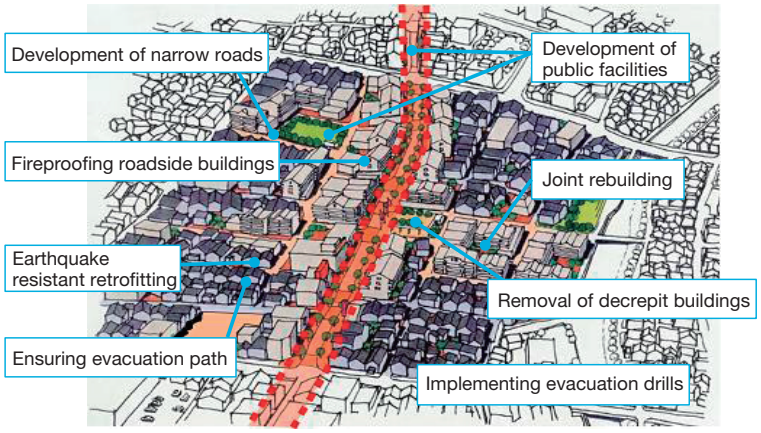
c. Implementing Judgment of the Danger Level of Disaster-Affected Housing Land

The Government works with the Liaison Council for Judgment of the Danger Level of Disaster-Affected Housing Land, an organization composed of prefectures and ordinance-designated cities, to develop the arrangements needed to prevent secondary disasters in housing areas and secure the safety of people there by, for instance, preparing an operation manual that experts can refer to when they work after a disaster to determine the level of danger quickly and accurately.

d. Development to Improve Densely Inhabited Areas

Densely Inhabited areas with issues regarding disaster resilience and living conditions are an urgent issue that requires immediate improvements through development. The Housing Basic Plan (National Plan) stipulates that the land area of densely inhabited areas (approximately 6,000ha nationwide) that are conspicuously dangerous when earthquakes occur should be mostly eliminated by 2020.

Figure II-7-2-9 Development Illustration of Densely Inhabited Areas



Source) MLIT

To realize this, making buildings more fire-resistant along highways and providing the roads with fire-spread prevention and evacuation routes together in order to develop Disaster-prevention Framework Axes (Disaster-prevention Environment Axes) in cities and the development of disaster prevention parks to serve as evacuation areas, disaster prevention block improvement projects, and integrated housing and urban development projects will be used to eliminate decrepit architecture and joint rebuilding of fireproof architecture, expansion of narrow roads to improve evacuation and firefighting efforts among other small measures to improve the disaster resilience qualities of densely inhabited areas and promote the development of the living conditions.

e. Securing Open Space

To improve disaster prevention functions and strive for safer and more comfortable town building, the development of disaster prevention parks is being promoted to serve as the center of restoration and reconstruction when earthquake disasters occur, center of disaster prevention as a relay hub for living supplies, and as an evacuation area to protect the lives of evacuees form urban fires. Also, a disaster prevention block improvement project that integrates the implementation of developing a disaster prevention park and the surrounding urban area is being implemented in six regions including Shinkawa Disaster Prevention Park (Mitaka City, Tokyo Metropolis).

f. Promoting the Development of Government Facilities as Disaster Prevention Centers

Government facilities need to ensure comprehensive earthquake resistance safety, not only ensure the safety of visitors but also to fully function as the central facility for disaster emergency measure activities when large scale earthquakes occur. For this reason, goals for making government facilities earthquake resistant are set and their development is being promoted in a planned and focused manner and in fiscal year 2012, the Kobe Regional Joint Government Building was renovated for earthquake resistance.

g. Improving the Earthquake Resistance of Public Works facilities

For river works, earthquake resistance inspections are carried out and necessary measures are implemented so that levees, floodgates, and other river structures remain functional even under what is referred to as level 2 seismic movement.

For coastal works, earthquake resistance measures are promoted in regions requiring large-scale earthquake measures so that their functions are not damaged before tsunamis arrive.

For road works, to ensure smooth emergency and rescue activities, transport emergency supplies, and emergency transport essential to recovery efforts when earthquake disasters occur, important roads such as emergency transport roads are subject to seismic strengthening of bridges and elimination of utility poles. As for elimination of utility poles , based on the amendment of the Road Act and other legislation in June 2013, for roads important to disaster prevention such emergency transport roads, frameworks to allow the road administrator to prohibit or restrict private use as well as allow for national government to grant utility cable administrators interest-free loans through local government were established.

For port works, for disasters in which extensive damages are expected such as the great earthquake along the Nankai Trough and Tokyo metropolitan epicentral earthquake, to secure an economic and social system that does not succumb to functional failure, increase Japan's competitiveness, and gain international trust, the earthquake and tsunami resistance of port facilities, that serve as the base of wide area networks both domestically and internationally as well as port complexes are being strengthened depending on the urgency of disasters and the importance of port function.

For airport works, in addition to serving as the base of rescue, emergency medical activities and emergency transport when earthquakes and other disasters occur, seismic strengthening of government facilities and basic facilities that are absolutely essential to ensure necessary control functions is being implemented for the airports considered important for maintaining air transport, as well as for maintaining the aviation network and ensuring the continuity of hinterland economic activity.

For railway works, in preparation for the great earthquake along the Nankai Trough and Tokyo metropolitan epicentral earthquake, earthquake measures for major stations, elevated bridges, and other railway facilities are being promoted. Also, the fortification of the Honshu-Shikoku Bridge's (Hon-Shi Bisan Line) earthquake resistance is being steadily implemented to avoid and reduce damages due to the Nankai Trough earthquake and other events and secure the railway network that connects Honshu and Shikoku.

For sewage works, to ensure the functions required of sewers during earthquakes, "disaster prevention" such as strengthening the earthquake and tsunami resistance of pipes and water treatment facilities that connect disaster prevention bases with treatment plants and "disaster mitigation" which aims to minimize damages in anticipation of disasters striking are being combined for the promotion of integrated earthquake measures.

h. Sediment-related Disaster Countermeasures against Large-Scale Earthquakes

In preparation for large-scale earthquakes such as the great earthquake along the Nankai Trough and Tokyo metropolitan epicentral earthquake, areas at risk of sediment-related disasters that are at high risk of damage due to earthquakes including factors such as being a base of disaster prevention and impacting important transport networks or evacuation routes or creating isolated population areas, the development of sediment-related disaster prevention facilities along with warning and evacuation systems will be promoted as part of effective sediment-related disaster measures that integrate soft and hard measures. Also, in preparation for secondary disasters due to post-earthquake rainfall and other events, regarding sediment-related disaster prevention facilities and risk areas as well as river channel blockage and other areas that may experience sediment-related disasters, when earthquakes occur, emergency and intensive inspections and studies will be conducted based on risk assessments regarding areas considered vulnerable to phenomenon such as slope failure to promote the establishment of a system to execute swift emergency measures when failure or other events are confirmed.

i. Japan Meteorological Agency Initiatives

To prevent and reduce disasters due to earthquakes, seismic activities in and around Japan and crustal movements of the area under intensified measures against earthquake disaster are being monitored 24/7 basis to provide rapid and accurate Earthquake Early Warnings (EEWs), earthquake information, and information related to the Tokai Earthquake as swiftly and accurately as possible.

For Earthquake Early Warnings (EEWs), in light of experiences with the Great East Japan Earthquake, to ensure information is announced appropriately, the power supply and communication lines of earthquake observation stations

have been strengthened and calculation software is going to be revised to improve the accuracy and swiftness of the information. Preparations to utilize data gathered from seismographs installed by relevant organizations in the sea and deep underground are also underway.

In addition, to provide useful information that will contribute to the initial response immediately after the earthquake such as the early detection of human and fixture damage caused by long-period ground motion, from March 2013, observation information on long-period ground motion is being announced on a trial basis. Also, technical studies regarding the prediction of long-period ground motion have begun.

j. Japan Coast Guard Initiatives

To elucidate the physical mechanism of huge earthquakes, observations of seafloor crustal movements are conducted on the landward slope of the major trenches along the Pacific side of Japan such as the Japan Trench and the Nankai Trough where the large earthquakes have repeatedly occurred. To monitor crustal movements GNSS observations are also conducted in coastal areas and the Izu Islands.

k. Geospatial Information Authority of Japan Initiatives

(a) Observing Crustal Movements and Strengthening Monitoring Frameworks

Across the nation and the area under intensified measures against earthquake disaster, the monitoring of crustal movements is boosted by continuous GNSS observations through 1,300 GNSS-based control stations, GNSS surveying, and geodetic leveling.

(b) Research on Natural Disasters caused by Earthquakes

From the results of geodetic observation such as GNSS, SAR interferometry and geodetic leveling, the mechanics of earthquake occurrence is being elucidated and research is being conducted to improve observations and analysis. Also, national fundamental geospatial information and past disaster record as well as seismic intensity is combined and analyzed to research and develop method to promptly obtain and provide disaster information soon after disasters. Additionally, for the purpose of exchanging information on surveys, observations and research outcomes regarding earthquake prediction between relevant government organizations and universities as well as conduct academic deliberations based on this, and for research on crustal movements, the Coastal Movements Data Center, is being operated in order to gather, archive and provide tidal records observed by relevant government organizations.

l. Stranded Commuter Measures

If a large-scale earthquake occurs in a major city, urban functions will be paralyzed and more commuters will be stranded than the Great East Japan Earthquake, therefore to secure the safety of evacuees and stranded commuters in regions where urban functions are concentrated, the Urban Reconstruction Safety Protection Plan System was newly established in 2012. Across the nation, 62 regions are designated as urban reconstruction emergency development regions to create a urban reconstruction safety protection plan, conclude agreements on urban reconstruction safety protection facilities, and carry out deregulation for cooperation between the public and private sector for a system designed to improve the disaster prevention capabilities of urban areas. Also, in 2013, special taxation measures were created for storage warehouses and budgetary measures were expanded to facilitate refugees and stranded travelers in the vicinity of major stations.

m. Safety and Security Measures of the Underground Malls

Underground malls, serve as important public spaces within the city, but there are concerns that evacuees may get confused when a large-scale earthquake occurs along with the fact that facilities are aging, therefore, a guideline was created on safe evacuation measures for underground malls to promote disaster prevention measures for the safe evacuation of users and others.

Column

Amendment of the Act on Promotion of Seismic Retrofitting of Buildings (Seismic Retrofitting Promotion Law)

·To prevent the loss of human life and economic damage

In recent years, major earthquakes such as the Niigata Chuetsu-Oki earthquake of July 2007, the Iwate-Miyagi inland earthquake of June 2008, and the Great East Japan Earthquake of March 2011 have occurred and there is growing concern that Japan can experience another large-scale earthquake at any time or place. In addition, possible earthquakes such as the Tokai earthquake, Tonankai and Nankai earthquakes, and the Tokyo metropolitan epicentral earthquake are considered highly likely and once these occur, the destruction will be enormous.

The Central Disaster Prevention Council conducted an estimation of damages regarding large-scale earthquakes that are most likely to occur and is formulating an earthquake disaster prevention strategy to set goals for disaster reduction based on likely damages,etc.

For this disaster prevention strategy the earthquake-proofing of building is one of the most important issues to achieve disaster reduction goals, since it will for the most part halve the number of deaths and the monetary amount of economic losses, so it is positioned as an urgent top priority initiative. Therefore, to promote the earthquake resistance of buildings, the “Seismic Retrofitting Promotion Law” was amended and put into effect on November 25, 2013.

Great Hanshin-Awaji Earthquake (1995)

Source) MLIT

·Main Points of the Amendment

1 Mandatory Seismic Diagnosis and Publishing of Results

For structures built before 1978 based on the so-called old earthquake resistance standards, the owners of architectural structures. that are used by unspecified number of people such as hospitals, stores, and hotels/inns, or that are used by people requiring special considerations for evacuation such as schools, nursing homes, and other facilities. are required by law to conduct earthquake resistance diagnosis and report on the results and also make publicly available the reported earthquake resistance diagnosis results.

2 Promotion of Earthquake Resistance for All Buildings

For the owners of all buildings that do not meet current building standards laws and regulations are newly required to conduct earthquake resistance diagnosis and perform seismic retrofitting to the best of their ability.

3 Relaxing of Certification Standards for Seismic Retrofitting Plans and Exceptions Regarding Certification for Floor-Area Ratio and Building Coverage Ratio

The certification standards for seismic retrofitting plans were relaxed and the scope of renovation works that qualify for certification is no longer limited. Also, depending on the seismic retrofitting construction method used for renovation, there are cases in which the building in question may no longer meet floor-area ratio and building coverage ratio restrictions, therefore in such cases these are considered exceptions and within the scope authorized, a special measure was established to relax floor-area ratios and building coverage ratios.

4 Framework for the Display of Earthquake Resistance

For all buildings, if the building is earthquake resistant, a framework was established to allow for the display of such information in areas visible to users and in advertising if desired.

5 Designating the Need for Seismic Retrofitting of Sectionally Owned Buildings

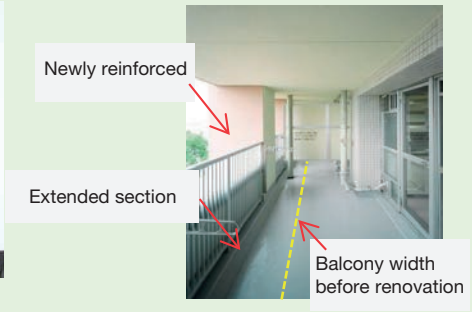
For sectionally owned buildings designated as requiring seismic retrofitting, the majority decision requirements to implement large-scale seismic

retrofitting was reduced from 3/4 to a simple majority like ordinary resolutions to carry out seismic retrofitting.

An example of a seismic retrofitting: External steel frame

Source) MLIT

An example of seismic retrofitting newly eligible for certification



Labeling system style

Building certified to conform with standards
In accordance with the provisions of Section 2 of Article 22 of the Act on Promotion of Seismic Retrofitting of Buildings, this building complies with relevant earthquake resistant rules or safety against earthquakes and is certified to be agreement with the standards defined by the Minister of Land, Infrastructure, Transport and Tourism.
Building Name
Building Position
Certification Number
Certification Date
Certified By

(9) Snow Damage Measures

a. Securing Winter Road Traffic (Snow and Winter Works)

In accordance with the "Act on Special Measures concerning Maintenance of Road Traffic in Specified Snow Coverage and Cold Districts", to support safe and comfortable living, strengthen exchanges and cooperation between regions, the "Five Year Plan to Secure Road Transport in Special Snow and Low Temperature Regions" was established in November 2013 by Cabinet decision along with the review of specification for the road within the area of snow coverage and cold, and the projects for removing snow, preventing snow, snow damage, and frost damage on roads (snow and winter works) are being promoted. In addition, the Hokuriku Snow Damage Measures Technology Center was established in July 2012 and is promoting research and development, human resources development, assistance to local governments, as well as providing information and raising public awareness related to snow damage measures across the country. Also, when large vehicles are stalled due to unusual snowfall, to prevent an additional flow of traffic from causing severe traffic congestion; traffic will be closed at an early stage in coordination with prefectural police and carry out concentrated snow removal to ensure traffic is restored quickly. Furthermore, unifying the sharing and dissemination of snow removal conditions and other information as well as improve the efficiency of snow removal, the establishment of information relaying headquarters by the relevant organizations of road administrators is being promoted.

b. Avalanche Disaster Measures in Heavy Snowfall Regions

Across the nation there are about 21,000 avalanche risk areas and to protect human lives from avalanche disasters in settlements, the development of avalanche prevention facilities is being promoted.

c. Implementing Snow Clearing Waterways Projects

In heavy snowfall regions, in addition to securing flood control functions, water conveyance channels are being developed for rivers with abundant water volume to supply small and medium-sized rivers flowing through the city with water for snow clearing waterways.

(10) Sophistication of Disaster Prevention Information

a. Aggregation of Disaster Prevention Information

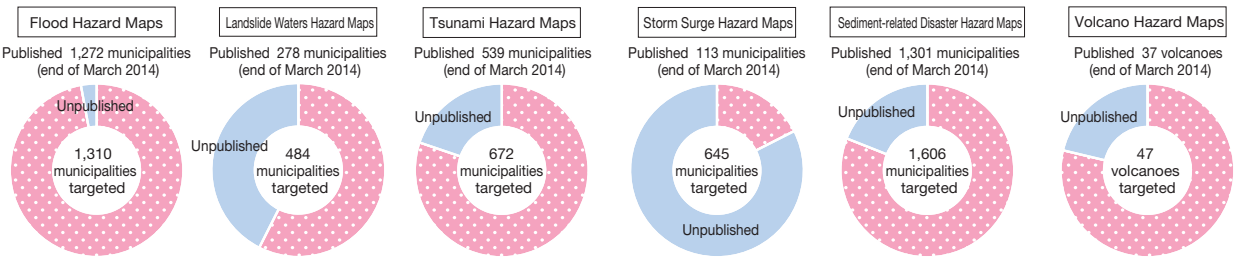
The "MLIT Disaster Prevent Information Center [Note] " enables citizens to easily obtain and utilize disaster prevention information by aggregating and providing information available such as rainfall as well as provide a comprehensive array of information on disaster responses and disaster prevention from a single source.

Note http://www.mlit.go.jp/saigai/bosaijoho/

b. Development of Hazard Maps

For residents to take appropriate evacuation actions when disasters occur, the creation and distribution of hazard maps by municipalities is being promoted to inform residents in advance of evacuation areas and evacuation paths in addition to creating an Internet portal site [Note] where various hazard maps from all over the country can be searched and browsed.

Figure II-7-2-10 Present Status of Hazard Map Development



Source) MLIT

c. Improvement of Disaster Prevention Weather Information

The Japan Meteorological Agency (JMA) issues warnings and advisories by municipality as well as provides distribution maps, which are named "nowcasts", indicating up to an hour forecast for extreme meteorological phenomena affecting a small area such as tornadoes, thunder, and heavy rains. These warnings, advisories and nowcasts are also available to mobile devices. In addition, for tornadoes and other gusts, Hazardous Wind Watch alert will be issued to call for caution.

On the other hand, in the heavy rain disaster in the Kii Peninsula caused by Typhoon Talas in 2011, JMA called for caution against great damages with Heavy Rain Warnings and other measures but there was no effective way to convey the acutely heightened danger due to sustained heavy rains reaching record levels and it did not lead to timely evacuation advisories and orders being given by municipality mayors or speedy evacuation actions by residents. For this reason, in May 2013 the "Meteorological Service Act" was amended and from August 30 of the same year, "Emergency Warnings" began operations. In September 16 of the same year, for the heavy rains in Fukui Prefecture, Shiga Prefecture, and Kyoto Prefecture due to Typhoon Man-yi, a Heavy Rain Emergency Warning was issued for the first time since beginning operations.

(11) Strengthening the Crisis Management System

In response to natural disasters, in addition to forecasting natural phenomena that could lead to disaster (Japan Meteorological Agency), conducting inspections and emergency rehabilitation of facilities during disasters (departments in charge of facility management), and rescue operations at sea (Japan Coast Guard), there are many places with established initial response systems such as the emergency assembly of staff and the establishment of disaster measure headquarters. But in light of the disaster response during the Great East Japan Earthquake, the crisis management system needs to be strengthened further. Additionally, using the equipment, manpower, expertise and other resources of MLIT and relevant organizations to support local governments stricken by disaster will be promoted more actively.

Note http://www1.gsi.go.jp/geowww/disapotal/index.html

a. Disaster Response by TEC-FORCE (Technical Emergency Control Force)

In order to respond to the occurrence or likelihood of large-scale natural disasters, the TEC-FORCE (Technical Emergency Control Force) was established in fiscal 2008 and is available for deployment to smoothly and rapidly implement technical support for the local government of the affected area to carry out various emergency disaster measures such as rapidly assessing the extent of the disaster, prevent or contain damages, and rapid recovery of affected areas. In fiscal 2013, approximately 1,600 members were dispatched to 41 prefectures and 113 municipalities for a total of 6,100 man-days in response to the Yamaguchi and Shimane heavy rains of July, Typhoon Man-yi in September, and the Oshima-machi landslides caused by Typhoon Wipha of October to implement assessments of damages immediately following occurrence as well as technical support including the minimization of further damages. Also, in fiscal 2013, the number of TEC-FORCE dispatches reached its highest number since inception.

Column

Responding to the Large-Scale Sediment-related Disaster in Oshima-Machi, Tokyo Metropolitan Area - Assistance and Strengthening of Sediment Disaster Measures by TEC-FORCE -

On October 16, 2013, Typhoon Wipha caused the greatest torrential rains in observed history in Izu-Oshima with 24-hour rainfall totaling 824 mm.

This torrential rain resulted in surface failure across a wide range in Oshima-Machi, Tokyo Metropolitan Area which upstream Ohkanazawa flows into and a large volume of sediment and driftwood went beyond the basin area and flowed into residential areas including the Motomachi Kandatsu district, causing great damage including 39 dead or missing persons and 111 partially or wholly damaged housing units.

The Ministry of Land, Infrastructure, Transport and Tourism immediately dispatched sediment-related disaster specialists and liaisons (frontline correspondents) to Oshima-Machi, Tokyo Metropolitan Area to gather information on damages to concentrate all efforts assessing the assistance needs of the city and disaster prevention helicopters belonging to the Kanto, Chubu and Kinki Regional Development Bureaus were used to aerially confirm large-scale sediment-related disasters and up to 84 persons/day from the Kanto, Hokuriku, Chubu and Kyushu Regional Development Bureaus' TEC-FORCE for a total of approximately 1,300 man-days were dispatched to the site.

Based on the disaster information gathered, the first TEC-FORCE team from the Ministry and the Kanto Regional Development Bureau were dispatched via Japan Self-Defense Forces transport aircraft on October 16th and on the 17th damage assessment surveys were conducted on site and on the 18th members of the Hokuriku, Chubu, and Kyushu Regional Development Bureau TEC-FORCE joined on site activities.

The mission carried out on site was to prevent secondary disasters from additional rainfall by swiftly implementing emergency inspections of risky areas that are vulnerable to sediment disasters that could affect human life and based on the results, to advise and provide information to Oshima-Machi, Tokyo Metropolitan Area as well as the Japan Self-Defense Forces, police, and firefighters searching for missing persons.

In particular, the emergency inspection of dangerous areas to relieve resident evacuation orders after the passing of Typhoon Francisco, activities involved extremely dangerous field conditions involving inspections by foot of mountain streams immediately after rainfall in danger of debris flow. As a result, since there were no major changes to conditions before rainfall, these inspection results were reported to the city and relevant agencies conducting search operations and was used to make decisions regarding the relieving of evacuation orders and resuming search operations.

In addition, for search operations lighting cars belonging to the Ministry of Land, Infrastructure, Transport and Tourism were used to assist the carrying out of night tasks.

Also, surveillance cameras were installed in five areas to monitor areas at risk of sediment flows to develop and establish sediment flow monitoring framework and the images were broadcast to the Tokyo Metropolitan Area, Oshima-Machi, and Cabinet Office via satellite and also technical

assistance was provided to Tokyo Metropolitan Area for the establishment of mud flow monitoring system using wire sensors.

In consideration of the fact that this disaster and the sediment disaster northern Kyushu in July 2012 claimed many victims in areas not thought to be at great risk of sediment disasters, a "Sediment Disaster Measure Improvement Study Committee" consisting of academics and experts was held to further comprehensive investigations into hard and soft measures against sediment disasters.

Night lighting support by lighting cars

Advising the Mayor of Oshima-Machi based on the inspection

The disaster mechanism in Izu Oshima-Machi, Tokyo Metropolitan Area

Source) MLIT

Installation of surveillance cameras at the affected site

b. Improving Business Continuity Abilities

Following the ratification of the government-wide operational continuity plan (government operation continuity plan), previous undertakings of the Ministry of Land, Infrastructure, Transport and Tourism Operational Continuity Plan (Second Edition) were followed up to create the Ministry of Land, Infrastructure, Transport and Tourism Operational Continuity Plan (Third Edition) on April 1, 2014. Also, the operational continuity framework is being strengthened through such measures as the stockpiling of supplies and securing support systems from other regions without awaiting orders from ministry headquarters (immediate dispatch of TEC-FORCE).

c. Deployment of Information Communication Systems and Equipment in Preparation for Disasters

To secure information communication systems in the event of a disaster, MLIT headquarters, local branch offices, and related organizations are connected with a highly reliable information communication network consisting of microwave networks and optical fibers, in addition to satellite communication channels to strengthen the system for gathering information from the disaster site, are used to create a high mobility system. Also, to rapidly respond to disasters, the deployment of disaster prevention helicopters, satellite communication vehicles, drainage pump vehicles, illumination vehicles, and other disaster response machinery is being expanded at regional development bureaus and local offices across the nation, so that in the event of a large-scale disaster, the framework will be able to execute rapid deployment.

d. Implementing Practical and Wide-Area Disaster Prevention Training

Assuming the worst-case scenario that can occur, realistic training was actively carried out including coordination with relevant organizations and dispatching the TEC-FORCE from Regional Development Bureaus. Also, more realistic and participatory water disaster prevention training and other exercise were carried out with more participation from regional residents, businesses, NPOs, and others as well as evacuation training using the hazard map.

Additionally, the Great East Japan Earthquake reaffirmed the importance of coordination between relevant organizations during large-scale disasters, therefore efforts to improve and strengthen a wide-area disaster prevention framework in preparation of massive earthquakes and other large-scale disasters through the implementation of various joint exercises between multiple organizations centered around regional offices and bureaus including designated local government agencies, fire fighting organizations, and the Japan Self-Defense Force is being promoted to promote initiatives to enhance and strengthen wide-area disaster prevention readiness in preparation for large-scale disasters such as great earthquakes.

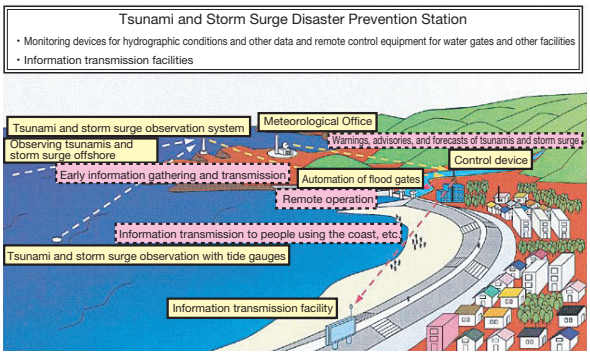
e. Preparing for Initial Response at Sea

The Japan Coast Guard deploys patrol vessels, crafts and aircrafts around the clock to allow for rapid responses in the event of a disaster. Also, In accordance with the scale of the disaster a countermeasure headquarters is established to implement damage assessment surveys and rescue operations through patrol vessels, crafts and aircrafts for an immediate and appropriate response.

(12) Management of Existing Stock with ICT (Information and Communications Technology)

An optical fiber network is being set up to enable the management of public facilities and sophistication of crisis management by taking advantage of ICT (Information and Communications Technology). Specifically, measures are being promoted for safe road use such as sophisticated management using optical fiber for continuous monitoring of the road slope and providing disaster information through the Internet. Also, in addition to remote control of floodgates and the remote monitoring of river flow conditions and volcanic regions, sewage treatment plants and pump stations are connected with optical fibers for remote monitoring and control as well to make management more sophisticated.

Figure II-7-2-11 Illustration of a Tsunami and Storm Surge Disaster Prevention Station



Source) MLIT

In addition, to speed up and consolidate the control of floodgates and other facilities, the development of tsunami and storm surge disaster prevention centers to prevent damages from tsunami and storm surge is being supported through social infrastructure improvement general grants and other means.

(13) Disaster Recovery of Public Works Facilities

In 2013, damages to public works facilities under the authority of MLIT (rivers, roads, coast, sewage, etc.) came to roughly 219.7 billion yen (15,197 cases) of reported damages due to many domestic large-scale disasters such as the heavy rains of July and August, mainly in Yamaguchi and Shimane Prefectures, as well as Typhoon Man-yi and Wipha.

Regarding these natural disaster damages, TEC-FORCE and others were deployed immediately after the disaster and swiftly carried out restoration and reconstruction as well as provide technical advice to prevent secondary disasters.

Also, for municipalities in which damages were concentrated in particular, the general price unit of spending limits for disaster assessments were expanded from less than 10 million yen to less than 50 million yen and for assessments involving only desk work, the monetary limit for assessments was raised from the usual less than 3 million yen to less than 10 million yen to simplify assessments and greatly reduce the administrative paperwork leading to project adoption in the interest of facilitating rapid disaster recovery to support early recovery.

Furthermore, the districts (30 cases) affected by natural disasters such as heavy rainfall caused by Typhoon Man-yi and rainy season; strong winds, heavy snow, and waves from low atmospheric pressure; as well as slope collapses and snow

melts were paid from emergency project promotion grants for disaster measures to ensure the safety and comfort of residents and urgently implemented measures to prevent a recurrence of disasters.

(14) Promoting Soft Measures Including Information and Public Relations for Safety and Comfort

To ensure safety and comfort, soft measures were promoted in addition to hard measures for natural disasters and the status of progress was subject to annual inspections in accordance with the "MLIT General Framework of Soft Measures Promotion for Safety and Comfort", however, the Great East Japan Earthquake brought to light the need for congruent and integrated evaluations of hard and soft aspects and currently deliberations are in progress following the re-evaluation of the Social Capital Improvement Priority Plan/MLIT Disaster Prevention Operation Plan.

2 Secure Transportation Systems Resistant to Disasters

(1) Ensuring Redundancy and Substitutability

Rail, ports, airports and other facilities are being made disaster resistant in addition to establishing an emergency transport framework for rescue and restoration activities ensures redundancy and substitutability in efforts to minimize the impact to domestic transport activities in the event of a disaster and secure the safety of users.

The road network functions as emergency transport roads during disasters to facilitate early relief, fulfilling its function as a "lifeline".

(2) Road Disaster Prevention Measures

To ensure a safe and highly reliable road network against disasters such as heavy rainfall, earthquakes, tsunamis, and heavy snowfall, disaster measures (measures for slopes, embankments, etc.), earthquake disaster measures (seismic reinforcement, etc.), and snowy/cold region measures (development of anti-snow facilities) are being promoted as well as supplementing traffic facilities with disaster prevention functions (turning Michi-no-Eki, service areas, and parking areas into disaster prevention bases as well as developing emergency lines of communication and escape stairs) and in June 2013 the Road Law, etc., was amended to promote the conclusion of disaster alliances with private sector businesses to implement swift road re-openings and establishment of a council for road administrators to create a framework that keeps roads open. In addition, for large-scale disasters, the actual travel data (big data) of public and privately owned vehicles was used to promote initiatives for rapid and accurate assessments and evaluations are underway for a framework to provide disaster information.

Additionally, for regions that sustained devastating damages from the tsunami caused by the Great East Japan Earthquake, road development is being carried out as part of urban area development prioritized in the recovery plan and the development of access roads to expressway interchanges is being promoted. Also, as one measure to reduce tsunami damages, sea level indicator sheets are being added to road sign posts to promote the provision of information on location's height above the sea level for road users.

(3) Disaster Prevention Measures for Various Transportation Modes

For railways, subsidies are provided to partially cover the costs of improvement projects such as disaster prevention projects carried out by passenger rail companies including rockfall and avalanche measures as well as coastal protection and improvement projects carried out by Japan Railway Construction, Transport and Technology Agency (Incorporated Administrative Agency) to maintain the function of the Seikan Tunnel such as the improvement of substations and train control facilities.

For ports, in order to maintain essential regional economic activities during disasters achieve an early restoration of facilities affected by disasters, Wide Area Port Disaster Councils and others are established for the national government, port authority, port users, and others to work together to promote the establishment of a cooperative framework to maintain port functions and facilitate rapid recovery following disasters through wide area coordination of the ports.

For airports, in addition to serving as the base of emergency transport when earthquakes and other disasters occur, airports considered important from the perspective of maintaining air transport to maintain the aviation network and ensure the continuity of hinterland economic activity, seismic strengthening is being carried out for government facilities critical to ensure necessary control functions as well as basic facilities that are absolutely essential. Also, in preparation for a large-scale tsunami disaster due to great earthquakes along the Nankai Trough, tsunami evacuation plans were created for major airports at risk of being affected by tsunami disasters to stipulate evacuation procedures for airport users in the event of a tsunami. In addition, a plan was formulated for rapid recovery of airport functions following a tsunami disaster and initiatives to establish a cooperative framework with relevant organizations based on the plan will be promoted.

(4) Building a Logistics System Resistant to Disaster

The Great East Japan Earthquake highlighted the importance of utilizing the expertise and facilities of private sector logistics companies from the perspective of ensuring the smooth transport of relief supplies. In light of this lesson, the establishment of a logistics system that is resistant to disasters through the coordination of central government, local government, and logistics companies was evaluated and private logistics facilities that could be used as a base for supplies in the event of an earthquake were listed up (1169 locations nationwide, as of March 14, 2014) and for applicable facilities, support was given to implement emergency power supply, communication, and other facilities to promote the establishment of a cooperative framework for coordination between the public and private sectors across the nation.

Section 3 Ensuring the Safety of Architecture

(1) Securing Trust for the Production and Supply System for Housing and Buildings

After the amended "Building Standards Law" went into effect in 2007, the building confirmation process became backlogged, leading to a large decrease in the number of building confirmations; therefore, in light of this, the operation of building confirmation procedures was improved on two occasions in 2010 and 2011 to speed up the building confirmation review and simplify the application documentation among other improvements.

In August 2012, the Minister of Land, Infrastructure, Transport and Tourism consulted the Panel on Infrastructure Development regarding the "ideal for future standards policies" and in September of the same year, the Building Standards Sub commission under the Building Subcommittee of the Panel is conducting a review, giving priority to categories that are most requested for review. Of this, regarding the scheme for promoting the seismic resistance of housing and buildings, the first findings were compiled in February 2013 and based on this the revised "Law for Partial Amendments to the Act for Promotion of Renovation for Earthquake-Resistant Structures of Buildings" was enacted in November 2013.

Also, regarding the "ideal standards regarding wood structures" and "ideal efficient and practically implementable confirmation inspection regulations" the second report was compiled in February 2014. In accordance with this, the "Law for a Partial Revision to the Building Standards Law" was enacted May 2014.

For measures concerning kenchikushi, in accordance with the "The Kenchikushi Law" amended in 2008, initiatives are being taken toward the course material and encouraging completion for the periodic training made mandatory for registered kenchikushi.

Additionally, when defects are discovered in new houses the defect warranty will be reliably fulfilled so that consumers can purchase housing with peace of mind and in accordance with the "Act on Assurance of Performance of Specified Housing Defect Warranty (Housing Defect Warranty Performance Act)", requiring construction companies and real estate transaction agents to secure funds (house defect warranty security deposit or a valid housing defect warranty liability insurance contract), the insurance underwriting system of housing defect warranty liability insurance entities will continue to be improved and initiatives to raise awareness among consumers and other measures to publicize the system are being carried out.

(2) Ensuring the Safety of Elevators and Play Facilities

To ensure the safety of conveyors (elevators and escalators) and play facilities, investigation into accident causes will continue to be done and the views of the "Interim report of the unintended car movement accident in Ishikawa Prefecture" will be incorporated into the initiatives promoted to prevent a recurrence of similar accidents. Additionally, local

government and regional development bureau officials were given training to conduct accident investigations of elevators and play facilities for the development of staff.

Section 4 Strengthening Safety Measures in the Transport Sector

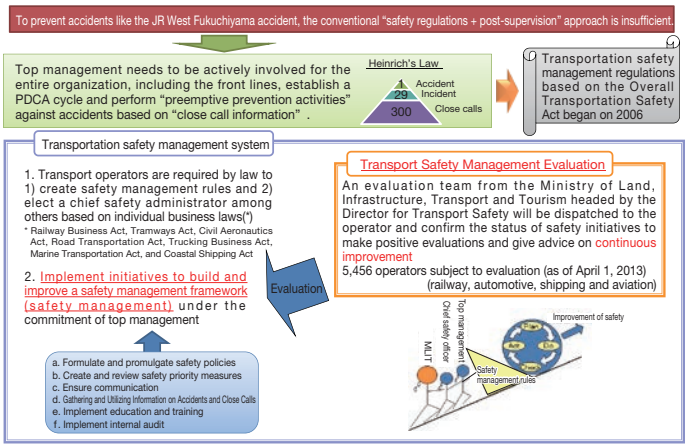
Ensuring safety is a central and fundamental issue in the transport sector and once an accident occurs not only can it cause significant damages but also has an enormous impact on society so various measures are being undertaken to prevent accidents from occurring.

1 Establishing and Improving the Safety Management System of Public Transportation

The "Transport Safety Management System", instituted in October 2006 when public transportation accidents and troubles due to human errors began to occur frequently, makes it mandatory for the transportation organization to create and submit a "safety management policy" as well as elect and register the "general safety manager" in addition to top management taking an active leadership role to guide the frontline to work together in establishing and strengthening the safety management system and these efforts will be assessed by national government so that the safety management system can be continuously improved under a PDCA (Plan, Do, Check, Act) cycle.

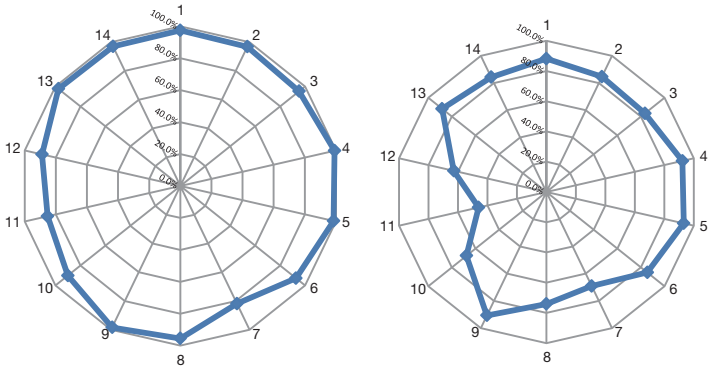
From October 2012 to the end of September 2013, transportation safety management evaluations were conducted for a total of 510 companies (103 rail companies, 90 car companies, 299 shipping companies, and 18 airlines). In light of these results, there is a great disparity between major operators and other operators in the status of implementation regarding these regulations. For this reason, a consistent policy across all modes include: 1) implement a sharper evaluation that prioritizes areas thought to have a greater effect, 2) implement evaluation that is more sophisticated and emphasizes implementable and effective initiatives by the operator for large and medium-sized operators, and 3) for small to medium-sized operators, prioritize initiatives that further promote and raise awareness of regulations including the use of public-private partnerships.

Figure II-7-4-1 Illustration of the Transport Safety Management System



Source) MLIT

Figure II-7-4-2 Differences in Implementation by Large-Scale Operators Other Operators (Fiscal 2012)



Fiscal 2012 Sufficiency rate for initiatives in all sectors (major operators)

Fiscal 2012 Sufficiency rate for initiatives in all sectors (other operators)

(Note) One through 14 on the radar chart correspond to the item reference numbers in the "Guidelines for Transport Operators to Conduct Safety Management - For the Further Improvement of Transport Safety" formulated and published March 2010 and indicate the rate of sufficiency for the implementation of each item.

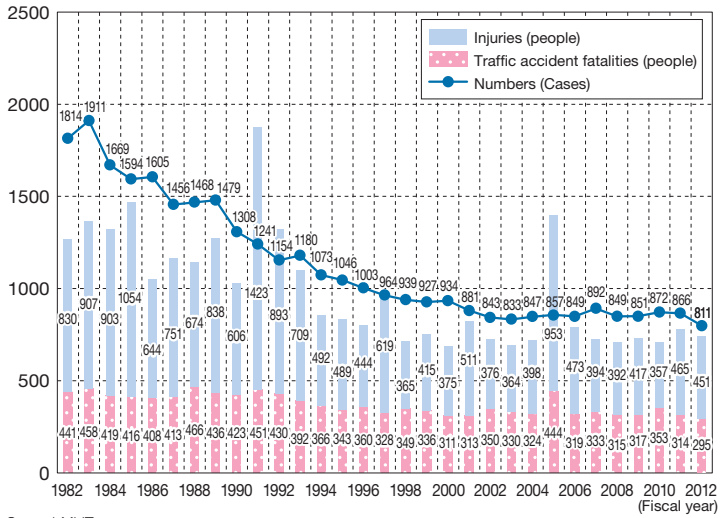
Source) MLIT

Specifically, as part of the "safety and security recovery plan for expressway and chartered buses" created in April 2013 following the Kanetsu Expressway highway tour bus accident, in October 2013, the scope of mandatory transportation safety management implementation was expanded from operators of a given scale (fleets of over 200 vehicles) to all chartered bus operators and others (approximately 4,500) and effective evaluations will be implemented toward operators newly requiring evaluations. Also, in July 2013, a framework for the Ministry of Land, Infrastructure, Transport and Tourism to certify seminars hosted by the private sector was established and efforts are being made to spread and solidify the operators' awareness of regulations by utilizing private sector resourcefulness and expertise.

2 Railway Transportation Safety Measures

Driving accident numbers for railway traffic show a declining trend over the long term [Note] due to such factors as the promotion of driving assistance facilities including automatic train stop systems (ATS) and rail crossing measures but the trend is plateauing in recent years, requiring the promotion of further safety measures.

Figure II-7-4-3 Railway Traffic Operating Accidents and Casualty Trends



Source) MLIT

(1) Improving Railway Safety

In light of past accidents, measures such as creating necessary standards will be implemented and direction will be given to railway operators to ensure implementation as well as confirm the status of implementation for safety audits, give feedback on audit results for further implementation of measures to improve the safety of railways.

a. Measures from the JR West Fukuchiyama Line Derailing Accident

The "Ministerial Ordinance to Provide the Technical Standard on Railway" was revised to make the installation of Automatic Train Stop (ATS) devices with functions to limit speed on curbs, driver anomaly detection and train stopping devices, and driving condition recording devices mandatory.

b. Measures from the JR East Uetsu Line Derailment

A "Railway Wind Measures Council" was convened to consider both soft and hard measures for strong winds and in addition to installing additional wind gauges, the wind observation system for railways was strengthened along with other measures.

c. Measures to Ensure the Safety of JR Hokkaido from the JR Freight Hakodate Line Train Derailment

See the column for more information.

Note For years such as the fiscal year of 2005 when the JR West Fukuchiyama Line derailing accident occurred, where an operation accident caused great human losses, the number of casualties is high.

Column Ensuring the Safety of JR Hokkaido

In September 2013, a freight train belonging to JR Freight was derailed within the premises of Onuma station of the JR Hokkaido Hakodate line.

As a result of this accident, it was discovered that JR Hokkaido had neglected track displacements that exceeded maintenance level values not only at the site of the derailment accident but in many other sites and additionally tried to doctor inspection data, which is completely unacceptable behavior for a railway operator.

The Ministry of Land, Infrastructure, Transport and Tourism performed three special safety inspections that were in part unannounced and with no set end dates, which is unheard of, for the purpose of finding out all the problems with JR Hokkaido from including not only the usual technical areas of civil engineering, carriages, and operation but also the management structure.

As for the result of these special safety inspections, to take comprehensive and drastic measures, it was compiled as the "Measures Required by JR Hokkaido to Ensure Safety -Revamping JR Hokkaido-" and published in January 2014. An order to improve business was ordered to JR Hokkaido based on the "Railway Business Act" and a supervision order based on the "JR Companies Act" and to ensure its execution a constant audit framework was put in place from January 2014 for a period of around five years.

The railways operated by JR Hokkaido serve as a core transport system that supports the lives and economy of Hokkaido and because there are no immediate alternatives, JR Hokkaido must not only ensure the day-to-day safety of transport but also surely implement comprehensive and fundamental measures by revamping JR Hokkaido.

(2) Promotion of Railway Crossing Measures

"Gridlocked rail crossings [Note]", mainly seen in urban areas, cause crossing accidents and chronic traffic congestion requiring immediate measures. For this reason, in accordance with the "Act on Promotion of Railway Crossings" and the "9th Fundamental Traffic Safety Program", the development of grade separations, structural improvements, and pedestrian bridges as well as improvements of crossing safety facilities for crossing gates are being used to prevent crossing accidents.

In FY2013, based on the "Act on Promotion of Railway Crossings", 7 crossings that need grade separations, 25 crossings that need structural improvements such as widening, and 50 crossings requiring safety facilities were designated. Furthermore, fast-acting measures such as widening of pedestrian paths and radical measures such as the removal of crossings through grade separation were promoted.

(3) Promoting the Development of Platform Doors

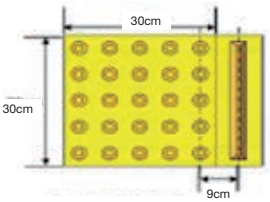
To improve the safety of the visually impaired and other rail station users, the installation of platform doors to prevent falling from the platform is being promoted (installed at 583 stations as of the end of fiscal year 2013). Based on the "Basic Policy to Promote Smoothness of Transport etc." (March 2011) and the "Priority Plan for Social Infrastructure Development" (August 2012), hard measures such as the promoting the development of platform doors and tactile pavings with boundary lines as well as technology development for platform doors with better carriage door alignment and soft measures are being promoted such as "friendly manners campaign" calling on rail users to offer assistance to those such as the visually impaired.

Note Railway crossings that are closed for more than 40 minutes/hour during hours when the train frequency is high.

Platform Door

Source) MLIT

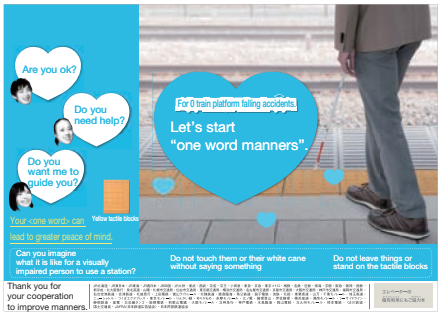
Tactile Paving with Boundary Lines



·25 truncated domes (5 x 5)
·Line shaped protrusion indicating the inside of the platform (boundary line)

Source) MLIT

Friendly Manners Campaign



Source) MLIT

3 Safety Measures for Maritime Traffic

In the waters around Japan, around 2,500 vessels are involved in ship accidents every year. Once a ship accident occurs, not only are precious lives and property lost but Japan's economic activities and marine environment may be adversely affected in a major way requiring the promotion of further safety measures.

(1) Improving Ship Safety and Ensuring Ship Navigation Safety

a. Improving Ship Safety

Regarding ship safety, the International Maritime Organization (IMO) is central in stipulating international standards and in addition to actively participating in IMO discussions, in December 2013, the installation of stability computers was made mandatory in accordance with the amendment of the SOLAS Convention [Note 1] and domestic laws were also revised.

Regarding the breakage accident of the Bahamas-flagged large container ship, MOL COMFORT, that occurred in the Indian Ocean, a committee was convened in June 2013 to evaluate safety measures for large container ships. In December, an interim report was prepared and published on the details of safety measures to be taken for the time being.

Also, to eliminate substandard ships [Note 2], Port State Control (PSC) [Note 3] is being implemented.

b. Ensuring Ship Navigation Safety

In accordance with the "Act on Ships' Officers and Boats' Operators" which complies with the STCW Convention [Note 4], the qualifications for ship personnel are defined to ensure ship navigation safety from human factors. In June 2010, the revised STCW Convention (Manila Amendments) with amendments stipulating additional competencies that ship personnel must possess was adopted and domestic laws are under revision for April 2014. Also, for the pilotage system, qualifications for people who can perform pilotage are defined for the safety of vessel traffic but finding successors is turning out to be challenging, therefore, securing a stable supply of human resources and the provision of necessary incubation training are being promoted.

Investigation and inquiry, in accordance with the "Act on Marine Accident Inquiry", are conducted for a marine technician, a small craft operator, or a pilot who causes a marine accident intentionally or negligently in the course of duties and in 2013 there were 310 cases of determinations and a total of 402 marine technicians, small craft operators, or pilots were performed disciplinary actions of suspension of business operation (one to two months) or admonition to prevent the occurrence of marine accidents.

Note 1 International Convention for the Safety of Life at Sea, 1974.
Note 2 Ships not compliant with the standards of international conventions.
Note 3 The oversight of foreign ships by the port of call.
Note 4 The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978. The international convention stipulates the training and certification of mariners for the purpose of improving the safety of human lives and assets at sea and also promote the protection of the marine environment.

For maritime accident prevention measures, initiatives such as Maritime Information and Communication System (MICS) and lighted buoys to serve as a platform for the meteorological information system to provide information, the hosting of intergovernmental maritime accident prevention liaison committees for the purpose of facilitating effective coordination of maritime accident prevention measures, and the promotion of the "National Campaign for Preventing Marine Casualties" among other activities through the coordination of relevant authorities and others.

In October 2013, the Council of Traffic Policy Maritime Subcommittee compiled the "Initiatives for the Safety of Maritime Traffic (Report)" which outlined the direction of maritime traffic safety policy along with specific measures. This report sets out to achieve the safe and smooth evacuation of vessels as well as drastic minimization of damages in the occurrence of large-scale disasters and the centralization of traffic control operations in Tokyo Bay to relieve vessel waiting times for traffic control signals and relieve congestion during peace times.

In addition, to improve the safety and efficiency of operations of transiting vessels in narrow waters, in the Kurushima Strait, accurate tide observations are being performed to establish an information provision system for tide information using area-wide simulation.

Also, electronic nautical charts are being further improved talking it to account that certain types of vessels are being obliged to deploy the Electronic Chart Display and Information System (ECDIS) on board. Aand nautical charts described only by English are published to prevent marine accidents by the ships operated by foreign crew. Revision of nautical charts in the major 15 ports affected by the Great East Japan Earthquake is still in progress.

For Aids to Navigation (AtoN), development is performed effectively and efficiently in accordance with the vessel traffic environment as well as needs and in fiscal 2013, improvements and renovation was carried out in 233 locations.

Also, of the 158 AtoN that were affected by the Great East Japan Earthquake, the remaining 41 AtoN (as of March 2014) awaiting restoration, these will be restored in time as the ports and breakwaters are restored.

The "Marine Accident Analysis Center" established under the National Maritime Research Institute (Incorporated Administrative Agency) conducts highly specialized analysis of accidents as well as rapid analysis and sharing of information when major marine accidents occur.

Regarding the Straits of Malacca and Singapore, vital and extremely important sea transport lanes where 80% of Japan's imported crude oil transits through, the Government of Japan has cooperated with the littoral states of the straits for the projects under the "Cooperative Mechanism" Note 1, as well as the Japanese business industry and the Nippon Foundation, a public interest incorporated foundation, have been providing contributions to the Aids to Navigation Fund Note 2. At the 6th Co-operation Forum under the mechanism held in October 2013, Japan explained the important role of the straits and Japan's contributions for the safety of navigation in the straits, and appealed user states and other stakeholders for more contributions to the Fund with aim of staple and reliable management of the Fund. Japan, as a major user state of these straits, continues to contribute actively for the navigation safety in the straits through public and private sector utilizing the knowledge and experience obtained from cooperation and friendly relations with the littoral states as a sole cooperating country before the establishment of the Cooperative Mechanism.

Note 1 An instrument which realizes the spirit of Article 43 of the United Nations Convention on the Law of the Sea that describes the cooperation between User States and States bordering State of a strait for the first time in the world. The Cooperative Mechanism consists of the three bodies; Co-operation Forum, Project Co-ordination Committee, and the Aids to Navigation Fund.

Note 2 A fund to cover the costs of maintenance and replacement of navigational aid facilities such as lighthouse, light beacon and buoy used in the Straits of Malacca and Singapore.

Column

The Third Traffic Vision - Initiatives for the Safety of Vessel Traffic -

In the waters around Japan, around 2,500 vessels are involved in ship accidents every year. Once a ship accident occurs, not only are precious lives and property lost but Japan's economic activities and marine environment may be adversely affected in a major way requiring the promotion of further safety measures. In October 2013, the Council of Traffic Policy Maritime Subcommittee compiled the "Initiatives for the Safety of Maritime Traffic (Report)" which outlined the direction of maritime traffic safety policy along with specific measures (7 issues and 3 goals) over the next five years.

The Japan Coast Guard positions this report as the "Third Traffic Vision" and will promote measures to achieve the goals.

The Seven Issues

(1) Safety measures for congested waters[Note 1]
(2) Safety measures for semi-congested waters[Note 2]
(3) Efficiency and safety of vessel traffic inside the harbor
(4) Safety measures for small boats
(5) Policy for the maintenance and management of Aids to Navigation (AtoN)
(6) Safety measures for vessel traffic in the event of a large-scale disaster
(7) Strategic technology development

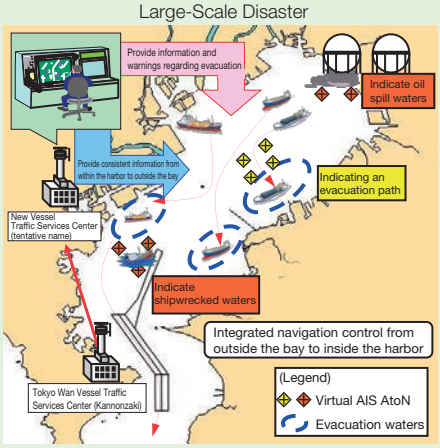
The Three Goals

(1) Maintain a low occurrence rate for collision and running aground accidents in congested waters
(2) Reduce the number of collision and running aground accidents within harbors, etc.
(3) Reduce the number of small boat accidents

Additionally, by promoting various initiatives comprehensively through coordination with relevant agencies, in the long-term, the aim is to reduce the current number of vessel accident numbers in half by the 2020s.

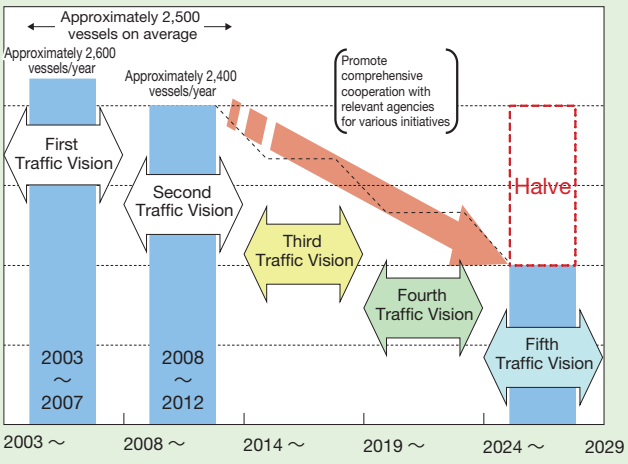
Also, Maritime Traffic Safety Sub commission was established within Council of Traffic Policy Maritime Subcommittee to meet around once every year to confirm the implementation status of the measures in the Third Traffic Vision and continue with deliberations on the approach for measures of the next fiscal year, drafting of the next traffic vision, and the way forward for Maritime traffic safety measures from a long-term point of view.

Illustration of Maritime Traffic Safety Measures in the Event of a Large-Scale Disaster



(Note) Virtual AIS AtoN emit signals from AIS land stations in the vicinity to display AtoN virtually that do not exist physically
Source) Japan Coast Guard

Long-term goals



Note 1 Tokyo Bay, Ise Bay, Seto Inland Sea, and Kanmonkou Bay (waters where the Act on Maritime Traffic Safety Act or the Act on Port Regulations are applicable).

Note 2 Waters that lead to Seto Inland Sea that connect congested sea areas through each of the waters of the mouth of Tokyo Bay, Irouzaki offing, the mouth of Ise Bay, Shionomisaki offing, Murotomisaki offing, and Ashizuri offing.

(2) Promoting Safety Measures for Ship Passengers

Around 50% of the fatalities and missing persons from accidents involving ship passengers is due to falling into sea. In order to survive a fall, it is essential that they are floating at sea and a request for rescue is made immediately. For this reason the Japan Coast Guard is spreading the message and raising awareness for wearing life jackets at all times, securing appropriate communication measures such as having cell phones in waterproof packs, and effectively using the emergency telephone hotline to the Japan Coast Guard, "118" as the three basic self-rescue measures. Also, for small crafts (fishing boats, recreational boats, etc.), the fatality rate of those that do not wear life jackets that fall into the sea is four times higher than those that wear life jackets; wearing a life jacket is a major factor in surviving a fall into sea. For this reason, in addition to support for LGL [Note 1] and designating model marinas for promoting life jacket wearing [Note 2], wearing a life jacket is promoted year round through coordination with relevant ministries and local government.

(3) Strengthening the Rescue System

In order for the Japan Coast Guard to carry out swift and appropriate rescue, distress frequencies are monitored around the clock and an emergency telephone hotline, "118" is made available to quickly catch information regarding incidents at sea. Also, along with improving the rescue technology and capabilities of those such as Special Rescue Team, mobile rescue technicians, and divers, enhancements and fortifications of the medical control framework to ensure the quality of emergency life-saving treatment that emergency response personnel perform as well as advancing the functionality of patrol boats and aircraft is being carried out as part of efforts to enhance and fortify the rescue and emergency system. Also, the enhancement and fortification of coordination between ministries, agencies, local governments, and private rescue organizations is also being carried out.

4 Air Traffic Safety Measures

(1) Strengthening Aviation Safety Measures

a. State Safety Program (SSP)

To ensure the effectiveness of the SSP to be introduced beginning April 2014, following the creation of the fiscal year plan which will include the establishment of indicators (safety performance indicators) and targets (safety performance targets) to be used for the quantitative measurement of aviation safety, the collection and analysis of safety information and its sharing with stakeholders of various fields along with inspections and other measures to service providers will be implemented in conjunction with activities to improve the safety of aviation. In the future, the series of activities themselves will be continuously reviewed as part of a PDCA cycle to improve the quality.

For service providers and others, with regard to events associated with certain violations (excluding aircraft accident, etc.), by allowing the internal implementation of improvement measures following dialogue (if the service provider and others can demonstrate appropriate remedial measures and actions through this dialogue, adverse dispositions will not be levied), it will support service providers in the establishment of safety management systems (SMS).

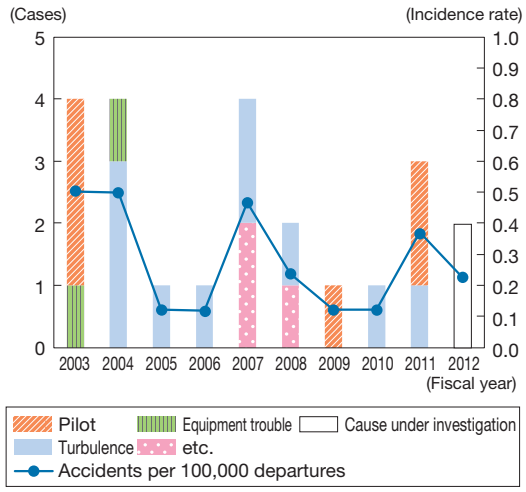
Note 1 Local activities to promote the wearing of life jackets by the family of fishermen and others. Stands for Life Guard Ladies (female wearing promotion staff).

Note 2 Marinas and fishermen's cooperatives that are actively taking the initiative to promote the wearing of life jackets at all times. Designated as centers for raising safety awareness and promoting life jacket wearing in the region.

b. Air Transport Safety Measures

Although there are no fatal accidents since 1986 among specified domestic air carriers [Note], to appropriately respond to safety troubles, the safety management system of airlines and others will be improved, preventative safety measures will be promoted, and preliminary audits and strict site inspections, including unannounced visits, for domestic airlines newly entering the market or expanding business along with other measures to appropriately improve systematic monitoring. Also, in accordance with the increased entrance of foreign airlines following the promotion of the open sky policy, monitoring of foreign airlines entering Japan were strengthened with site inspections and other measures.

Figure II-7-4-4 Incidence and Frequency of Accidents on Domestic Airlines



(Note) The number of accidents are values from designated domestic air carriers
Source) MLIT

c. Certification of Domestic Jetliners

For the domestically produced passenger jet project under development, as the national government of design and manufacturing, certification is under way concerning compliance with safety and environmental standards. To implement certification more appropriately and smoothly, the establishment and expansion of the certification organization, along with close coordination with the aviation authorities of the United States and Europe, are being carried out.

d. Action taken for Boeing 787 Battery Trouble Measures

Battery trouble occurred on Boeing 787 in January 2013, causing a suspension of flights lasting several months. For this case, close coordination with aviation stakeholders involved including those of the United States and other relevant countries was carried out. Based on the consideration of the potential causes and preventative measures, the airlines were requested to make a proper disclosure of safety information to users in addition to battery improvements to ensure safety and peace of mind before revenue flights were resumed in May of 2013. Afterwards, a similar trouble occurred with a 787 model that was parked in January 2014. However, the scope of damages and other impacts was limited and it was an event that would not interrupt the safe operations if it occurred during the flight. Close coordination with stakeholders will continue to be pursued.

(2) Developing Air Traffic Systems for Aviation Safety

Since the majority of serious incidents concerning air traffic services originates from human error, measures to prevent human error such as miscommunication between controllers and pilots and installation of visual display and transmission systems for controllers and pilots are being promoted.

Since the demand for operation of small aircraft such as helicopters is increasing for various kinds of missions including disaster response and medical transportation, developments of low altitude routes and departure/landing/approach procedures are being evaluated.

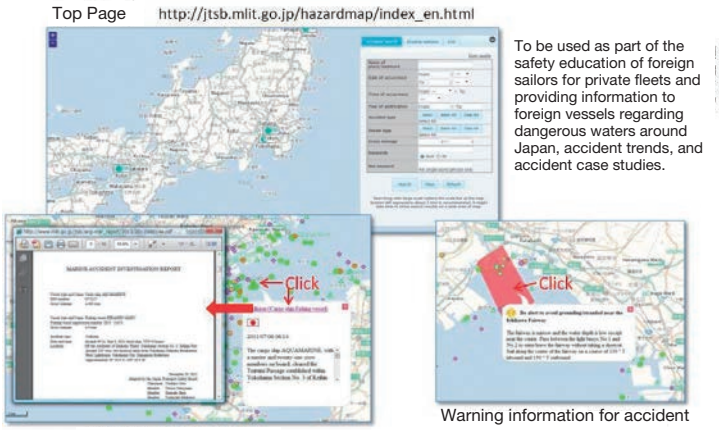
Note Domestic air carriers that operate air transport businesses that use aircraft with 100 or more passenger seats or with a maximum takeoff weight of more than 50,000 kilograms.

5 Determining the Causes of Air, Rail, and Marine Accidents/ Serious Incidents and Preventing Recurrence

The Japan Transport Safety Board began operations of the Japan-Marine Accident Risk and Safety Information System (J-MARISIS) from September 2013 for foreign sailors, in light of the fact that most Japanese merchant marine fleets are operated by foreign sailors and also numerous accidents involving foreign flag vessels in Japanese coastal waters in recent years (in the future, a global version showing ship accidents around the world is planned for operation).

With regard to accidents/serious incidents investigations, 23 investigation reports of aircraft accidents/serious incidents were published, and of this, regarding the accident that occurred in July 2011 in Hokkaido where the aircraft crashed into the mountainside during basic instrument flight training resulting in three fatalities and one serious injury, a recommendation was made to the Minister of Land, Infrastructure, Transport and Tourism that until those involved in the causes can autonomously and surely operate the safety management system on their own, the status of measures regarding the safety management situation need to be accurately assessed and supervised among other measures as an example of the four recommendations and three safety recommendations for aircraft accidents/serious incidents.

Japan-Marine Accident Risk and Safety Information System



Accident investigation report display example

Warning information for accident prone waters display example

Source) MLIT

Besides, 21 investigation reports of railway accidents/serious incidents were published including that of the train derailment accident that occurred in May 2011 in Hokkaido, where recommendations were made to those involved in the causes to ensure that wheels exceeding the limits of usage for tread abrasion and the length of the abrasion are not used by establishing appropriate inspection intervals and methods to assess the status of the wheel tread and fully enforce its management as part of the three recommendations regarding railway accidents/serious incidents.

Moreover, 1,151 investigation reports of marine accidents were published including the collision accident that occurred in the Kinkasan offing in Miyagi Prefecture in September 2012, where opinions were stated to the Minister of Land, Infrastructure, Transport and Tourism and the Director-General of the Fisheries Agency to consider measures for raising increased awareness towards the effectiveness of AIS for the owners of fishing vessels and ships, gather and utilize information on the operational status of fishing ships with maritime vessel traffic from Japan-Marine Accident Risk and Safety Information System and other sources as part of the four recommendations and two opinions stated regarding maritime accidents.

6 Support for Victims and Families of Public Transport Accidents

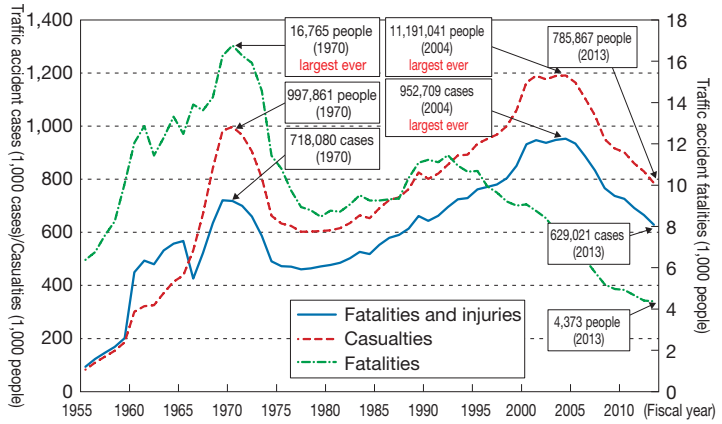
To ensure support for victims and others of public transport accidents, the Public Transport Accident Victims Support Office was established in April 2012. The Support Office is in charge of such tasks as: 1) serving as a contact point to provide information when public transport accidents occur and 2) coordination functions over the mid to long-term until the victims and affected can resume a normal life following the accident.

In fiscal 2013, support activities at the hospital where victims are being treated when serious public transportation accidents occur and promoting awareness for the support contact point were carried out. Also, during ordinary times, education and training was implemented for support staff, networks with external organizations were established and the promotion for the creation of victim support plans by public transport operators among other activities were carried out. In the future, based on feedback from stakeholders, the Support Office's functions will continue to be improved and measures to support the victims and others of public transport accidents will be steadily moved forward.

7 Safety Measures for Road Traffic

The traffic accident fatalities of 2013 decreased for 13 consecutive years and was 4,373 (0.9% decrease from the year before) but the percentage of the elderly traffic accident fatalities that are 65 years old and over exceeded 52% and 780,000 people suffer from injury or death caused by traffic accidents and the condition is still severe. For this reason, efforts will be made to further reduce traffic accidents and various measures will be implemented in coordination with the National Police Agency and others.

Figure II-7-4-5 Traffic Accidents, Fatalities, Injuries, etc., Trends



(Notes)1 Up until 1959, minor damage accidents (injuries lasting less than 8 days or less than 20,000 yen in property damage) are not included.
2 After 1966 property damage accidents are not included.
3 The cases prior to 1971 do not include fatalities and casualties of Okinawa Prefecture.
Source) Developed by MLIT from National Police Agency documents

(1) Promoting Efficient and Effective Traffic Accident Measures

Recent advances in road development and contemporary changes in the social landscape, there is a great needs for a road environment in which pedestrians, bicyclists, and a diverse other users can safely and comfortably coexist. For arterial roads which account for roughly 70% of traffic accident fatalities, effective and efficient entire accident measures are being promoted through public participation and collaboration under the "Traffic Accident Zero Plan (strategy for concentrated relief of accident prone sections)" to implementing concentrated measures for areas categorized by high degree of accident risk.

In addition, it is necessary to pay special attention to those community roads on which the proportion of accident casualties involving pedestrians and bicyclists is particularly high. In such cases, it is essential to ensure the existing safe pedestrian spaces, to this and wide-ranging integrated traffic accident suppression measures are currently being promoted. These include a wide ranging speed regulation, narrowing roads, widening road shoulder, sidewalk development, speed limits, installation of physical devices to reduce vehicle speed.

(2) Promoting Safety Measures for School-Commuting Roads

For school-commuting roads, following a series of accidents in April, 2012 involving groups of children commuting to schools, a "school route emergency joint inspection program" was implemented through coordination between schools, boards of education, police, and other stakeholders. Intensive support was implemented toward the measures based on the result above.

In addition, Japan has instituted school-commuting roads safety program in each municipality, these measures include regular joint inspection infrastructure improvement and others enhancement.

(3) Safety Driving Support on Expressways Using the ITS Spot Service

The ITS Spot Service has been available on expressways across the country since August 2011. The service supports safety driving by calling attention to accident prone areas or falling objects as well as forewarning of snow and overtopping wave conditions through car navigation system among others.

(4) Systematic Road Facilities Management to Provide Safe and Comfortable Road Services

On December 2, 2012, nine precious lives were lost when the Chuo Expressway Sasago Tunnel ceiling panel collapse accident occurred. At the "Research and Investigation Committee on the Tunnel Ceiling Collapse Accident " after the accident, the cause of the fall and preventative measures were compiled in the report on June 18, 2013.

In the future, considering that bridges and other road structures will rapidly age, to investigate and review the optimal standards for the appropriate maintenance of road structures, a "road maintenance technical subcommittee" was established to create a maintenance cycle for maintenance and management including the improvement of measures for things such as inspections, diagnosis, and repairs as well as life cycle extension plans for the interim report.

Additionally, to achieve the appropriate management of the roads, clarifying the need for inspections, creating regulations to designate roads to attract the traffic of large vehicles that impact road structures the most, and persecution of vehicles that violate limits were some of the things included in the amended Road Law that was promulgated and for government ordinances, the facilities subject to renovation and repairs by agency were defined as tunnels and bridges and technical standards were established for the maintenance and management of roads.

A ministerial ordinance was enacted on March31, 2014 that clarified the obligations of road administrators such as visual inspections in close proximity for bridges and tunnels once every five years.

In addition, on April 14, 2014, the "Recommendations for the Full-Scale Implementation of Road Aging Countermeasures" was published by Panel on Infrastructure Development Road Subcommittee for the establishment of maintenance cycles (clarifying the obligations of road administrators) and to create a framework that runs the maintenance cycles.

(5) Steady implementation of the "Expressway and Chartered Bus Safety and Security Recovery Plan"

In response to the Kan-Etsu Expressway tour bus accident that occurred in April 2012, the "Expressway and Chartered Bus Safety and Security Recovery Plan" was established in April 2013 to transition and unify expressway tour buses into the new share-ride expressway bus and already established standards for driver replacement shifts and for the remaining measures, these will be definitely implemented in the two years between fiscal 2013 and 2014 and the status of implementation will be followed up and its effects measures as needed to intensively promote measures to improve the safety and regain trust of bus operations.

Column

Measures to Improve the Safety and Regain Trust of Bus Operations

In the early hours of April 29, 2012, a serious accident where seven passengers were killed and 38 passengers sustained minor to serious injuries occurred when an expressway tour bus crashed into the protective wall of the Kan-Etsu Expressway.

The Ministry of Land, Infrastructure, Transport and Tourism established an "Accident Response Headquarters" immediately after the accident to gather information and responded to inquiries and requests from victims through the victim support contact point.

Also, after the accident, intensive emergency audits were implemented against expressway tour bus operators and a user contact point for reporting violations was established as part of the "emergency measures" established and implemented to ensure the safety of bus operators by July 2012, and during the busy period of summer, bus pick up and drop off areas nationwide were inspected simultaneously to check regulatory compliance.

Afterwards, a "Study Group on the Direction of Bus Services" was held in fiscal 2012 and in accordance with the study findings, the "Expressway and Chartered Bus Safety and Security Recovery Plan" was established and published in April 2013. Based on this plan, individual measures such as transitioning and unifying expressway tour buses into the new share-ride expressway bus, establishing standards for driver replacement shifts to prevent overworking, and transition to fares and pricing systems that reflect the safety costs were implemented swiftly and surely over the two year period of fiscal 2013 and 2014, and the status of implementation will be followed up and its effects measures as needed to intensively promote measures to improve the safety and regain trust of bus operations.

(Reference) Summary of the "Expressway and Chartered Bus Safety and Security Recovery Plan"

- ·Transition and unify expressway tour buses into the new share-ride expressway bus
- ·Establish shift standards for replacement drivers
- ·Legally require small to medium operators to submit safety management rules, etc.
- ·Intensive monitoring and increased penalties for offending operators
- ·Transition to fares and pricing systems that reflect the safety costs

Distribute leaflets to users on the implementation effects of the plan

State of simultaneous inspection
(July 24, 2006 in Shinjuku)

Source) MLIT

(6) Safety Measures for the Land Transportation of International Maritime Containers

In order to enhance the safety of the land transportation of international maritime containers, "Guidelines for the Safe Land Transportation of International Maritime Containers" were compiled and measures based on this will be in effect from August 2013 and the implementation status and other progress will be followed up by the Safety Measures Committee.

(7) Comprehensive Safety Measures for Automobiles

a. Safety Measures for Commercial Motor Vehicles

Under the "Commercial Motor Vehicles Comprehensive Safety Plan 2009" which aims to reduce accident fatalities and personal injury accidents by half and completely eliminate driving under the influence in the ten years from 2008 to 2018, more safety measures are being implemented such as expanding the scope of mandatory installment of tachographs in trucks.

b. Considering Vehicle Safety Measures for the Future

In the Ninth Fundamental Traffic Safety Program (established March 2011), the goal of reducing traffic accident fatalities to less than 3,000 by 2015 was established. For the achievement of this traffic accident reduction goal, the three measures of "expanding, enhancing, and strengthening safety standards, etc.", the "Advanced Safety Vehicle (ASV) Promotion Plan", and "vehicle assessment" will be coordinated in a synergistic manner to promote vehicular safety measures.

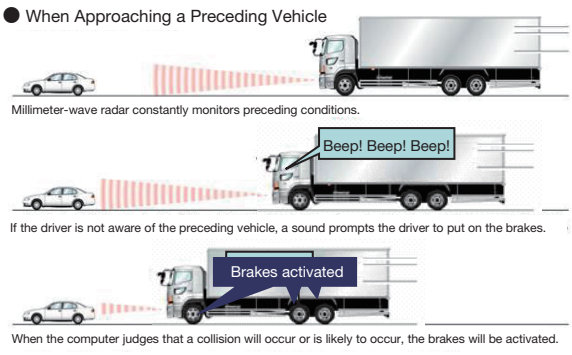
c. Expanding and Strengthening Safety Standards

For the attainment of the world's fastest adoption of fuel cell vehicles with the coming market introduction in 2015, safety standards for fuel cell vehicles were developed. Also, the scope for mandatory equipment of collision avoidance systems on heavy vehicles was expanded and standards were strengthened. Also, to improve the safety of child seats, standards for side impact standards were added to the existing standards for frontal and rear impact.

d. Development, Commercialization, and Promotion of Advanced Safety Vehicle (ASV)

The development, commercialization, and promotion of Advanced Safety Vehicle (ASV) is being promoted under the cooperation of industry, academia and government and ASV technology that is already commercialized such as collision damage reduction brakes are being widely promoted and efforts are under way for the commercialization of safe driving support systems that use communication such as vehicle-to-vehicle communication systems and pedestrian-to-vehicle communication systems. As part of this effort, the Tokyo 2013 ITS World Congress was held in October 2013 and a public road demo was done for the advanced highway safety system using vehicle-to-vehicle communication and pedestrian-to-vehicle communication.

Figure-7-4-6 Illustration of Collision Avoidance Brake Activation



Source) MLIT

e. Providing Safety Information Through Automobile Assessment

In order to promote the selection of safe automobiles and child seats by users and the development of safer automobiles, the evaluation results of the safety of cars is published. In fiscal year 2013, 14 automobiles types and nine child seat types were newly evaluated.

f. Swift and Steady Implementation of Automobile Recalls and Informing Users and Others

For the swift and steady implementation of automobile recalls, efforts are made to gather information from automobile manufacturers and users and during the audit of recall operations by automobile manufacturers confirmation and guidance is carried out and for automobiles with concerns for safety and environmental performance, the National Traffic Safety and Environment Laboratory (Incorporated Administrative Agency) will conduct technical verifications using the current model. Also, to strengthen the gathering of defect information from users, public awareness campaigns for the "automobile defect information hotline" (www.mlit.go.jp/RJ/) were actively carried out.

In addition, the information collected by MLIT including malfunctions, accidents, and fires are made public and information is provided to users regarding matters that require the attention of users or details necessary for the appropriate usage or maintenance and management or to take appropriate measures when malfunctions occur. Press releases and other measures were used to especially raise user and public awareness for "pumping the brakes for trucks equipped with air brakes are dangerous" and "ensuring the functionality and knowledge regarding the use of vehicular emergency escape hammers".

Also, in fiscal year 2013 the number of recalls submitted was 303 and the number of cars affected was 7,978,639.

g. Sophistication of Vehicle Inspections

In order to prevent illegal secondary modifications[Note] and the early detection of vehicular malfunctions, information technology is being utilized to make vehicle inspections more sophisticated.

(8) Protecting Victims with the Automobile Liability Security System

The automobile liability security system, implements various victim relief measure services such as insurance payments of mandatory vehicle liability insurance, relief (governmental indemnity services) for victims of hit-and-run and uninsured car accidents, and payments for caretaker fees and establishment of care facilities for those with heavy residual disabilities

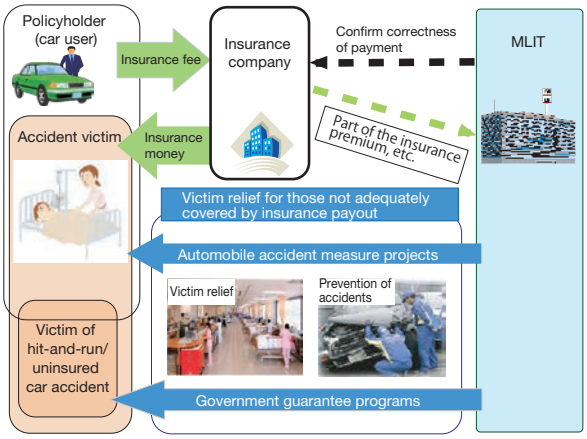
Note Obtaining a new inspection with various parts removed and then reinstalling the parts in question after the inspection for usage.

based on the principle of the mutual support of the car society and is fulfilling a big role in protecting victims of traffic accidents.

(9) Safety Measures of Mechanical Multistory Parking Garage

In light of the occurrence of fatalities and other accidents involving mechanical multistory parking garages, the Safety Measures Review Committee conducted analysis of the conditions surrounding the occurrence and factors involved in the accidents, then requested relevant organizations and others to ensure safety and proper usage.

Figure II-7-4-7 Automobile Liability Compensation Security System



Source) MLIT

Section 5 Crisis Management and Security Measures

1 Promoting Crime and Terrorism Countermeasures

(1) Coordinating with Other Countries for Crime and Terrorism Countermeasures

a. International Initiatives for Security

In addition to participating in meetings and projects in the field of transport security at international organizations such as Group of Eight (G8), International Maritime Organization (IMO), International Civil Aviation Organization (ICAO), and Asia-Pacific Economic Cooperation (APEC), this knowledge is applied to domestic security measures while promoting initiatives for international cooperation and harmony.

The "International Working Group on Land Transport Security (IWGLTS)" established in 2006 is currently participated in by over 16 nations and is expected to further develop as a framework for land transport security and bilateral conferences with the United States of America and European Union are also utilized to improve domestic security and international contributions.

b. Anti-Piracy Measures

The number of pirate incidents in 2013 declined from the previous year's 15 in off the coast of Somalia and the Gulf of Aden, a strategic point of the sea lanes, due to the effect of anti-piracy measures by international society such as the continued anti-piracy activities by the navy and other forces of various countries including the Japan Maritime Self-Defense Forces, self-defense measures through Best Management Practices (BMP) [Note 1] implemented by merchant ships, and embarkation of Privately Contracted Armed Security Personnel on merchant ships, the fundamental causes of fostering piracy such as the poverty within Somalia are still unresolved and the continuing unstable situation surrounding vessel navigation still requires vigilance.

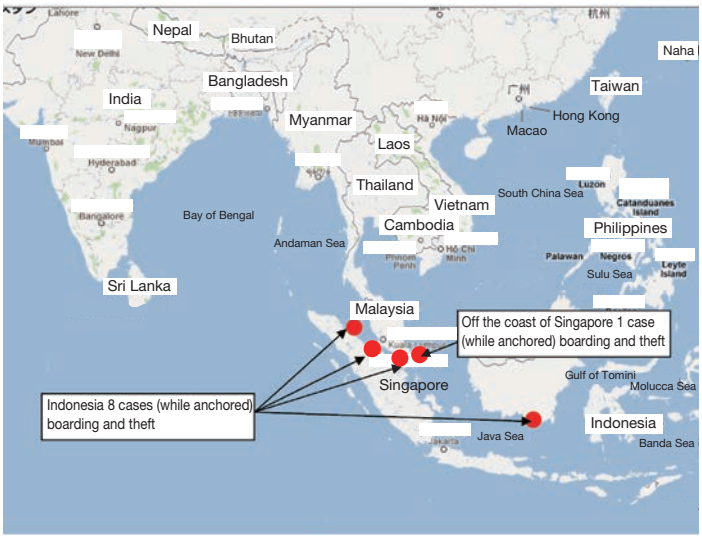
Under this situation, the Japan Maritime Self-Defense Force destroyers conduct escorts of vessels and within CTF151[Note 2] carries out zone defense[Note 3] in the Gulf of Aden as well as surveillance patrols with two P-3C patrol aircraft under the auspices of the "Law on Punishment of and Measures against Acts of Piracy (Pirate Measures Law)". The Ministry of Land, Infrastructure, Transport and Tourism consolidates contact points for escort requests from shipping companies and others as well as the selection of vessels to be escorted and the implementation of special protection by

Note 1 A compilation of self-defense measures (avoidance measures for pirate activities, establishing evacuation areas [citadels] within vessels, etc.) created by various organizations deeply involved with shipping such as the chambers of shipping to prevent or minimize damages due to Somali pirates.
Note 2 Multinational coalition missions against pirates.
Note 3 Permanently stationing warning and surveillance vessels in certain waters to protect navigating vessels from piracy activities.

Privately Contracted Armed Security Personnel under the "Act on Special Measures for the Security of Japanese Vessels Pitate infested waters " established in November 2013 to ensure the complete navigational safety of Japanese flag vessels.

Japan Coast Guard, for anti-piracy measures in the water off the coast of Somalia and Gulf of Aden, dispatches its eight officers, to conduct judicial police activities in case of piracy incident, onboard Japan Maritime Self Defense Force destroyers deployed to the Gulf of Aden in accordance with the Anti-Piracy Operation Order, and Japan Coast Guard provides capacity building assistance towards the coast guard agencies in Somalia and its neighboring countries such as Djibouti and Oman by inviting law enforcement officials from these countries to such training courses as the Maritime Crime Investigation Training Course held in Japan, supported by the Japan International Cooperation Agency (JICA, Incorporated Administrative Agency).

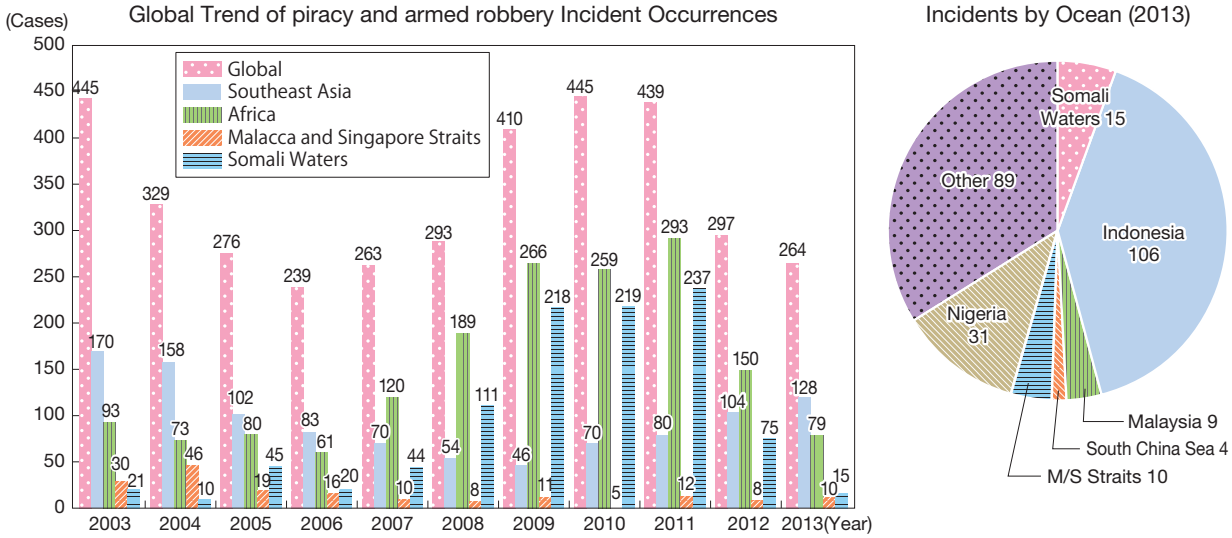
Figure II-7-5-1 Condition of Piracy Incidents and Other Damages Japanese Related Ships (2013)



Source) MLIT

For anti-piracy measures in the water in Southeast Asia, Japan Coast Guard also provides capacity building assistance in the area of human resource development and technical transfer, towards the coast guard agencies in Southeast Asian countries through the dispatch of the Japan Coast Guard patrol vessels for joint exercises and law enforcement trainings. Additionally, Japan Coast Guard, under the JICA framework, dispatches law enforcement experts to coast guards agencies as well as invites law enforcement officials from relevant countries to Japan for law enforcement training courses. The recent number of piracy and armed robbery incidents in Southeast Asia lower than its peak in 2000. It is however an increasing trend in these years. Since pirates has not yet eradicated, continued anti-piracy measures in this region is still necessary.

Figure II-7-5-2 Global piracy and armed robbery Incidents and Trends by Ocean (2013)



(Notes) 1 The number of incidents for the Malacca and Singapore Straits and Somali Waters are also included in the numbers for Southeast Asia and Africa respectively.
2 The number of cases for Somali Waters from 2003 to 2008 is the total for Somalia, Gulf of Aden, and the Red Sea.
3 Since 2009, due to reorganization of the International Maritime Bureau (IMB) annual report, the number of cases for Somali Waters includes piracy and armed robbery incidents from Somalia, Gulf of Aden, and the Red Sea as well as the Arabian Sea, Indian Ocean, and Oman.

Source) MLIT

c. Security Measures for Ports

Human resource development for port security measures is being implemented for ASEAN countries through training, expert conferences, and other measures. Also, information is being shared with other countries as port of the initiative to further raise the level of security in international ports.

(2) Comprehensive and Strengthened Counter-Terrorism Measures for Public Transport

In recent years, a variety of major incidents targeting public transport are occurring around the world since the September 11 terrorist attacks in the United States of America (September 2001), such as the London Bombings (July 2005), and the Mumbai attacks (November 2008). In light of these circumstances, counter-terrorism measures are being developed in each respective field and during busy seasons, thorough supervision and inspections for counter-terrorism measures are implemented.

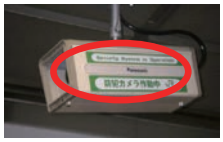
Figure II-7-5-3 Implementing "Displaying Security and User Participation" as the Axis of Railway Counter-Terrorism Measures

(Picture 1) "Crisis management poster" displayed inside the station

(Picture 2) "Anti-terrorism cooperator emblem" on sales staff, etc.


(Picture 3) Displaying request for cooperation relating to any suspicious objects, etc. discovered on the platform ticker


(Picture 4) Patrols by security guards and staff


(Picture 5) Prominently display warnings such as "surveillance cameras in operation"

(Picture 6) Utilization of train intercom for the discovery of suspicious objects, etc. (State "For the discovery of suspicious activity" prominently on the explanation sticker as grounds for reporting

Source) MLIT

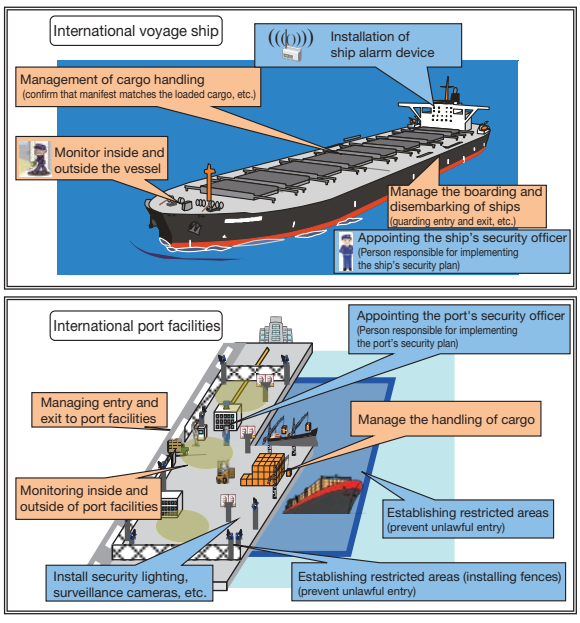
a. Promoting Counter-Terrorism Measures for Railways

In addition to increasing security cameras within stations and strengthening patrols, "crisis management levels" are set and operated as well as "displaying security and user participation[Note]" as the axis of promoting counter-terrorism measures. Also, the sharing of information regarding railway counter-terrorism measures with major nations is being actively pursued.

b. Promoting Counter-Terrorism Measures for Ships and Ports

Ensuring security is done through the approval of security rules and ship inspections of international voyage ships, approval of security rules for international port facilities, regulation of arriving ships, and site inspections of international voyage ships and international port facilities as well as Port State Control (PSC) in accordance with the "Act on Assurance of Security of International Ships and Port Facility". Also, security measures are being made more comprehensive in light of the results of site inspections of international port facilities and security levels of other countries.

Figure II-7-5-4 Security Measures for International Voyage Ships and International Port Facilities



Source) MLIT

c. Promoting Counter-Terrorism Measures for Aviation

In order to do everything possible to prevent a terrorist attack involving aircraft in our country, the aviation security framework is being strengthened in accordance with the

Note Displaying Security: Measures to proactively prevent terrorism by making security highly visible to people.
User Participation: Measures to promote each individual railway user to be aware of preventing terrorism and take appropriate actions to strengthen the network for monitoring terrorist activities.

international standards defined by the Convention on International Civil Aviation. In these circumstances, new strengthening measures are being implemented to respond to cases of terrorism and illegal entry both within and without the country, each airport is being strengthened with measures such as fences to prevent the intrusion of vehicles or people and sensors are installed so that when there is an intrusion, a swift response can be made and from October 2012 international flight passengers are subject to random manual screenings to prevent explosives and other objects that cannot be discovered by metal detectors from entering the aircraft. Also, information exchanges with major countries are carried out through active participation in international conferences and other opportunities to share Japan's experience with the latest security measures.

d. Promoting Counter-Terrorism Measures for Automobiles

Relevant businesses are instructed to carry out inspections inside vehicles, strengthen patrol of the insides and perimeters of business offices and garages, and dispatching security officers to major bus stops during busy seasons.

e. Promoting Counter-Terrorism Measures for Major Facilities

For various river facilities special attention is paid for suspicious objects during river inspections and sight patrols; the lockdown of entries and exits of dam management offices and dam body inspection corridors is also being strengthened. For various road facilities, special attention is paid to suspicious objects when patrolling expressways and directly managed roads and the trash boxes of rest facilities is also being aggregated. For national parks, security patrols are strengthened and caution is called for with various bulletins. At construction sites signboards are installed along with other measures calling for greater caution.

(3) Crime Prevention Measures for Automobiles

The sealed system[Note 1] is effective for the prevention of unauthorized usage of vehicle license plates and the mandatory confirmation of the personal ID for people requesting the issuance of proof of registered information and indication of chassis number among others.

(4) Balancing Security and Efficiency of Logistics

For international logistics, industrialized nations and international organizations are playing a central role in initiatives to balance security and efficiency. In our country, the spread of the AEO system[Note 2] is being promoted for logistics businesses and support is given to various countries to obtain AEO. Starting in fiscal year 2011, export filings from AEO approved businesses are able to get "permission" from outside bonded areas.

For the security system of airfreight with the purpose of protecting airfreight from the shipper to loading on aircraft, the KS/RA system[Note 3] based on international standards established by the ICAO is adopted. Afterwards, the regulation was revised, while taking consideration of maintaining smooth logistics, in accordance with requests from the United States to further strengthen security. The new regulations will be applied to international cargo flights with passengers destined for the United States from October 2012 and the scope is to be expanded to all international cargo flights with passengers from April 2014.

Also, in the container terminals of major ports, to accurately confirm the identity and association of truck drivers an access management information system is being implemented.

Note 1 A type of inspection and registration system for vehicles. To prevent the removal of license plates and other tampering, an aluminum cap is placed on the bolt securing license plates.

Note 2 This system rewards international shippers with superior security measures for their supply chain with certification as Authorized Economic Operator (AEO) by customs and gain the benefit of streamlined customs procedures.

Note 3 A system that confirms the safety of all air cargo before loading the aircraft for designated shippers (Known Shipper), designated air cargo shipping businesses or designated air shipping agents (Regulated Agent), or airline companies.

(5) Information Security Measures

As the dependence on IT for socio-economic activities in general continues to grow, various cyber attacks are becoming more prevalent such as email attacks targeted toward government institutions, increasing the importance of initiatives for information security measures. In accordance with the policy of the "Information Security Policy Committee", security policies are being promoted for major infrastructure (rail, air, logistics) with measures to prevent information leaks, creation of guidelines for MLIT information security measures and prevent the disruption of operations due to IT outages.

Also, efforts are being made for implementing an initial response system and preventing the spread of damages in the event of a cyber attack against MLIT and businesses under its jurisdiction.

2 Establishing a Response System for Accident Disasters

When accident disasters such as accidents involving multiple fatalities occur on rail, air, etc. or ships are involved in oil spill accidents, the disaster conditions are assessed an a disaster measures headquarters is established within MLIT (for especially large-scale accident disasters in the field of transport the government will establish an emergency disaster headquarters, etc.) to collect and aggregate information and comprehensively coordinate with relevant government organizations and other parties for urgent disaster measures to ensure that swift and appropriate disaster measures are implemented.

For accident disasters at sea, coordination with relevant organizations is being furthered such as ensuring a dispatch system for patrol boats and aircraft and readying disaster mitigation equipment in addition to implementing joint training. Also, for pollution accidents involving oil or Hazardous Noxious Substances, response equipment is being improved to strengthen the system for a swift and effective response and environmental protection information on coastal waters needed to contain oil, etc., is being compiled and provided.

3 Strengthening the Coast Guard System

(1) Improving and Strengthening the Operational System

In the waters surrounding the Senkaku Islands, Chinese government vessels are persistently violating territorial waters adding to continued tension. The Japan Coast Guard is developing 1,000 ton patrol boats equipment with monitoring ability and suppression capability to establish a full-time patrol system for the Senkaku territorial waters equivalent to 14 large-scale patrol vessels, developing docking facilities to provide base functions for patrol vessels in Ishigaki Port, and strengthening operation and command functions for the swift and appropriate sharing and dissemination of information between headquarters, district headquarters, and patrol vessels along with the assignment of new personnel to patrol vessels. Also, to ensure a system that can appropriately respond to further changes in the situation, six more large-scale patrol vessels will begin development.

(2) Promoting Counter-Terrorism Measures

To prevent terrorism, the Japan Coast Guard patrols around facilities that are at risk, such as coastal nuclear power plants and petrochemical complexes as well as U.S. Armed Forces facilities by patrol vessels and aircrafts. Also, during peak travel periods, special security is conducted at passenger ship terminals where many people are concentrated.

In order to prevent terrorism proactivity, it is important to tie with not only relevant agencies but the private sector as well. The Japan Coast Guard encourages those who work at maritime industry to take self-security measures completely and conducts cooperation with regional communities by getting information on suspicious activities from them.

(3) Promoting Measures Against Suspicious Vessels and Spy Ships

It is well known that suspicious vessels and spy ships are probably engaged in serious crime in Japan, and it is need to stop them for inspection in order to shed light on their objectives and activities In case any illegal activities are found, it needs to carry out a proper criminal investigation. For this reason, in response to suspicious vessels and spy ships, the Japan Coast Guard which is the policing organization deals with them as the primary agency.

The Japan Coast Guard conducts various training as well as stronger ties with relevant ministries and agencies to exchange information, and thereby strives to detect suspicious vessels and spy ships early as well as to maintain and improve capabilities to cope with them.

(4) Promoting Measures against Maritime Crimes

Some major characteristics of recent maritime crimes include a diversity of non-fishermen casually engaging in maritime poaching crimes as well as organized criminals seeking sources of funding and environmental crimes such as illegal dumping of waste into the ocean to save processing costs and its characteristics are becoming more malicious and sophisticated. Also, for domestic crimes involving firearms and drugs, there are some that are closely related to smuggling crimes facilitated by Japanese criminal organizations and international crime syndicates along with illegal transit facilitated by international crime syndicates.

Regarding various maritime crimes, there is still a need for vigilance and the Japan Coast Guard is strengthening monitoring and prosecution, gathering and analyzing crime information, and strengthening site inspections by effectively utilizing patrol ships and aircraft as well as sharing information with relevant domestic and international organizations as part of the efforts to pursue effective measures and take strict yet appropriate measures against maritime crimes.

4 Protecting Our Country's Interests in Maritime Rights

(1) Security Activities to Protect Maritime Interests

Recently, there have been cases where official vessels from China and Taiwan have encroached upon Japanese territorial waters and through their activities have sought to stake territorial claims in the seas around the Senkaku Islands. Particularly since the acquisition and maintenance of three of the islands (Uotsuri Island, Kitakojima Island, and Minamikojima Island), in September 2012, there are cases where official vessels from China have approached and intruded upon the seas surrounding the Senkaku Islands. Activists have also intensified their efforts to assert claims on the islands.

Also, in the Japan's Exclusive Economic Zone in the East China Sea and other waters, foreign oceanographic research vessels are conducting surveys without Japan`s consent.

In response to these tense conditions, the Japan Coast Guard advanced legislative changes to strengthen maritime policing powers including the improvement and strengthening of prosecution powers of Japan Coast Guard officers among other measures by coming into force the "Law for the Partial Revision of the Japan Coast Guard Act and the Law on Navigation of Foreign Ships through the Territorial Sea and Internal Waters," in September 2012. Additionally, the security system of territorial sea is being strengthened by conducting appropriate patrols on territorial sea by patrol vessels and aircraft as well as monitoring and vigilance activities in Japan's Exclusive Economic Zone to ensure Japan's sovereignty and protect maritime rights.

(2) Promoting Maritime Surveys in Territorial Waters and the Exclusive Economic Zone and Consolidating Maritime Information

In our country's territorial waters and the exclusive economic zone there are waters lacking adequate survey data and the Japan Coast Guard is conducting intensive maritime surveys in these waters including submarine topography, crustal structure, and the baselines of territorial waters to strategically and continuously implement the development of basic information that will contribute to the safety of ship traffic, protecting our country's maritime rights, and maritime development. Also, under the comprehensive coordination of the Headquarters for Ocean Policy Secretariat, Cabinet Secretariat the "Maritime Information Clearinghouse", which aggregates the gathering, management, and provision of maritime information, is being operated. Additionally, the "Maritime Cadastre" was developed which is a web service that can overlay information on maps and allows general users to utilize various natural information (submarine

topography, ocean currents, water temperature, etc.) and social information (port areas, fishing rights areas, etc.).

(3) Initiatives to Delineate the Limits of the Continental Shelf

In April 2012, the UN "Commission on the Limits of the Continental Shelf" adopted the recommendations in regard to the submission made by Japan in November 2008 regarding the continental shelf beyond 200 nautical miles in accordance with the United Nations Convention on the Law of the Sea. In the recommendations, the total are of the approved continental shelf is equivalent to roughly 80% of Japan's national land's area. But some evaluations of water areas were deferred, the Japan Coast Guard therefore continues its further efforts to obtain recommendations with relevant government agencies under the comprehensive coordination of the Headquarters for Ocean Policy Secretariat, Cabinet Secretariat.

(4) Conservation of Okinotorishima, Protecting the Low-Tide Line and Developing the Base of Activities

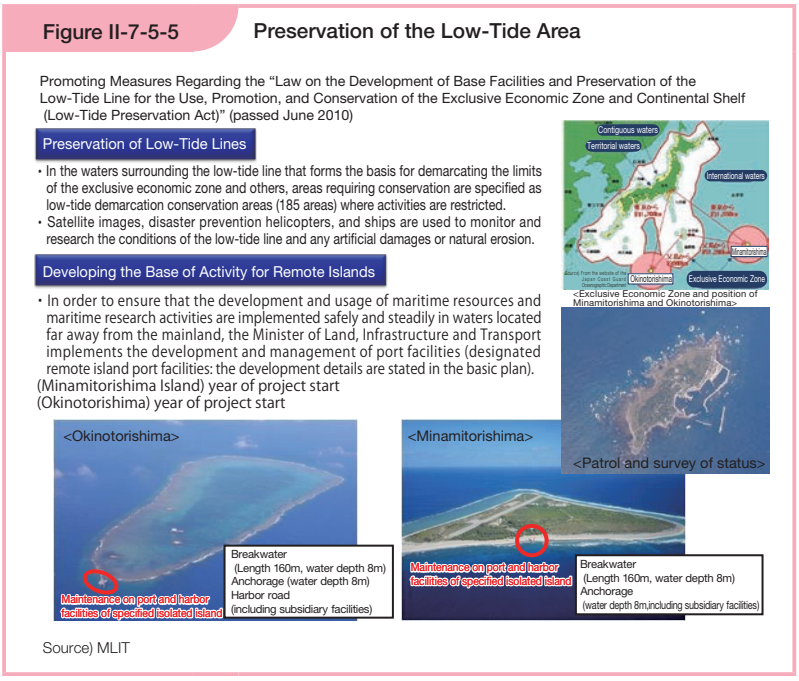
a. Conservation of Okinotorishima

Okinotorishima is Japan's southernmost territory and is a very important island that forms the foundation of the 400,000 km2 area exclusive economic zone which exceeds the area of national land, so the observation and gathering of basic data, inspections of damages, and repairs are carried out. In addition to the two islets, the central government is taking direct control to ensure adequate measures to preserve the entire atoll.

b. Preservation of Low-Tide Lines

In accordance with the "Law on the Development of Base Facilities and Preservation of the Low-Tide Line for the Use, Promotion, and Conservation of the Exclusive Economic Zone and Continental Shelf (Low-Tide Preservation Act)", 185 domestic locations are designated by government decree as lot-tide conservation areas to implement restrictions on activity in the area. Also, sight patrols by disaster prevention helicopters and ships as well as satellite images are used to survey low-tide lines and its surrounding conditions and by confirming the existence of restricted activities in the area or topographical changes due to natural erosion, strive to protect the low-tide line which forms the basis of the Exclusive Economic Zone and continental shelf as well as appropriate management of related information for the implementation of sure and efficient preservation of low-tide lines.

Figure II-7-5-5 Preservation of the Low-Tide Area



Source) MLIT

c. Developing Bases of Activity in Remote Islands (Okinotorishima and Minamitorishima)

In accordance with the "Low-Tide Line Conservation Act", etc., Minamitorishima and Okinotorishima which are areas remote from the mainland, port facilities are being developed as a base of activities for the conservation of the exclusive economic zone, etc., and usage for the development and usage marine resources to enable the mooring and berthing of vessels, cargo handling, etc.

5 Security and Protecting Citizen's Lives and Assets

(1) Responding to North Korea Issues

In response to the North Korea launching ballistic missiles and conducting nuclear tests, in accordance with the "Act on Special Measures concerning Prohibition of Entry of Specified Ships into Ports", all ships registered to North Korea are prohibited from entering Japan's ports and in light of the international situation this measure was extended to April 13, 2015. To ensure the implementation of these measures, the Japan Coast Guard is conducting the confirmation of information regarding the arrivals of North Korean-flagged ships. Also, to ensure the effectiveness of import and export restriction measure against North Korea such as the United Nations Security Council Resolution 1874, in accordance with the "Act on Special Measures concerning Cargo Inspections etc. Conducted by the Government Taking into Consideration United Nations Security Council Resolution 1874, etc.", the Ministry of Land, Infrastructure, Transport and Tourism and the Japan Coast Guard is coordinating closely with relevant administrative agencies to ensure the effectiveness of measures stipulated by the law.

Also, in light of leadership changes at North Korea, MLIT is strengthening its readiness including information gathering and communication to thoroughly implement measures in preparation of worst case scenarios and will continue to maintain the monitoring and watching framework. Also, for the cases of missile launches referred to "artificial satellites" conducted by North Korea on April 13 and December 12, 2012, and nuclear tests conducted by North Korea on February 12, 2013, information was collected and shared as part of the efforts to ensure the safety and comfort of citizens.

(2) Responding to Armed Attacks Situations and Other Situations Under the Civil Protection Plan

In accordance with the "Act concerning the Measures for Protection of the People in Armed Attack Situations, etc" and "Basic Guidelines for Protection of the People" which stipulates measures regarding the evacuation, rescue and minimization of losses due to armed attacks situations, etc., MLIT, the Geospatial Information authority of Japan, the Japan Meteorological Agency, and Japan Coast Guard stipulate "Civil Protection Plan[Note] ". MLIT will implement support such as communication and coordination with designated public institutions which are transport business operators for the transport of evacuating residents in accordance with requests from local government; the Japan Coast Guard is designated to carry out the transport of evacuating residents and emergency supplies when the transport capacity of designated public institutions is insufficient and to carry out search, rescue, and emergency activities.

6 Infectious Disease Measures

For countermeasures against pandemic influenza and new infectious diseases, in May 2012 the "the Act on Special Measures for Pandemic Influenza and New Infectious Diseases Preparedness and Response (hereinafter Act on Special Measures)" was established and put into effect in April 2013. The Act on Special Measures is designed to limit the spread of infections as much as possible, protect the life and health of national citizens, and minimize impact to citizen's lives and the national economy by: 1) businesses in general must work to cooperate with prevention and countermeasures and consider impacts due to epidemics and work to implement appropriate countermeasures in conducting business, 2) registered business operators as requiring prior vaccination must continue to carry out business activities that contribute to the stability of citizen's lives and economy even during outbreaks, and 3) designated public institutions are required by regulation to implement countermeasures against breakouts of pandemic influenza and new infectious diseases, and designated public institutions which are transport business operators must establish individual business plans in the event of a pandemic influenza and New Infectious Diseases emergency and carry out necessary measures to appropriately implement the transport of passengers or cargo.

In June 2013, the National Action Plan for Pandemic Influenza and New Infectious Diseases of JAPAN (hereinafter National Action Plan) based on the Act on Special Measures was approved by the Cabinet and it includes countermeasures against pandemic influenza and new infectious diseases such as the basic policy, the implementation system, surveillance and intelligence gathering, prevention and stopping of outbreaks, medical treatment, and ensuring the stability citizen's lives and the national economy for the various outbreak stages of pandemic influenza and new infectious diseases.

Note Following the establishment of the Japan Tourism Agency in October 2008, MLIT's plan was changed to the "MLIT and Japan Tourism Agency Plan for the Protection of National Citizens".

In accordance with this, MLIT amended the MLIT Action Plan or Pandemic Influenza and New Infectious Diseases and for the implementation of the newly incorporated various measures in the Act on Special Measures: 1) the role of designated (local) public institutions which are transport business operators, 2) responses when a declaration of an emergency situation regarding Pandemic Influenza, 3) newly define industries and others that will be subject to legally specified prior vaccination, and 4) expanded the scope of the action plan to new infections diseases. Additionally, during overseas outbreak phase, cooperate with preventative measures to delay domestic epidemics as much as possible and when quarantine airports and harbor are aggregated, call for cooperation between airport and port administrators to ensure the aggregation goes smoothly and after the early phase of domestic outbreak, make transport requests for emergency supplies such as medical and food supplies in case of urgent need.

Chapter 8 Creating and Preserving a Beautiful and Healthy Environment

Section 1 Promoting Countermeasures against Global Warming

1 Implementing Global Warming Countermeasures

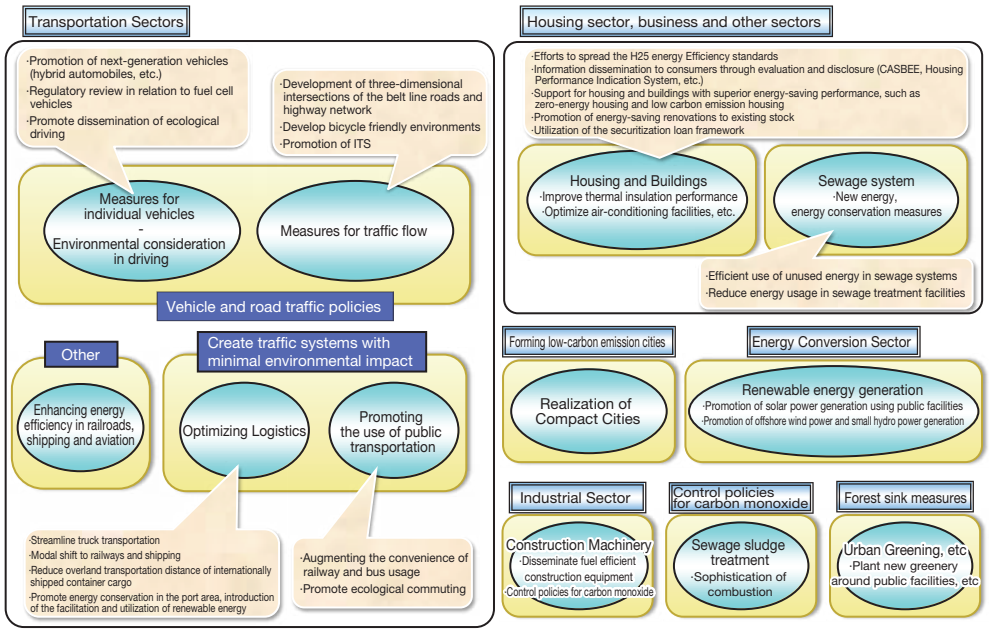
The 5 year average of Japan's Greenhouse Gas Emission Rate for the Kyoto Protocol First Commitment Period (2008 – 2012) has been 1,278,000,000 (one trillion, two hundred seventy eight million) t-CO_2, which although is an increase of 1.4% compared to 1990, by taking into consideration the Kyoto Mechanism Credit or sinks such as forests, it is a 8.4% decrease compared to 1990 which means the goal (6% decreased from 1990 rate) set by the Kyoto Protocol has been attained.

Although Japan is not participating in the Second Commitment Period of the Kyoto Protocol, in order to continue promoting an approach at a level higher than thus far, new "Plans for Countermeasures against Global Warming" are to be formulated for the future.

Taking into consideration this governmental movement, The Ministry of Land, Infrastructure, Transport and Tourism—with the Environmental Subcommittee of the Panel on Infrastructure Development and the Transportation System Division, Environmental Committee of the Panel on Transportation Policy at the center—is continuing to investigate medium-term global warming countermeasures in order to maximize the promotion of energy-saving measures and implementation of renewable energy.

(The Main Global Warming Countermeasures of the Ministry of Land, Infrastructure, Transport and Tourism)
·Promoting Low Carbon City Development
·Promotion of Transport Sector Measures (Promotion of the development, dissemination and optimal utilization of environment-friendly vehicles; promotion of traffic flow measures; promotion of the use of public transportation; promotion of efficient distribution; promotion of low carbon emissions in railway, ships and aviation; and others)
·Promotion of measures for home, business and other sectors (Improvement in the energy efficiency of houses and buildings, promotion of energy-saving measures in the sewage system)
·Promotion of industrial sector measures (promotion of environmental measures for construction machinery)
·Promotion of measures for greenhouse gas sinks (Promotion of urban greening, etc.)

Figure II-8-1-1 MLIT countermeasures for Global Warming



Source) MLIT

2 Promoting Global Warming Countermeasures (Mitigation Measures)

(1) Promoting Low-carbon City Development

For the cities where the population and building are quite concentrated, in December 2012, "The Low-Carbon City Act" was enacted from the standpoint of promoting low-carbon city development through consolidation of urban facilities and the promotion of public transportation use, efficient use of energy such as area energy networks at the district level, conservation and promotion of greenery. 11 municipalities have formulated the "Low-Carbon City Plan" by the end fiscal 2013. Government of Japan has been continually promoting "Low-Carbon City Development" through budgetary and tax measures as well as deregulation.

(2) Promoting the Development, Distribution and Optimal Utilization of Environment-friendly Vehicles

a. Improving Mileage of Vehicles

We are formulating the gas mileage standards and publishing vehicle mileage of the "Top Runner System" [Note 1] in accordance with the "Law Concerning Rational Use of Energy (Energy Saving Law)," and in 2007 we established mileage standards with 2015 as the objective year. Furthermore, in 2013, a new mileage standard for passenger cars was enacted with 2020 as the objective year. In 2012, 80% of the gasoline passenger cars shipped had cleared the mileage standards objective for 2015 and the average mileage rate improved approximately 40% compared to 2004. The mileage improvement efforts will continue further.

b. Schemes to stimulate improvements in mileage capabilities and reduction in exhaust gas

In order for consumers to easily identify and select vehicles with high mileage capabilities, we have implemented systems to evaluate and disclose mileage capabilities of vehicles to stimulate their dissemination. Additionally, for vehicles that emit lower amounts of harmful substances than the latest exhaust gas standards, we are implementing the "low emission vehicle recognition system," according to how much less exhaust is emitted by the vehicle. The indication for mileage capabilities are marked by a "2015 Mileage Standard Fulfilling Vehicle" sticker.

c. Promoting the dissemination of environment-friendly vehicles

In promoting the distribution of environment-friendly vehicles, such as putting into place tax incentives such as EcoCar Tax cuts (vehicle weight tax and vehicle excise tax) for vehicles with superior environmental performance (EcoCar) and the special greening provision for fuel reduction (vehicle tax).The number of vehicles sold in 2013 that are subject to the EcoCar tax cuts are approximately 82% (approximately 4,400,000 cars) of all vehicles sold.

From the perspective of countermeasures against global warming and air pollution in large cities, we are enforcing policies to disseminate environment-friendly vehicles such as by supporting the usage of CNG vehicles [Note 2], hybrid vehicles, and electric vehicles by truck, bus and taxi businesses. We are also supporting the implementation of a new category of transportation that contributes to energy conservation and low-carbon emission called "Ultra Lightweight Vehicles".

Note 1 Identify products such as household appliances and vehicles, set standards based on the examples of the products with the best gas mileage standard or low rate of electricity consumption, and request that the manufacturers and importers that sell these products will meet the standard quota by the target year.

Note 2 Compressed Natural Gas Vehicles (Natural Gas Automobiles)

d. Development, application and creating a usage environment for next generation heavy vehicles

In order to promote the development and application of next generation heavy vehicles, we have been developing the technology of high-efficiency hybrid trucks, electric and plug-in hybrid trucks, and high-performance electric buses since FY2011. Demonstration driving tests have also been conducted under actual driving conditions for these prototypes. Efforts to actualize the practical use of these prototypes will continue.

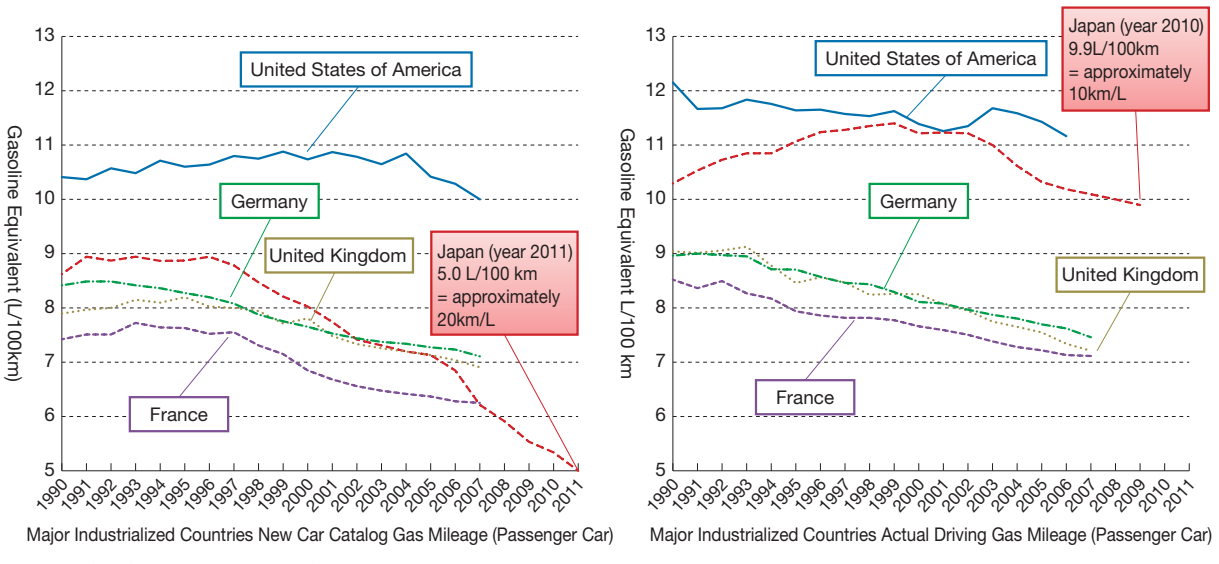
e. Promoting and disseminating ecological driving

By cooperating with related ministries and agencies, we revised the "Eco Drive 10 Recommendations" during the "Eco Drive Promotion Month" in November 2012. We also focused on conducting symposiums and lectures, and worked on educational activities for disseminating ecological driving through press releases. Furthermore, we are working to promote the dissemination of the Ecological Management System (EMS) [Note] to motor carrier enterprises.

(3) Promotion of Traffic Flow Measures, etc.

Japanese automobiles have the world's top level of catalog gas mileage but the driving gas mileage is on the same level as the U.S.A. For this reason, we are implementing various measures for traffic flow to increase the speed of driving by facilitating traffic flow to improve mileage and decrease the amount of CO_2 emitted by vehicles. Specifically, in order to alleviate traffic congestion in urban areas, we are arranging the arterial expressway network with belt highways which curbs the inflow of traffic to the inner-city by providing an alternative route for traffic moving through urban areas. Additionally, we are promoting three-dimensional intersections and the continuous grade separation project to eliminate railroad crossings that stop traffic, as well as promoting "Smart Use of Roads" such as utilizing the big data collected by means of ITS technologies, undertaking the most suitable usage of existing road networks in order to realize the smooth and safe traffic services, and advancing the creation of a bicycle friendly environment by redistributing road space. Also, in order to improve the low carbon emission of road infrastructure, actions are being taken such as installing LED road lighting and making use of renewable energy.

Figure II 8-1-2 New Car Catalog Gas Mileage and Actual Driving Gas Mileage of Major Industrialized Countries



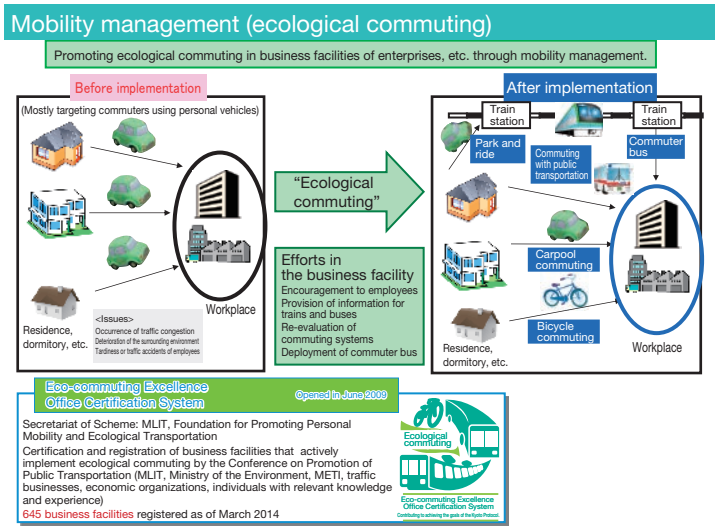
Source) IEA (International Energy Agency) data
Since 2007, in Japan,MLIT reports based on data from Japan Automobile Manufacturers Association, Inc.

Note Approach for the implementation of planned and continuous ecological driving of motor vehicles with the integration of evaluation and guidance.

(4) Promoting the use of public transportation

The shift from private vehicles to public transportation reduces travel with vehicles and is a necessary facet of global warming countermeasures. For this reason, we are promoting automation such as implementing IC cards, and improving the convenience of public transportation through better transit connections. We also encourage ecological commuting in each business establishment through the Ecological Commuting Outstanding Business Certification Scheme, as well as spreading environment-friendly commuting by cooperating with regional schemes that promote ecological commuting. Furthermore, information analysis and validation results of past activities for the "Environmentally Sustainable Transport (EST) Model Project" were provided nationwide to regions working to realize EST.

Figure II-8-1-3 Promotion of "Ecological Commuting" through Mobility Management



Source) MLIT

(5) Optimizing logistics

Exceeding 50% of the total domestic transportation means in Japan, trucking accounts for the majority of the share ratio (ton to kilometer basis in transportation). The CO_2 discharge rate [Note 1] of trucks is greater than that of mass transportation such as railroads and domestic shipping, and accounts for up to 90% of the CO_2 output in logistics. In order to reduce CO_2 emission while sustaining domestic logistics, we must strive to utilize energy efficient transportation means such as railroads and domestic shipping in addition to improving energy efficiency and transportation efficiency of each truck, in combination with transitioning trucking [Note 2] from private to commercial means. And, in an effort towards further establishing an efficient logistics system with low environmental impact, assistance is being provided for joint transportation, modal shift, introduction of large CNG trucks, low-carbon logistics centers, and low-carbon emission of the port area. The introduction of 31ft railway containers of similar size to the 10-ton truck, the demonstration experiments of a new style 12ft refrigerated railway container, as well as working to energize the coastal shipping and ferry industry by promoting the building of energy-saving vessels, are all in progress. We also work to disseminate the "Eco Rail Mark" (recognition of 83 cooperating enterprises of 138 products (192 items) as of March 2012), and the "Eco Ship Mark" (Recognition of 82 consignors and 98 logistics businesses as of December 2011). In ports and harbors, which act as nodal points between overland and overseas transportation, we are implementing initiatives to conserve energy within ports and harbors, implementing, facilitating, and applying renewable energies and expanding carbon dioxide sinks. Moreover, we strive to reduce overland transportation distance of international cargo by renovating facilities such as international overseas container terminals.

In addition, in cooperation with the relevant ministries and related organizations, a Green Logistics Partnership Conference was held and public awareness and recognition is being given to the excellent businesses through the collaboration of logistics and shipping companies.

Note 1 The amount of CO_2 emitted by shipping 1ton of cargo for a distance of 1km.
Note 2 Change from privately-owned trucks (private truck carrying own cargo) to improving transport efficiency by such methods as combined cargo transport by several shippers and reduce transportation cost by using business truck (trucks transporting cargo of others for a fee).

Figure II-8-1-4 Promotion of Activities through the Green Logistics Partnership Conference

Substance of activities by the Green Logistics Partnership Conference

·In order to promote the reduction of CO_2 emissions of the logistics sector, meeting to promote exchange and sharing of the recognition of the importance of green logistics in those connected to the shipping and logistics business.
·Organized by: Ministry of Land, Infrastructure and Transport; Ministry of Economy, Trade and Industry; Japan Federation of Freight Industries, Japan Institute of Logistics Systems Supported by: Japan Federation of Economic Organizations
·Established: April, 2005
·Membership: 3,314 members (as of December, 2013) - - - Logistics Companies, Cargo Owners, each of the industry associations, think tanks, research institutes
·Introduction and commendation of excellent businesses as well as holding discussions regarding Green Logistics aimed towards the expansion of voluntary efforts in the private sector aimed at reducing CO_2 emissions.

Summary of the Awarded Enterprises

[Purpose] By awarding the achievements of the efforts made in the logistics sector for global warming countermeasures that produced remarkable results, promote the popularization and expansion of green logistics as well as motivating the voluntary efforts of businesses.
[Types of Awards] Ministers Award, Director-Generals Award, and a Special Award have been created.
Ministers Award - - - Award from Minister of Land, Infrastructure and Transport Award; Award from Ministry of Economy, Trade and Industry
Director-Generals Award - - - Award from Ministry of Logistics Deputy from the Ministry of Land, Infrastructure and Transport Secretariat; Award from Ministry of Commerce and Distribution Safety Deputy from the Ministry of Economy, Trade and Industry Secretariat
Special Award - - - Award on the level of the Ministers Award and the Director-General Awards for particularly superior initiatives (created in 2013)

Example of a case awarded by the Ministry of Land, Infrastructure and Transport

•Award from Ministry of Logistics Deputy of the Ministry of Land, Infrastructure and Transport Minister's Secretariat

Project name: "Efficiency for Chemical Products Transportation – New possibilities for transport of liquid goods by the birth of oil wagons and trains dedicated to chemical tank containers–"
Companies: Japan Oil Terminal Co. Ltd.; Shin-Etsu Chemical Co., Ltd.; Japan Freight Railway Company; VORTEX SEIGUN Co., Ltd.; KANARIN LTD.

•Special Award from Green Logistics Partnership Conference

Project name: "—For the Further Evolution Joint Delivery—CO_2 reduction made possible by the reduction of joint delivery vehicles in waiting by implementing coordination with the wholesalers"
Companies: Wakamatsu Konpou Unyu Soko, Inc.; Kanakan Inc.; Hokuriku Chuo Shokuhin Co., Ltd.; Hokuriku Ryoshoku Ltd.
*No applicable candidates for 2013 Award by Ministry of Land, Infrastructure and Transport

Source) MLIT

(6) Promoting low carbonization of railways, ships, and aviation

a. Initiatives contributing to further enhance environmental performance in the railway sector

Although the railway has little environmental burden in comparison to other modes of transport, in order to further reduce environmental burden, we are promoting the technological development of battery powered trains and the implementation of facilities contributing to promoting low carbonization and enhancing energy efficiency for railway facilities and railway vehicle in cooperation with the Ministry of Environment.

b. Initiatives for energy conservation and low carbonization in shipping

Efforts for conserving energy are being promoted in domestic shipping through the "Integrated Measures for Green Shipment," such as the dissemination of super eco ships [Note] and by subsidizing the deployment of new technologies and facilities that contribute to energy conservation and low carbonization of ships. In ocean shipping, in order to promote an international framework and an integrated technology development and dissemination, from 2013, we are supporting the world's most advanced marine environmental technology development which targets a 50% reduction of CO_2 emissions from ships. Japan is leading the discussion on creating an international framework on matters such as the fuel consumption reporting system ("visualization" of fuel consumption in a real voyage), being promoted by IMO following the introduction in January 2013 of the regulation on CO_2 emissions in international shipping, as well as the economic regulations. Also, as the environmental preparation for the early commercialization and introduction of natural gas fueled ships, standard Guidelines and Operations Manual that defines the safety measures of natural gas re-fueling procedures was compiled in June 2013.

Note Next generation domestic vessels with excellent environmental capabilities and economic capabilities that utilize electronic propulsion systems that enhance mileage and reduce CO_2 and NO_x emissions.

c. Initiatives to reduce CO_2 emissions in aviation

We are advancing the implementation of area navigation (RNAV), which enables shortening flight time and distance and the UPR [Note 1] method, which allows the flight to have the most efficient altitude desired by the pilot, as well as enhancing aerial traffic systems by implementing the Continuous Descent Operation (CDO) which sustains minimal engine output by continuously descending without leveling out at any point during descent. We also promote the use of ground power units (GPU) for airplanes and ecological cars such as GSE [Note 2] vehicles as part of Eco Airport (eco friendly airport) activities. Furthermore, we are strengthening international initiatives, such as participating in the "Asia and Pacific Initiative to Reduce Emissions (ASPIRE)" [Note 3] where air traffic control authorities and airline companies cooperate to attain efficiency in flying. We are also leading the discussion to develop a global scheme to reduce CO_2 emissions from international aviation. Furthermore, a new study related to the promotion of alternative fuelsin aviation was started in 2013.

Column

The Promotion and Dissemination of Alternative Fuels in Aviation (Biojet fuels)

There are high expectations worldwide for alternative fuels (biojet fuels) as a CO_2 emissions reduction measure for jet planes. Alternative fuels are made from materials such as algae, plants such as jatropha and camelina, used cooking oil or municipal waste, and compared to fossil fuels, may lead to the reduction of CO_2 emissions over the entire life cycle including the growth process of the raw materials.

At the Assembly of International Civil Aviation Organization (ICAO) in 2010, a resolution was adapted on the global aspirational goals to reduce CO_2 emissions from international aviation and, at the Assembly in 2013, promotion of the use of sustainable alternative fuels was agreed upon as one of the main pillars to achieving the goals.

In Japan, from 2009 through 2012, test flights using alternative fuels have been conducted and the technical demonstration of the flight itself has been done, and we are now in the planning stage on ways to spread the use of alternative fuels. There are already overseas examples of using alternative fuels in fare-paid flights such as regularly scheduled flights, and Japan plans to continue studying this matter including these example cases.

There are a few issues that have been raised in regards to promoting the dissemination of alternative fuels in Japan. First of all, currently the cost of alternative fuels is extremely high. Also, for the time being, it is necessary to import alternative fuels to secure the supply. In addition, issues such as impact on the existing aging facilities and ensuring the transport method need to be considered.

With regard to these points, while working on various cooperative relationships, the related parties will continue to proceed with the initiatives to solve these issues.

As an international effort, consideration is also necessary regarding the establishment of a common calculation and evaluation criteria for the world with regards to the CO_2 emissions reduction effect of alternative fuels, as well as the global supply outlook for alternative fuels to the aviation sector, including the trends in other industries. These challenges are now being studied by ICAO's group of experts, and Japan is going to be actively participating in these activities.

Note 1 User Proffered Route
Note 2 Ground Service Equipment
Note 3 Asia and Pacific Initiative to Reduce Emissions

Aircraft used for the test flights performed in Japan

JAL

ANA

NCA

Source) JAL … Japan Airlines Co., Ltd., ANA and NCA … Reprinted from the website of both companies

(7) Enhancing energy-saving performance in housing and buildings

Compared to past eras, the rise in the amount of energy consumed by the civilian sector is more prominent than in other sectors, which makes improving energy-saving performance in housing and buildings an urgent task. For this reason, the Energy Efficiency Standards under the Energy Conservation Law introduced the consumption of primary energy which assess building equipment performance and created energy comprehensively, adding to building envelop performance (scheduled to come into effect in 2015). Furthermore, the approval system of the low carbon building which has high energy-saving performance based on the "Act on Law Carbon City Promotion", has taken effect; we now aim for its dissemination.

In other fronts, we are working to develop and disseminate the Housing Performance Indication System and Building Energy-efficiency Labeling System (BELS) those show the energy-saving performance to consumers, in addition to comprehensive Assessment System for Built Environment Efficiency (CASBEE). This CASBEE system integrally evaluates enhancing livability, and reducing environmental strain of housing and buildings as comprehensive environmental performance.

Also, in order to promote energy-saving in housing and buildings, it provides support for small and medium-sized construction firms in building Zero Energy housing and leading projects that introduce cutting edge CO_2 reduction technology and energy-saving remodeling of housing and buildings, as well as implementing an interest rate cut utilizing the framework of the securitization support business of the Japan Housing Finance Agency. In addition, it is working for the development and dissemination of things like the design and construction technology of energy-saving houses and buildings through holding workshops for design and construction professionals and providing support for the leading technological development of the private firms.

Furthermore, we are formulating supportive taxation measures for renovation work towards energy conservation in already existing residences and buildings.

(8) Promotion of energy-saving methods in sewage

The reduction of carbon monoxide is being advanced by the implementation of energy-saving measures such as high efficiency equipment for sewage treatment, and with new energy measures such as the processing of raw sewage into solid fuel, the use of bio-gas, and the high temperature incineration of raw sewage.

(9) Promotion of environmental measures for construction machinary

In 2010, Japan established a system for certifying construction machinary with exceptional CO_2 reducing capabilities, such as hybrid vehicles, as low-carbon type construction machinary and is providing support through low interest loan systems. Japan also set fuel efficiency standards for the hydraulic excavator, the bulldozer, and the wheel loader, which are major construction machinery, and established a system that certifies construction machinery that meets these standards as fuel efficiency standard achieving construction machinery.

(10) Implementation of CO_2 sink measures through urban greening

Urban greening has been internationally recognized as a "vegetation recovery activity" which is subject to be reported as the amount of greenhouse gas absorption based on the Kyoto Protocol. The Kyoto Protocol Target Achievement Plan also recognizes this activity as creating low carbon cities because of improvements to the thermal environment through mitigating urban heat island effects, as well as the heightening of public awareness to its significance and effects. Based on the "Master Plan for Parks and Open Spaces", devised by municipalities concerning overall greenery, the improvements to urban parks, the greening of roads, ports and harbors and private properties are being actively undertaken.

3 Promotion of the Use of Renewable Energy

Based on the energy constrains after the Great East Japan Earthquake, while the future utilization of renewable energy has become an important issue in the government, the Ministry of Land, Infrastructure and Transport in particular has been promoting the introduction of ways to utilize the potential of renewable energy of resources such as the vast infrastructure space of facilities like airports, water flowing in rivers, and the abundant and stable sewage biomass.

(1) Promotion of the use of marine renewable energy

Japan that is surrounded on all four sides by the sea, and is blessed with abundant marine renewable energy.

Of these, the wind power over the ocean, which is vast compared to land and where a stable, strong wind blows, is expected to be widely used in the future and interest is increasing especially in the port and harbor areas.

Therefore, the Bureau of Port and Harbor has decided to organize the installation procedure to the port and harbor and first published in June 2012 "Regarding Wind Power at Ports and Harbors – The Manual for Coexistence with the Administration and Operation of the Port and Harbor".

This year, the study continues on the technology guidelines, which will become the guidelines for decision-making by the port administrator, to confirm that the original function of the port and harbor will be ensured when wind power is introduced to the port and harbor.

Also, in Japan, where there is very little area of shallow ocean, floating offshore wind power that floats on the ocean has been considered most promising, so in order to assure safe operations in the harsh natural environment of offshore conditions, "Safety Guidelines" was compiled.

Furthermore, in the future, even for ocean energy such as wave power and tidal stream, we have decided to develop a system to ensure the safety of power generating facilities such as float structure power generation facility, etc., and efforts to spread the use of marine renewable energy in cooperation with the relevant ministries and agencies will be ongoing.

(2) Promoting small hydroelectric generation

As initiatives toward a low carbon society, the implementation of small hydroelectric generation by using rivers is being pushed forward. Specifically, for the promotion and dissemination of small hydroelectric power generation, a thorough utilization of unused energy is being conducted through the introduction of a registration system of dependent power generation based on the River Law revisions, a project development support by consultation and survey data provision of the irrigation use application process at the contact desk of the Regional Development Bureau, and support for the placement of a small hydroelectric power facility for erosion control, to introduce aggressive management of the power generation facilities of the dams under the direct control of the Ministry.

(3) Promotion of the use of Sewage Biomass

Through the use of PPP/PFI, we will promote the energy utilization of sewage sludge by the effective use of bio-gas and solid fuel, as well as the use of sewage heat.

(4) Promotion of Solar Power Generation using Infrastructure Space

Based on the changes in energy supply and demand which was triggered by the Great Eastern Japanese Earthquake, in addition to the effective utilization of the vast spaces of sewage treatment plants, ports and and harbors, and airport facilities, steps have been taken to insure installation and placement by public entities of solar power generation facilities in public infrastructure spaces, such as government buildings and railway stations, and private businesses can install such facilities in roads and urban parks.

(5) Promotion of contribution towards the hydrogen society

With the expected expansion of hydrogen energy demand in the future, such as household fuel cells (marketed in 2009) and fuel cell vehicles (marketing plan 2015), working to create an environment for the realization of a hydrogen energy utilization society from the concepts of hydrogen production, storage, transportation, and usage.

a. Setting guidelines in regards to fuel cell vehicles

With the goal of achieving the world's fastest distribution of fuel cell vehicles scheduled to be marketed from 2015, the safety standards for fuel cell vehicles were determined.

b. Setting up the marine transportation system for liquefied hydrogen

Early construction of a liquefied hydrogen carrier that allows mass transport of liquefied hydrogen is expected. However, as this carrier will be the world's first, there are no existing safety standards which makes it necessary to determine the safety requirements as soon as possible. Therefore, from 2013, the Ministry has been studying the safety standards for a vessel that is resistant to the characteristics of hydrogen including an ultra-low temperature of -253°C, spread and penetration into material of the hydrogen molecule, a wide explosive range and the high ignition potential.

4 Promotion of Global Warming Countermeasures (Adaptations)

For the effects of global warming that cannot be avoided even with the most stringent mitigation measures, it is essential to have measures (adaptations) to prevent or reduce the damage to a minimum, or even take advantage of the opportunities for benefits.

As a part of the adaptation measures so far, the Ministry of Land, Infrastructure and Transport has been actively promoting measures against water-related disasters such as floods, landslides, storm surge disaster and drought, but also the government as a whole, established in July 2013 a climate change impact assessment subcommittee under the Central Environmental counsel's Global Environment Committee, which is working on evaluations of the impact of climate change in Japan towards establishment of an adaptation plan by the summer of 2015.

In the future, in accordance with the adaptation plan of the government, global warming predictions making use of the technical capabilities as well as addressing the accuracy of the monitoring system, measures against water-related disasters and wide range consideration will be given to the multifaceted effects of climate change, such as transportation infrastructure and heat island, to work on the study and development of overall adaptation measures from both the hardware and software perspectives.

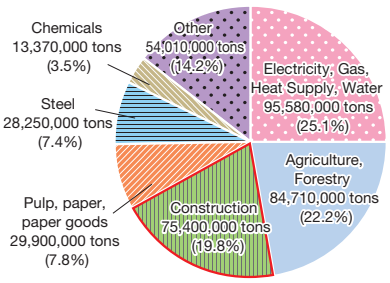
Section 2 Promoting the creation of a recycling society

1 Advancing recycling in construction

Construction waste accounts for approximately 20% of all industrial waste, 20% of final disposed amount, and 75% of all illegally discarded waste. Controlling the output of construction waste is a major task in the advancement of recycling. The total amount of construction waste produced in 2011 amounted to 75 million tons. Although the recycling rate for 2012 was 96%, better than the 93.7% of 2008, we must continue these activities in order to achieve high levels of recycling.

Raw sewage also accounts for 20% of all industrial waste, reaching approximately 75 million tons in 2011. We are promoting recycling in order to reduce this amount.

Figure II-8-2-1 Amount of Industrial Waste by Industry Sector and Recycle Rate of Construction Byproducts



Source) Prepared by the MLIT from "Status on Production and Disposal of Industrial Waste" of the Ministry of the Environment

Subject materials	Index	Results from 2005	Results from 2008	Results from 2012	Objectives for 2012
Asphalt, concrete clusters	Recycle rate (%)	98.6	98.4	99.5	More than 98
Concrete clusters		98.1	97.3	99.3	More than 98
Wood material derived from construction		68.2	80.3	89.2	77
Wood material derived from construction	Recycling and reduction *rate (%)	90.7	89.4	94.4	More than 95
Construction sludge		74.5	85.1	85.0	82
Construction mixed waste	Produced amount (ten thousand tons)	293	267(9% decrease in comparison to 2005)	280(5% decrease in comparison to 2005)	205(30% decrease in comparison to 2005)
Total construction waste	Recycling and reduction *rate (%)	92.2	93.7	96.0	94
Construction generated soil	Efficient utilization rate (%)	80.1	78.6	88.3	87

*Reduction refers to reducing the amount of waste through incineration, dehydration, or other processes.
Source) MLIT "2012 Construction Byproducts Survey"

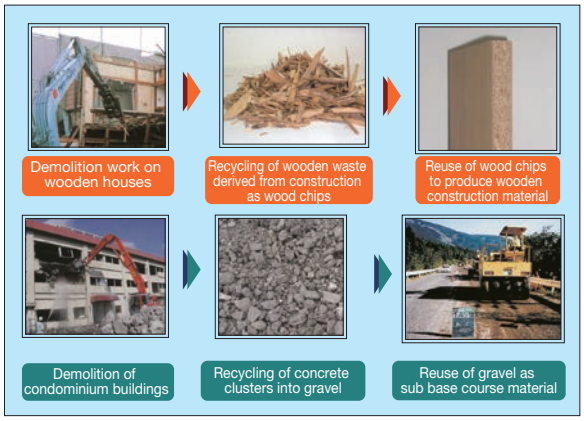
(1) Advancing recycling in construction

Based on the "Construction Material Recycling Act (Construction Recycling Law)", we are working to enforce proper measures through a simultaneous patrol throughout Japan.

In addition, we are conducting investigations and surveys needed for overcoming various challenges, such as the thorough dismantling and separation of plaster boards waste, as pointed out by the "Compilation on the Assessment and Investigation on the State of Enforcement of the Construction Recycling Scheme," and are working to advance recycling in construction.

In addition, because of the development of the new "Construction Recycling Promotion Plan" which incorporates the basic concept and goal of construction recycling, the "Construction Recycling Promotion Plan Study Subcommittee" established under the Social Capital Development Council and the Council of Transport Policy started review in 2014 to find measures to deal with the priority issues such as ensuring high recycling rate and reducing the rate of construction waste, responding to concerns about the development of up-cycling, decrease of soil from construction and construction waste in the future, and challenges related to the regional differences in construction materials recycling.

Figure II-8-2-2 Examples of Activities for Advancing Recycling in Construction



Source) MLIT

(2) Reducing sewage sludge and promoting recycling

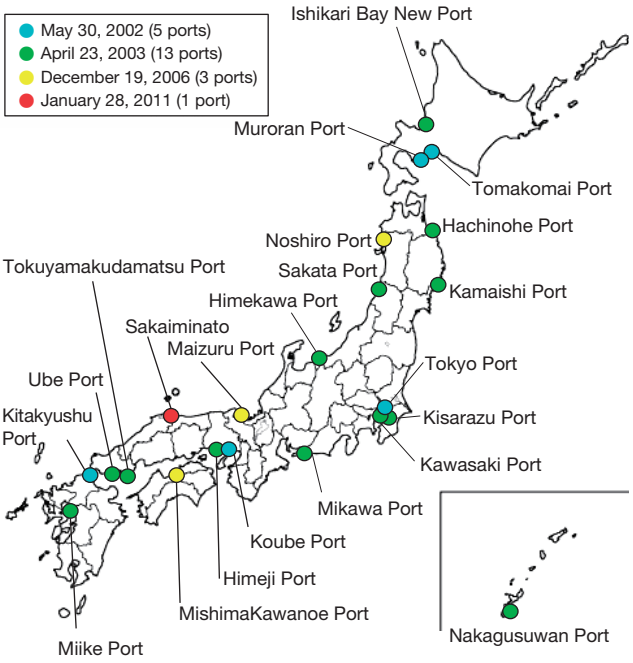
We are promoting the recycling of sewage sludge (recycling rate of 55% in 2011), utilizing of bio-gas produced by incinerating sewage for generating electricity and for fuel in cars that utilize natural gas, utilizing energy such as the solid fuel processing of sewage sludge, and advancing recovery and utilization of phosphorus from sewage and sewage sludge. Furthermore, we are proceeding with the Breakthrough by Dynamic Approach in Sewage High Technology Project (B-DASH Project) for proving innovative technology and systems for the effective use of sewage based resources.

2 Constructing a resource recycling logistics system

(1) Forming a resource recycling logistics system by utilizing shipping

In order to form the "cycling" of reusable resources for creating a recycling society, we have specified 22 ports throughout Japan as Recycle Ports (Integrated Reverse Logistic Base Port) for wide-spread flows concerning reusable resources. At the Recycle Ports, they undertake activities such as securing coastal facilities like wharfs, aiding in establishing facilities for handling reusable resources, promoting the cooperation between civilian and government sectors, and operations related to handling reusable resources.

Figure II-8-2-3 Specified Recycle Ports



Source) MLIT

(2) Systematic acquirement of bay area landfill sites for waste

Bay area landfills are being prepared in order to receive dredge soil produced by harbor improvement, or to receive waste materials that have difficulty finding final landfill sites. Particularly in the Osaka Bay, regional waste disposal sites are being improved through the Osaka Bay Phoenix Project [Note 1] to receive waste from the 168 municipalities in the 6 prefectures of the Kinki region. In addition, based on the Super Phoenix Plan [Note 2], surplus soil produced from construction in the Tokyo Metropolitan Area is being shipped to various ports and harbors and being widely used as landfill material.

Note 1 Business to promote the orderly development of the port by properly disposing in the sea landfill the waste generated from the 2 cities, 4 prefectures and 168 municipalities of the Kinki region.

Note 2 Mechanism for adjusting at the national level, the soil from construction in metropolitan areas to use it effectively as resources for port construction in ports that need landfill materials.

3 Recycling vehicles and marine vessels

(1) Recycling vehicles

In accordance with the "Act on Recycling, et. of End-of-Life Vehicles (Act for automobile recycling)", a system for confirming that end-of-life vehicles are scrapped, is being implemented. When deleting vehicle registrations from the "Road Transportation Vehicle Law," the scheme for returns in vehicle weight tax is also conducted, in order to promote the proper disposal of end-of-life vehicles and prevent illegal dumping.

(2) Recycling marine vessels

The recycling of large vessels (ship recycle) [Note 1] has generally been conducted in developing nations such as Bangladesh and India, where the frequent occurrence of human casualty accidents and marine pollution in the facilities continue to raise concern. In order to solve these issues, Japan lead discussions with the International Maritime Organization (IMO), which resulted in the adoption of the "2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (tentative name) (Ship Recycling Convention)". This convention mandates the inspection and retention of proof documents for marine vessels and ship recycling facilities respectively, and also bans the use of asbestos or polychlorinated biphenyl (PCB) in newly built vessels. Various guidelines to supplement the implementation of this convention were formulated at the IMO under the initiative of Japan and were all adopted in October 2012.

Japan, ahead of the world, is working towards a developed-country-style ship recycle system with the environment in mind, while carrying out the study of business management schemes based on market characteristics. There is also a study underway for a domestic legalization of a treaty with an eye towards the conclusion of the Ship Recycling Convention.

On other fronts, because privately owned pleasure boats are mostly made of fiber reinforced plastic (FRP), which is difficult to dispose, there has been a demand for a waste processing route for proper disposal. In response, we undertook activities in building a processing route, as well as developing recycling technologies for FRP boats. As a result, approximately 600 FRP vessels are properly recycled yearly under the leadership of the Japan Boating Industry Association throughout Japan since 2005.

4 Efforts in Green Procurement [Note 2]

In light of partial revisions to the basic government policies, based on the "Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Law on Promoting Green Purchasing)", the "Policy for promoting the procurement of ecologically friendly goods, etc." was adopted. Based on this policy, we are actively advancing the procurement of ecology-friendly goods for building materials, construction machinery, method of construction, and objectives in public construction work.

5 Promoting the use of wooden building materials

Because wood is an environment-friendly building material due to reasons such as requiring less energy to process in comparison to other materials, and long-term utilization in various applications contributing to preventing global warming and forming a recycling-oriented society, we strive to encourage the utilization of wooden materials in public construction.

Note 1 Vessels that have reached the end of their operational use are dismantled, and the majority of the parts are re-used as steel.
Note 2 Procuring eco-friendly goods that are defined under Article 2 in the "Green Purchasing Law" is called Green Procurement here.

Based on laws such as "the Act for Promotion of Use of Wood in Public Buildings", in May 2011, the "Plan for Promotion of Use of Wood in Public Buildings" was formulated to work on the use of wood as building materials and for the interior of buildings. In November 2013, the government's implementation status of this Act was published. Also, in cooperation with local government, introduction guidelines for the use of wood to be used in the design stage was published in June of the same year.

In addition, to promote the development of wooden houses and buildings that utilize local materials, the Ministry is working to support building of long-life quality wooden housing that use local materials, and the development of large-scale wooden buildings which will make use of cutting edge design and construction technology, as well as the development of leaders and wooden house production system in the region.

Figure II-8-2-4 Examples of the Use of Wooden Building Material

Entrance hall of Shinonome National Government Building

Source) MLIT

Section 3 National land development that revives and preserves the natural environment

1 Initiatives for preserving biodiversity

As efforts towards the Strategic Plan 2011 to 2020 (objective for the Aichi prefecture), adopted at the COP10 held in Nagoya city in Aichi prefecture in October of 2010, we are currently advancing activities for its achievement. Furthermore, the "National Biodiversity Strategy 2012 to 2020" was formulated in September of 2012, and we have decided to continue the advancement in activities for preserving, reviving and creating animal habitats in rivers, urban green lands, coastal regions and harbors.

In addition, as reference material for drawing up "Master Plan regarding Afforestation, Greening, and the Preservation of Forests and Other Green Spaces" (Master Plan for Parks and Open Spaces"), the master plan formulated by municipalities concerning overall greenery, we established the "Technical Considerations related to Conservation of Biodiversity in regards to the Master Plan for Parks and Open Spaces" in October 2011. Furthermore, in May, 2014, we formulated the "Urban Biodiversity Indices" to evaluate the situation of biodiversity and progress of policies taken by the local governments and now working to promote activities by local public organizations for the conservation of biodiversity in urban areas.

2 Creating rich and beautiful river environments

(1) Creating and conserving a healthy river environment

a. Creating a rich river environment and stimulating revival

In river development, based on the "Basic Guideline for Rich River Development (established October 2008)", we work for the conservation and restoration of animal habitats and diverse river scenery, while concurrently sustaining safety over flood control.

We are also promoting the restoration of wetlands through nature restoration projects and bettering the environment for fish climbing up or descending down river by improving fish ladders. By advancing these various activities through cooperation, we form an ecological network [Note] and promote the conservation and revival of the river basin ecosystem.

Note Using districts which have excellent natural conditions as core areas and by connecting them organically to ensure the appropriate placement and connections between habitat spaces.

Moreover, to effectively proceed with these activities, we are joining efforts with educated experts and various institutions, as well as utilizing research findings of government inspections of river areas and the Aqua Restoration Research Center, which has the largest experimental waterway in the world.

b. Implementing countermeasures for foreign species in rivers

One of the greatest threats to preserving biodiversity is the presence of foreign species. These species continue to spread their habitat throughout Japan, posing problems to the native ecosystem. As a countermeasure, we have circulated information such as the "Guideline of Countermeasures for Non-native Plants in Rivers" and "Examples of Countermeasures for Non-native Fishes (December 2013)" and are implementing measures against foreign species in various locations.

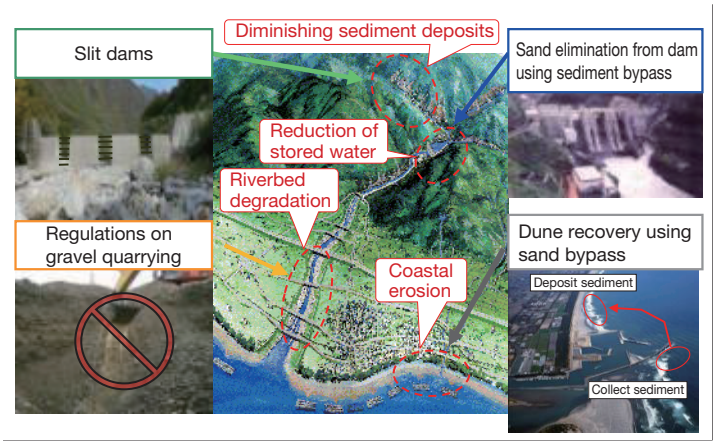
(2) Initiatives to recover the water supply in rivers

In order to preserve a healthy river environment, it is essential to sustain a rich supply of water. For this reason, we have specified the required amount of water in the basic policies for river improvement, based on the habitat of plants and animals, scenery, and water quality. In addition to working to sustain the supply, we are proceeding with activities for clean river recovery in recession areas downstream from dams of hydroelectric power plants. Meanwhile, in order to preserve and improve river environment downstream of dams, we are implementing flexible dam operation and tests for flexible operation (conducted in 16 dams throughout Japan as of 2013) to efficiently utilize a portion of the flood control capacity without hindering flood regulation. Furthermore, we are working to restore the water supply of rivers in urban areas, where the average amount of naturally flowing water has diminished, by pumping treated water from sewage plants.

(3) Promoting activities in the comprehensive management of sediment from mountains to coastal areas

Concerned that climate change will accelerate problems such as diminishing sand supplies to the coast, variation in river environments caused by changes in sedimentary flow, and coastal erosion caused by changes in littoral drift, in recent years, relevant institutions are working in cooperation to comprehensively control sediment flowing down from mountains to coastal areas. Specifically, we are strengthening cooperation with relevant institutions, by drawing up policies aimed at project collaboration in order to respond to problems caused by sedimentary flow from mountain streams, dams, rivers, and coast.

Figure II-8-3-1 Initiatives in the Comprehensive Management over Sediment



Source) MLIT

(4) Environmental education on rivers

As natural environments close to communities, recently, rivers host a variety of activities such as environmental studies and natural experience activities. In addition, we are promoting projects and disseminating of information so children can safely learn and play by riversides. Because there are hidden dangers and proper knowledge is essential for safe activity, we cooperate with the NPO "River Activities Council (RAC)", a citizens' groups which played a central role in establishment, to promote the cultivation of river administrators. Moreover, to prevent incidents caused by sudden swells in rivers, we are implementing measures by referring to the "Action Plan to Prevent Water Accidents caused by Sudden Flooding" established in 2007, and the reports from the "WG on water accidents prevention in small and medium size rivers" which was established in response to the occurrence of the Toga River flash flood in the Hyogo prefecture in July 2008.

• Children's Riverside Rediscovery Project
With the cooperation of citizens' groups, educators, and river administrators, rivers are registered as Children's Riversides and receive various means of support from the Center for Supporting Children's Riverside Activities. 295 locations are registered as of March 2013.

• Riverside Fun School Project
Utilization is encouraged for riversides that are registered as Children's Riversides and undergo riverside improvements required for enhancing experiential activities. 281 locations are registered as of March 2013.

• National Aquatic Organism Study
This activity is conducted to raise interest in rivers by investigating creatures that live in rivers close to communities. In 2012, 61,818 people participated. 59% of the inspection points (2,432 points) were judged to have "clean water".

3 Preserving and improving coastal environments

Because we must preserve animal habitats, care for scenery, and sustain appropriate usage of beaches, while protecting the coast from high tides, tsunamis, and billows, we are proceeding with maintenance and conservation that balances between "defense," "environment," and "usage."

Due to beached waste originating from foreign countries, in recent years, the diminishing coastal functions and deterioration of the environment, scenery, and ecosystem, and the effects on safe navigation for ships and the fishing industry have become severe. In response, based on the "Law for Protecting Beautiful and Rich Nature through the Promotion of Disposing Beached Coastal Waste contributing to the Preservation of Coastal Scenery and Conservation of the Environment (Coastal Waste Disposal Promotion Act)", we plan to implement effective measures for beached waste in close cooperation with relevant institution in the future.

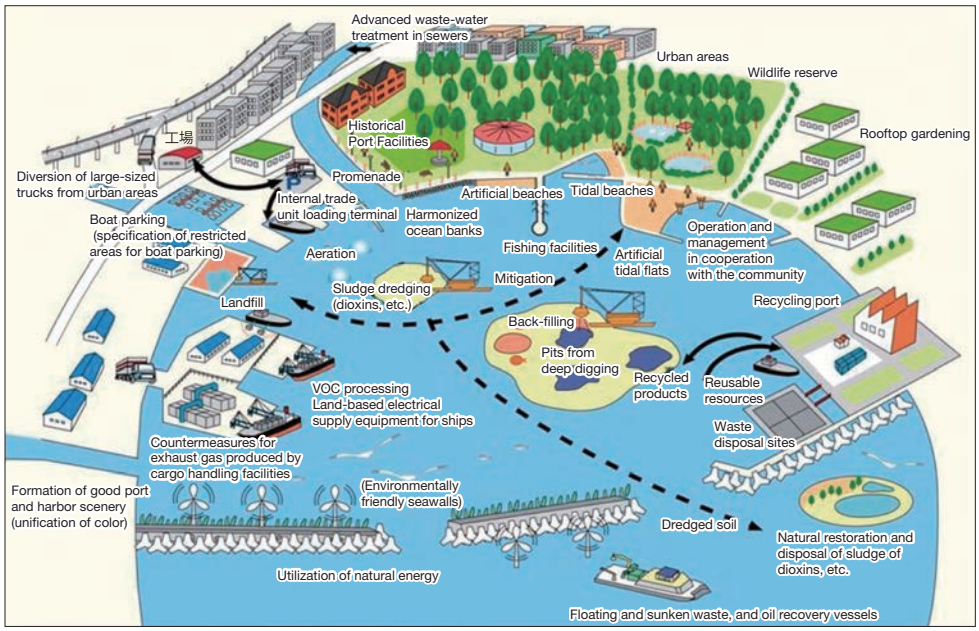
In addition, we are advancing the "Emergency Large-Scale Disposal Project for Beached Waste related to Disaster", where personnel from "Multiple Beaches" from a wide area work to integrally and efficiently dispose of waste, especially for emergency disposal of large amounts of beached waste, which disrupt the functions of coastal protection facilities.

4 Greening port and harbor administration

(1) Basic direction of future port and harbor environment policies

In order for ports and harbors in Japan to uphold their position as grounds for logistics, industry and living, and sustain continual growth, they must recover as much degraded or lost nature as they can, and incorporate environmental conservation in various port functions. For this reason, we are working towards "greening port administration," which involves the two parts of port and harbor development and utilization, and conservation, revival, and creation of environments in to one consolidated subject.

Figure II-8-3-2 "Greening port administration"



Source) MLIT

(2) Actively preserving, reviving, ad creating a healthy environment

We strive to efficiently utilize dredged sediment derived from harbor maintenance, by usage in creating tidal flats, sand capping, filling pits from deep digging, and disseminating port facilities that can coexist with organisms. After the projects have been started, we will continuously monitor the status after maintenance by implementing adaptable management methods. Various organizations such as administrative agencies and research institutes will register environmental data and construct a sharable database on the ocean environment; gathering, accumulating and analyzing data. Together, we actively work to preserve, revive and create a rich natural environment in coastal areas.

In addition, the "Seaside Nature School", which utilizes the areas preserved, revived or created, is being held in various locations throughout Japan as an effort to create opportunities for learning the importance of the natural environment.

(3) Initiatives in measures for preventing illegal boat parking

Because illegally parked boats affect the navigation and anchorage of vessels, coastal recreation, and fishing activities, as well as raising concerns over secondary damages from tsunamis, regulatory measures are being implemented for the specification of parking prohibited zones and the enhancement of mooring capabilities for small vessels.

In May 2013, the Ministry developed the "Promotion Plan for Comprehensive Measures for the Appropriate Management and the Improvement of the Operation Environment of Pleasure Boats" in working towards the elimination of abandoned boats.

5 Greening roads and promoting natural environmental measures

Greening roads is crucial for providing a comfortable atmosphere for road users, creating favorable scenery, mitigating global warming and heat island effects, and developing favorable urban environment. Due to these reasons, beginning with the green shade road projects for creating bowers in the road atmosphere, we are promoting improvements to roadside trees and cooperating with roadside communities in maintenance and management. In addition, we strive to preserve and revive the environment by avoiding areas that are valuable and natural environments, for road construction from planning stages, or try to minimize the effects or implement alternative measures if it cannot be avoided.

Figure II-8-3-3 Example of Greening Roads (Chiyo-da-ku, Tokyo)

Source) MLIT

Figure II-8-3-4 Example of Lawn Square (Tottori-shi, Tottori Prefecture)

Source) MLIT

Section 4 Building a healthy water circulation system

1 Becoming a society that can enjoy the blessings of water

Thus far, the development of water resources development facilities were promoted because of the priority placed on ensuring the balance of water supply and demand in response to the rapid increase in water demand in the post-war high-growth period. On the other hand, there is pressure to respond to the various challenges that have emerged such as the vulnerability of water infrastructure like the occurrence of long-term, wide-area suspension of water supply resulting from large-scale disasters and aging facilities, the risk of climate change due to global warming, societal demands of securing a healthy water circulation system as well as strengthening Japan's presence in contribution on an international level.

Against this background, on October 22, 2013, the Minister of Land, Infrastructure and Transport held an inquiry on the "Role of Water Resources Policy of the Future" and held a deliberation session in the National Land Council Water Development Subcommittee's Investigation Planning Committee which was then organized into the "The Role of Water Resources Policy in the Future (Interim Report)".

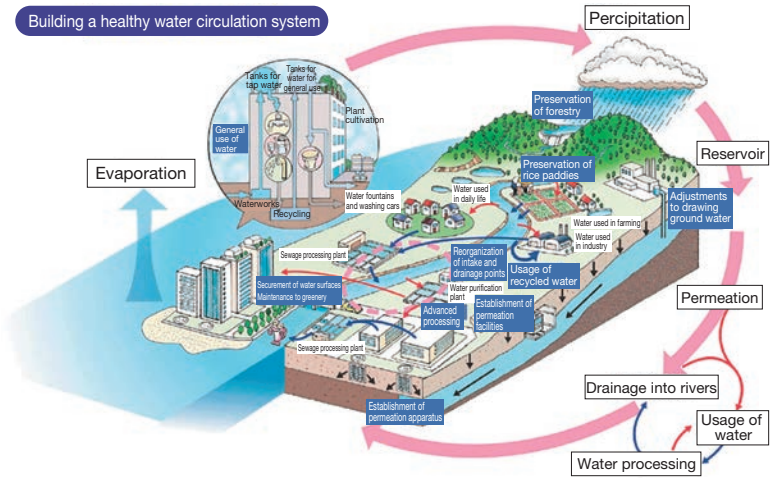
Aiming for the fundamental philosophy of "A Society that can enjoy the blessing of water", the "Interim Report" indicated that as the "First Year of Next Generation Water Policy", now is the time to address the construction of a "Social System with Width" that can respond in a flexible and comprehensive manner in any situation which may arise, the

strengthening and maintaining of measures already implemented along with a "multi-tiered deployment" of new measures, the inflection point indicating the basic, long-term direction, and specific measures are being considered in the work of finalizing the Policy.

2 Measures in building a healthy water circulation system in cooperation with ministries and agencies involving water

The liaison conferences for ministries and agencies involving in building water circulation systems has published the "Initiatives for Planning a Healthy Water Circulation System," and these ministries and agencies are working together to provide various means of support to promote activities in communities.

Figure II-8-4-1 An Image of Building a Healthy Water Circulation System



Source) MLIT

3 Establishment of the Basic Law of Water Circulation and the law concerning the promotion of rainwater use

By promoting integral and comprehensive measures for water circulation, the "Basic Law of Water Circulation" with the purpose of the sound development of the economy and society and improving the stability of citizen's lives by restoring and maintaining healthy water circulation, as well as the "Law regarding the promotion of rainwater use" with the purpose of achieving effective use of water resources along with contributing to suppression of the intensive outflow of rainwater into sewers and rivers, were established in March 2014.

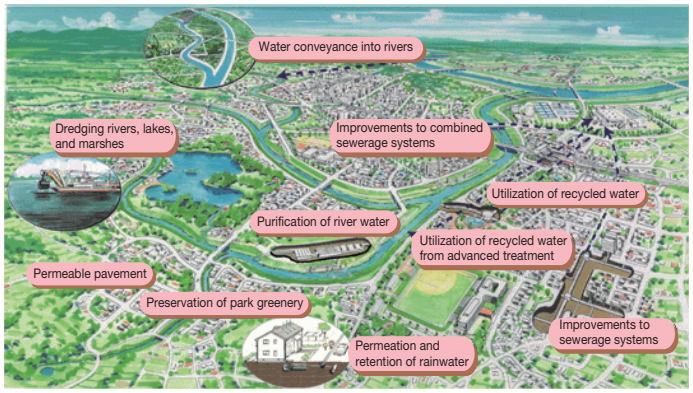
4 Initiatives in improving the water environment

(1) Proceeding with water purification

For bodies of water with serious deterioration in water quality, we are striving to acquire clean river water through water purification measures such as clean water transmission, dredging sediment, and purification by vegetation in places such as Kasumigaura Lake (Ibaraki prefecture), Shinji Lake and Nakaumi Lake (Shimane and Tottori prefectures).

In addition, local municipalities, river administrators, and sewage works administrators are striving to improve the river environment of 34 rivers with seriously

Figure II-8-4-2 Clear Stream Renaissance II



Source) MLIT

deteriorated water environments. They are working together to formulate and implement the "The Second Urgent Action Strategy for Water Environment Improvement (Clear Stream Renaissance II)" (34 locations selected).

(2) Surveys on water quality and response to water quality hazards

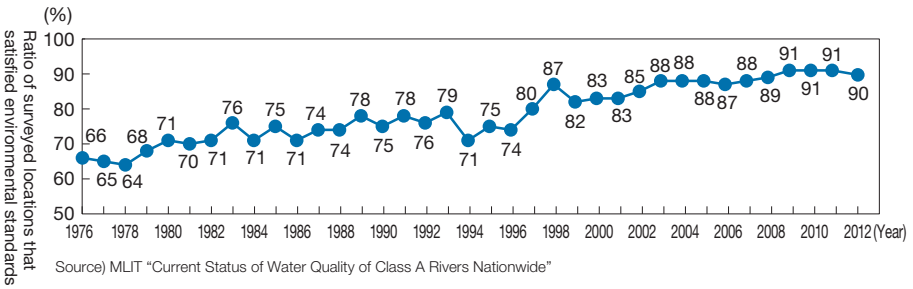
Water quality surveys of rivers, lakes, and water reservoirs are crucial for activities in conserving or reviving healthy water environments. In 2012, 1,077 locations in 109 water systems were surveyed.

In addition, we are creating a map of water quality surveys and conducting studies on aquatic organisms in cooperation with local citizens. Furthermore, based on a new water quality index, which comprehensively evaluates bodies of water from various standpoints, the results for the survey conducted in cooperation with citizens showed that approximately 25% (76 locations out of 305) class A rivers were judged as "clean rivers desirable for swimming" in 2012.

However, 1,244 cases of water quality hazards involving the leakage of oils or chemicals occurred in class A water systems in 2012. As for water pollution control, the Liaison Council for Prevention of Water Pollution, consisting of river administrators and relevant administrative authorities, was set up in all 109 water systems in Japan to quickly communicate information on the occurrence of water quality hazards, and for the containment of hazards, such as installing oil fences.

- On the national level, in 2012 the proportion of survey sites that met the environmental standards for BOD (biochemical oxygen demand) value (or COD – chemical oxygen demand) was 90% .
- Of surveyed locations in the rivers, 94% of the locations had good water of 3.0mg/L of BOD, in which salmon and sweetfish can thrive.
- For environmental standard items relating to the protection of human health (27 items such as arsenic), the proportion of survey sites that met the environmental standards was approximately 99%, with most sites meeting the standards.

Figure II-8-4-3 Ratio of Surveyed Locations that Satisfied BOD Levels (or COD Levels)



Source) MLIT "Current Status of Water Quality of Class A Rivers Nationwide"

(3) Improving the water environment of enclosed coastal seas

Regarding the enclosed coastal seas of the Tokyo Bay, Ise Bay, Osaka Bay, and the Inland Sea of Japan, because of the large amounts of organic pollutants and chemicals such as nitrogen and phosphate draining from land, and the loss of tidal flats and seaweed forests, the fishing industry has suffered damages from the occurrence of red and blue tides. In addition, problems such as environmental degradation and barriers to ship navigation have been occurring due to drifting garbage.

To resolve the current state, we advance activities to revive beautiful oceans by (1) sediment dredging, sand capping, and back-filling pits from mining to improve the substratum, (2) creating habitats for organisms by reviving tidal flats and seaweed forests and disseminating buildings that can coexist with nature, (3) removing floating waste and spilled oil by using sea clean up boats, and (4) reducing the amount of pollutants released into the ocean by improving sewage treatment facilities.

(4) Stimulating sewage maintenance to improve the water environment

We will appropriately formulate and review the comprehensive basin-wide planning of sewage systems, and promote high temperature incineration to remove nitrogen and phosphates which contribute to the eutrophication of enclosed bodies of water. In addition, we are working for early advancement in improving water quality and stratified advanced water treatment by partially renovating equipment and facilities in treatment plants that have not yet reached their scheduled renewal period.

As for the combined sewerage system, we plan to complete implementation of measures by 2022 through controlling the amount of water and the frequency at which untreated water is released in to streams during heavy rains.

5 Cultivating water and using it efficiently

(1) Stable supply of water resources

In order to secure stability in the utilization of water, there must be various policies corresponding to the situation of communities from both standpoints of supply and demand. Specifically, in the facet of demand, we must enhance the recovery and reuse of water, and increase awareness for conserving water. In supply, we must build and improve water resource development facilities such as dams, implement countermeasures for aging facilities related to water resources, develop crisis management measures, and increase the number of water resources by utilizing rainwater and recycled water. In addition to the conservation and use of groundwater, in order to conserve and activate the water source area, based on the "Special Measures for Water Source Area Act", work is being done to establish the living environment of the water source area and the industrial base, along with prevention of water pollution of the dam reservoirs.

In addition, climate change due to global warming has been pointed out, and as a response to the effects of climate change, such as an increase in the range of rainfall variation in the recent and future years and the early melting as well as reduction in snowfall, work is being done towards risk management of drought, building a water-saving society through demand management, implementing measures for aging and maintenance, earthquake resistance, avoidance of draught risk by promoting the public understanding of the conditions, as well as measures for water resources.

(2) Efficient use of water resources

a. Initiatives towards expanding the utilization of recycled water derived from sewage

Stable amounts of recycled water can be secured and is a valuable water resource in urban areas. Of all the treated sewage, approximately 1.4% undergoes treatment according to purpose, and recycled water is used in streams, sustaining water levels of rivers and the sanitation of toilets. We aim to further expand the utilization of recycled water.

b. Promoting the utilization of rain water

In order to efficiently utilize water resources, initiatives are being promoted to treat and use rainwater and waste water from facilities for sanitation of toilets and sprinklers. There are approximately 1,900 facilities utilizing treated water as of 2010, and they use over 65 million m3 a year. In order to continue promoting the utilization of rainwater, we are gaining understanding regarding actual conditions, including examples of facilities using rainwater and the considerations for using rainwater, and share this information with users.

(3) Securing safe and delicious water

Water service has become popular in Japan, and in recent years, the public's need for safe and delicious water continues to increase. For this reason, improvement measures such as water conservation measures for dam reservoirs, promotion of the sewer system, the introduction of advanced water treatment and combined sewer systems have been implemented.

(4) Promoting measures concerning the permeation of rainwater

Due to the spread of impervious areas in recent years by urban development of drainage basins, more rainwater flows into rivers in short periods of time instead of being absorbed into the ground. In addition to reducing flood damage from heavy rains by absorbing as much rainwater as possible into the ground, improvement to rainwater storage penetration facilities are being promoted through tax measures, for cultivating groundwater, contributing to the revival of springs, and building a healthy water cycle system.

(5) Promoting measures concerning groundwater

As a result of excessive utilization of groundwater for industrial purposes during the period of high economic growth, adverse affects emerged in various locations such as land depression and salination of water supplies. In the Noubi plain, Chikugo and Saga plains, and the Northern parts of the Kanto plain, where land depressions have occurred, activities for preserving groundwater and promoting proper usage are being conducted, based on the Guideline on Measures for Prevention of Ground Subsidence.

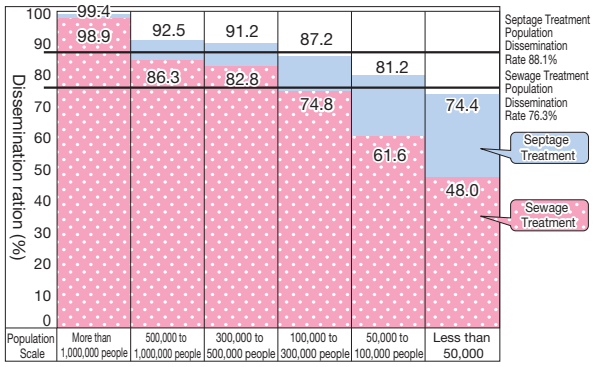
6 Realizing amenity by promoting improvements to sanitary drainage

Sewage is the indispensable social infrastructure for the development of healthy cities, treating waste, and preventing floods. In recent years, new demands are being made of sanitary drainage, including forming a low carbon, recycling society and a healthy water circulation system.

(1) Dissemination of sewage processing with sanitary drainage

Although the dissemination of sewage treatment plants reached around 88% (dissemination of sanitary drainage systems of around 76%) of Japan as of 2012 (total of 46 prefectures, excluding Fukushima due to effects from the Great Eastern Japan Earthquake), there is a large gap between regions. In particular, the dissemination of sewage treatment plants in small to medium communities with populations of less than 50,000 people remain low, only reaching a ratio of approximately 74% (dissemination of sewage systems approximately 48%). Focusing on improvement in areas with high population density, the advancement of efficient development in accordance to condition of communities and the rectification of the gap between communities are seen as being of the utmost importance for developing sewage systems in the future.

Figure II-8-4-4 Sewage treatment population by city scale

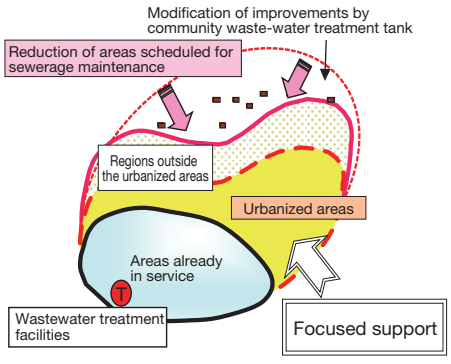


(Note) Due to the Great Eastern Japan Earthquake, the Fukushima prefecture was excluded from the survey. The collected data is of the 46 prefectures excluding the Fukushima prefecture.
Source) Prepared by the MLIT from information materials provided by the Ministry of Environment and Ministry of Agriculture, Forestry and Fisheries

a. Cooperation between businesses for efficient maintenance of sewage treatment facilities

In regards to the maintenance of sewage treatment facilities, individual disposal by using septic tanks are economical in areas where households are widely distributed throughout a region, while the collective disposal with sewerage systems and drainage facilities for agricultural communities become more economical as the population density rises. For this reason, each prefecture has established a “Prefectural Plan”, a compiled maintenance plan over sewerage treatment which reflects considerations over regional characteristics such as the economic efficiency and importance of protecting water quality. Based also on the declining population trend, a rapid review of State initiatives has been promoted in order to develop more efficient sewage treatment facilities. In addition, efficient means of maintenance are also being actively promoted through the implementation of cooperative schemes between other waste water treatment facilities such as cross-jurisdictional waste water treatment.

Figure II-8-4-5 Revision of Sewerage Plans and Focused Improvement



Source) MLIT

b. Sewage quick project

In light of the declining population and the strained state of public finances, this project aims for the widespread implementation of new methods for swift and mobile maintenance, not constrained by past technological standards, low in cost, and corresponding to circumstances of regions with the cooperation of local citizens, while a committee composed of experts inspect them for aspects such as capability, etc. Manuals are being drafted to assist in the utilization of six technologies, such as the "plant manufactured small-scale waste-water treatment facilities (catalytic oxidation method)", which were acknowledged for their effectiveness in field tests that took place in 14 municipalities up to 2012. Other technologies are also under inspection and evaluation for their utilization throughout Japan.

Figure II-8-4-6 Example of Implementing the Sewerage Quick Project (Small-Scale Waste-Water Treatment Facility in Engaru Town, Hokkaido)

Source) MLIT

(2) Attaining durability in sewerage projects

a. Proper stock management

With the progress of sewage systems, at year-end of 2012, there is a vast stock of approximately 450,000km of sewer line extension facilities as well as approximately 2,200 sewage treatment plants.

Because these sewerage facilities were built rapidly starting around the high economic growth period, the number of aging facilities is expected to increase rapidly from now on. Although in 2012, mainly small scale issues were arising, road collapses have occurred in 3,900 places due to corrosion caused by hydrogen sulfide and aging of the conduit facilities. Because the sewage system is an important social infrastructure which supports the safe and secure social and economic activities of urban living and provides a lifeline that is difficult to replace with alternative means, there is a necessity to sustain the required functions by conducting efficient, planned measures to deal with aging facilities through the introduction of stock management that practices preventative maintenance, while at the same time considering the introduction of comprehensive work consignment to private sector and efficient pipe inspection methods.

b. Reinforcement of business infrastructure

In the operation of sewerage projects, although it is a fundamental rule to cover costs (excluding portions covered by public expense) for treating waste water with money acquired from usage fees, the initial establishment requires a lump sum of funds. Due to the business characteristic in which income begins to stabilize as sewerage systems develop, there are cases where funds fall short during construction. Therefore, with the "Guide for restoring financial health in sewage management" we are pushing initiatives in each municipality for the restoration of financial health in sewage business management.

c. Consigning facility management to private sector and acquiring technical capabilities

In regards to the operation and maintenance of waste water treatment facilities, initiatives such as environmental improvements are being conducted to facilitate furthering the comprehensive work consignment to private sector [Note]. Based on demands from local public organizations, the Japan Sewage Works Agency provides technical support for constructing sewage facilities, as well as for optimizing their operation and maintenance, and cultivating technical experts at local public organizations, while developing new technology.

Note A method of facility management that reflects original ideas of private contractors by consigning details of operation methods in order to optimize operation while charging the responsibility to secure a specified level of capabilities such as sustaining the quality of released water to optimize operation.

(3) Revitalizing communities through sewage

The proper treatment of waste-water through improvements in sewage, and the preservation or creation of healthy water environments, stimulates regional settlement and promotion of tourism and industry. In addition, by creating river fronts using recycled water from advanced waste water treatment, stimulating regional activities through the operation and management of water amenity spaces by citizens, utilizing space above waste water treatment facilities, transferring sewage heat to be used as district heating, utilizing bio-gas as energy and efficiently using recycled resources derived from sewage, sewage contributes to regional vitalization in numerous facets.

(4) Promoting environmental education in the field of sewage

Working groups, consisting of elementary school teachers and sewage administrator representatives, created teacher edition textbooks that were well-suited for classroom use for sewage education. In order for teachers to freely make use of these teaching materials regarding sewers, they are being offered through the "Sewer Systems, the Path of Circulation Environmental Education Portal Site." Note Additionally, subsidies are granted to each elementary and middle school for supporting environmental education on sewage.

Figure II-8-4-7 Environmental Education in the Field of Sewer Systems

Efforts of Sewer Environmental Education by Osaka Minoo-shi Saito-no-Oka Elementary School

Source) MLIT

Section 5 Protecting the marine environment

(1) Control policies over large scale oil pollution

In order to eliminate the substandard vessels (a major factor for large scale oil pollution), Japan actively participates in international initiatives, such as the formulation of the international shipping database (EQUASIS), while also strengthening Port State Control (PSC), which checks if vessels meet standards, by conducting on-site inspection of vessels that enter Japanese ports. As for systems for inspecting if flag state governments are fulfilling their duties in monitoring and supervising ships from their own country, an arbitrary system proposed by Japan was authorized for establishment by the IMO Convention in 2005. However, in light of progress in initiatives, the system is now scheduled to be mandatory by January, FY2016. In order to enhance the effectiveness of inspections, Japan will participate in discussions in reviewing the manner of operation.

In addition, as countermeasures for occurrences of large scale oil and HNS pollution in and around the Sea of Japan, Japan works to strengthen international cooperation and collaborative systems by establishing the "NOWPAP Regional Oil and HNS Spill Contingency Plan" through the "Northwest Pacific Action Plan (NOWPAP)", the framework for joint efforts among Japan, China, Korea and Russia for protecting the marine environment. As for large scale oil spillages that occur in the sea areas surrounding Japan, measures have been established for prompt and reliable response through the utilization of large sized dredging and oil skimming vessel.

Note http://www.jswa.jp/kankyo-kyoiku/index.html

Moreover, the amount of allowable oil and waste discharge from ships is regulated by the MARPOL Convention [Note 1]. The regulation on waste discharge from ships was become more stringent in January 2013 through the amendments on annexes of the convention. In order to ensure proper disposal measures in ports and harbors, Japan provides support for improving reception facilities for waste oil generated in ships by means of tax policies and the formulation of the "Guideline for Reception Facilities of Ship Generated Waste for Ports and Harbors (Plan)".

(2) Control measures on air pollution from ships

As nitrogen oxides (NOx) would cause acid rain and provide adverse impacts on human health, the International Maritime Organization (IMO) regulates the NOx emissions from ships based on the MARPOL Convention. Currently, NOx Tier II limits are in effect, which reduce the NOx emissions by 20% compared to NOx Tier I limits. Further, the MARPOL Convention provides Nox Tier III limits which redude NOx emissions by 80% compared to the Nox Tier I limits for future. The NOx Tier III limits was proposed by Japan, as one of the world's leading engine manufacturing countries. In proposing NOx Tier III limits, Japanese engine manufactureres conducted developments of a exhaust gas after-treatment device (SCR equipment) which significantly reduces NOx emissions from ships as well as in-engine combustion technologies and demonstrated availability of those technologies through onboard tests. As the results of the technological developments, it was shown that reduction of NOx emissions for Tier III limits could be achieved.

The NOx Tier III limits will enter into force on January 1 2016. The MLIT has contributed to the discussion of the reduction of air pollutant from international shipping through the technological development of NOx Tier III, development of verification guidelines for SCR denitration equipment, and providing information which shows NOx Tier III limits could be achieved by such technologies.

(3) Control measures on invasive aquatic species carried by ships

It is pointed out that the transfer of aquatic species via ships' ballast water [Note 2] and ships' biofouling would threat marine ecosystem in waters where these ships navigate in. In order to prevent the transfer of invasive species, "International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004" and "the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species in 2011" were adopted at the IMO. The MLIT has actively participated in the discussion on development of the guidelines at the IMO with an aim of early entry into force of the Convention. In 2013, an IMO Assembly Resolution, lead by Japan, was adopted at the 28th session to relax the schedule for the installation of ballast water management systems. Futhermore, since the Convention is to enter into force near future, the implementation law of the Convention was proposed to the 186th ordinary session of the Diet [Note 3].

Section 6 Improving living environments by preventing atmospheric and noise pollution

1 Policies for environmental issues related to road traffic

(1) Measures for individual vehicles

a. Reinforcing exhaust gas regulations

For exhaust gas measures of new vehicles, seeking to further reduce nitrogen oxides and particulate matter emitted by vehicles, Japan established the most stringent regulations among global standards (post-new long-term regulation) in 2008, and began its consequent enforcement beginning in October 2009. In addition, test methods based on uniform domestic standards for special and two-wheeled vehicles were implemented in 2010. As for the diesel special car, tighter regulations of particle matter were set in 2010 for which the mandatory application was carried out sequentially from October 2011, along with the revision in January 2014 of relevant laws and regulations regarding further reduction of nitrogen oxides and blow-by gas measures for which the mandatory application is to be carried out sequentially starting in October 2014.

Note 1 International Convention for the prevention of pollution from ships.
Note 2 Sea water loaded as weight to balance the ship when it carries no cargo.
Note 3 Also, a proposal to obtain the approval for accession to the Convention was submitted to the 186th ordinary session of the Diet.

Meanwhile, exhaust gas measures for in-use vehicles (vehicles already in usage) such as those based on the "Amendment Act on Reduction of Total Amount of Nitrogen Dioxide and Particulate Matters Originating from Automobiles in Designated Areas (Automobile NOx PM Law)" are being implemented; Japan is working to bolster exhaust gas measures.

b. Development and practical application of next generation heavy vehicles

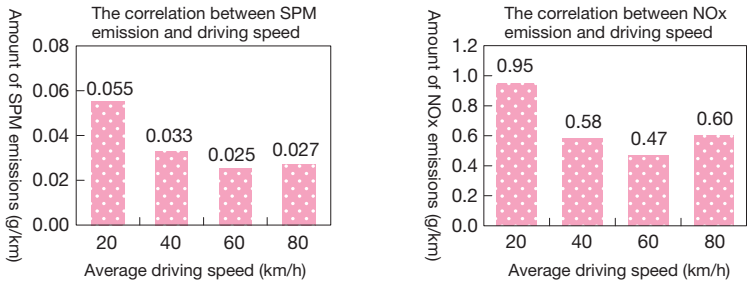
In order to stimulate the development and practical use of next generation vehicles, Japan is preparing environments for their dissemination. The government, industry, and academia are collaborating in their efforts for conducting demonstrative driving tests and vehicle development regarding high efficiency trucks, next generation bio-diesel engines, electric or plug-in hybrid trucks, and high performance electric buses, also formulating technical policies on safety and environmental conservation.

(2) Promotion of Traffic Flow Measures, etc.

a. Countermeasures for Air Pollution

As the emission of particulate matter (PM) and nitrogen oxides (NOx) from automobiles is increased by the number of starting and stopping times as well as the decrease of running speed, traffic flow improvement measures are being promoted from the viewpoint of improving roadside environment, such as setting up trunk road networks, countermeasures to bottlenecks, and transportation demand management (TDM) measures.

Figure II-8-6-1 **The Correlation Between Driving Speed and the Emission of Particulate Matter and Nitrogen Oxides (NOx) from Vehicles**



Source) MLIT

b. Countermeasures for noise pollution

We are proceeding with the lamination of low-noise pavement, installation of noise barriers, and maintenance of environmental roadside facilities along with the measures for traffic flow. Based on the "Law for the Improvement of Areas along Trunk Roads", in addition to preventative measures for issues caused by traffic noise, financial assistance is being provided for buffer buildings and noise insulation work for housing in construction projects in areas alongside roads.

2 Environmental measures for airports and surrounding areas

The most effective means of curbing aircraft noise is the implementation of low-noise equipment. In comparison to the past DC8, the current B767 only produces 80dB (A)[Note] of noise which has an approximately 90% smaller range of noise impact. However, even if low noise equipment is implemented, areas that are affected by noise impact require measures such as noise insulation work and relocation compensation projects. Most of the sound insulation work for housing, excluding continued maintenance, has been completed. Although the issues related to aircraft noise are progressing towards improvement and noise control zones in each airport are being sequentially reviewed, further measures are needed to reduce noise pollution in the future in order to promote harmonious development around airports and surrounding areas.

Note The noise (sound pressure) level weighed by A-frequency (frequency adjustments to evaluate sounds close to that of human senses, because the sensitivity of human ears differ depending on frequency).

3 Countermeasures for Railway Noise

In policies to control noise generated by Shinkansen bullet trains, to satisfy environmental standards, Japan implemented sound source control measures such as installing and heightening noise barriers, installing pantograph covers, and conducting corrective railway grinding to eliminate the cause of noise itself. As for the construction of new railways for Shinkansen bullet trains, for regions where the measures mentioned are difficult to implement, Japan is providing financial aid for sound insulation work in already existence housing.

As for noise control measures for existing lines, each railway company is instructed to lower noise levels below a fixed value when constructing new railways and renovating already existing railways, more than previously in large-scale improvement projects, based on the "Guidelines for Noise Abatement Measures in the Construction of New Lines and Large-scale Improvement of Conventional Railways."

4 Countermeasures for urban heat islands

Heat island effect refers to the phenomenon where a metropolitan area is significantly warmer than its surrounding rural areas. Though the global temperature has only elevated around 0.7oC in the last century, Japanese metropolitan areas have seen elevations of around 2 to 3oC, indicating the significant progression in heat island phenomena compared to the global warming trends. The main cause of this phenomenon is said to be increases in artificial heat from air-conditioning, the reduction of greenery and water surface, and the modification of land surface by urban development.

In order to promote comprehensive and effective countermeasures against urban heat islands, Japan is administering improvements to the "Heat Island Monitoring Network", a collection of specific measures systematically compiled in 2004 by relevant ministries and agencies. Improvements included the addition of the four objectives for promoting policies to alleviate health effects on people: reducing artificial heat emission, improving land surfaces, urban morphology, and lifestyle. The MLIT focuses on promoting policies for the swift acquirement of greenery and open spaces.

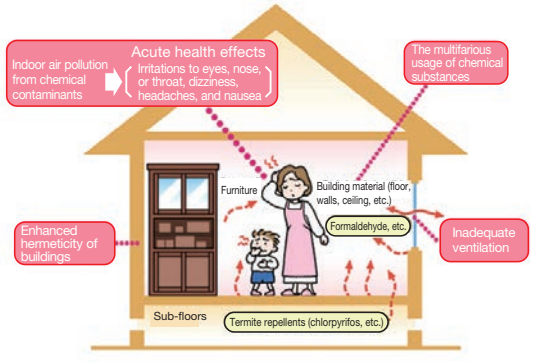
5 Countermeasures for sick building syndrome and soil contamination

(1) Countermeasures for sick building syndrome

Sick building syndrome describes a situation where materials used in the interior of a building disperses chemical substances which are hazardous to health. Japan is taking measures such as regulations on building materials and ventilation in the "Building Standard Act", and formulating performance labelling systems based on the "Housing Quality Assurance Law".

In the construction of government facilities, Japan has implemented restrictions over the usage of building materials containing chemical substances, as well as measuring the indoor concentration of airborne chemical contaminants after completing construction.

Figure II-8-6-2 Visualization of Sick Building Syndrome



Source) MLIT

(2) Countermeasures against issues related to dioxins

Studies over the water and earth quality of class A river systems throughout Japan are being conducted for dioxins specified in the "Act on Special Measures concerning Countermeasures against Dioxins". In FY2012, the sediment of all locations and the water quality of 97% (208 locations out of 215) of the locations satisfied environmental standards.

For rivers and harbors where sludge containing dioxin levels exceeding environmental standards were found, basic concepts over measures for rivers and harbors were integrated, and measures are being implemented based on the "Manual for countermeasures against contaminated sediment with dioxins encountered in harbors. (revised edition)" and the

"Manual for countermeasures against sediment with dioxins encountered in rivers and lakes", which were revised in April 2008. In addition, Japan is supporting pollution prevention projects in rivers and lakes with dioxins levels detected to be exceeding standards. In addition, support is being provided for pollution prevention enterprises for harbors and rivers for which dioxins exceeding the standards have been detected in the bottom sediment.

(3) Measures against asbestos

Issues concerning asbestos are life-threatening. As buildings that were built in the 1970s—when mass amounts of asbestos was imported to Japan—each their dismantling period, it is important to implement pre-emptive measures to prevent injuries from occurring.

In 2013, in order to efficiently and accurately grasp the actual use of asbestos building materials, the system for investigators of structures containing asbestos building materials was created.

Also, based on the "Building Standards Law," the removal of sprayed asbestos when renovating a building is required, auxiliary system of comprehensive grants for social capital development is in place to promote the asbestos removal in existing buildings and follow ups are being done for the situation of the removal and anti-scattering of asbestos in the existing facilities under the jurisdiction of national ministries and agencies.

Furthermore, Japan is promoting the dissemination of information in efforts such as compiling data bases on referential cost estimates for removal work of spray-applied asbestos insulation, documents useful for identifying building materials containing asbestos (Visually identifiable building materials containing asbestos) and information on such materials, as well as pamphlets for measures related to asbestos in buildings.

6 Environmental measures in construction

The regulations for use under the "Law on the Control of Specified Special Automobile Exhaust Gas" have been implemented for the purpose of reducing the damage to atmospheric environment caused by construction machinery, not travelling on public roads and, in January 2014, the Ordinance Notice (sequential application from October 2014) was amended to strengthen the regulation value for NOx to approximately 1/10. In addition, the dissemination of the use of construction machinery specified as the type with measures for exhaust gas, low noise and low vibration will be promoted along with the promotion for use in direct-control businesses.

Section 7 Observing, monitoring, and forecasting changes in the global environment

1 Observing and monitoring the global environment

(1) Observing and monitoring climate change

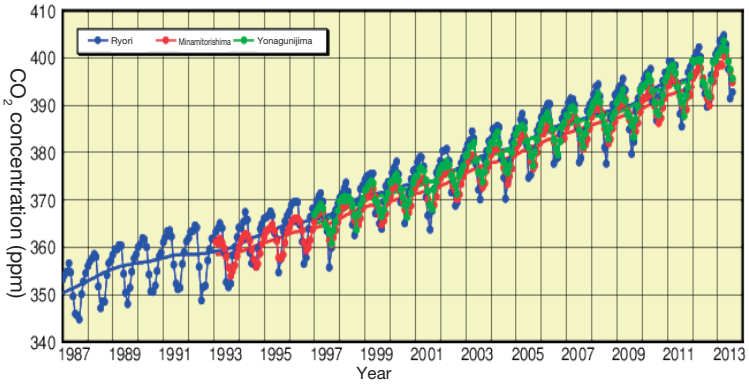
In order to grasp the status of greenhouse gases (GHGs), the Japan Meteorological Agency (JMA) is observing CO_2 trends in the atmosphere at three stations in Japan. CO_2 concentrations in the marine atmosphere, as well as those in the sea surface water are being observed in the northwest Pacific by ocean station vessel. GHGs in the upper troposphere in the northwest Pacific is also being observed. Furthermore, JMA is not only monitoring climate changes but also observing solar and infrared radiation at domestic five stations in order to reduce an uncertainty of global warming projections.

In addition, JMA observes sea level rise accompanied by global warming, and publish information on the long-term change in sea levels around Japanese coasts.

In addition, in order to improve the accuracy of seasonal weather forecasting and monitoring of climate change, JMA produced the Japanese 55-year reanalysis (JRA-55), a historical global atmospheric data with homogeneity in space and time.

Moreover, "Climate Change Monitoring Reports" and "Report on Climate Change and Extreme Weather" (in Japanese) are compiled based on results from observation, and future projection of climate changes, extreme weather events and global warming is disclosed to the public. Serving as the World Data Center for Greenhouse Gases (WDCGG) of the World Meteorological Organization (WMO), JMA also archives and provides observation data on greenhouse gases around the world.

Figure II-8-7-1 Shifts in CO_2 concentration throughout Japan



Source) Japan Meteorological Agency

(2) Observing and monitoring extreme weather events

The Japan Meteorological Agency (JMA) monitors extreme weather that occurs in Japan and many parts of the world to compile and then report on a regular basis their observations regarding areas with extreme high and low temperatures or rainfall as well as weather disasters. Also, when extreme weather conditions are occurring that significantly affect the public, progressive reports are given summarizing the information regarding features, factors and the outlook.

Furthermore, as a Regional Climate Center of the World Meteorological Organization (WMO), JMA provides information such as monitoring and analysis of extreme weather as well as technical assistance through training and dispatch of experts to National Meteorological and Hydrological Services in Asian countries to support the climate services in the Asia-Pacific region.

(3) Initiatives aimed to improve next generation geostationary meteorological satellite

The manufacture of the next geostationary meteorological satellites Himawari-8/9 was started in 2009 and the launch plans are for Himawari-8 in 2014 and Himawari-9 in 2016. In addition to the improvement of disaster mitigation function against such weather as typhoons and torrential rain, these satellites lead the world in their powerful monitoring functions for the global environment such as global warming.

(4) Observing and monitoring the ocean

The ocean is greatly impacting the earth's climate by storing a much larger amount of heat than the atmosphere, and it is also easing the progression of global warming by absorbing CO_2 discharged by human economic activity. In order to monitor global warming, an accurate grasp of oceanic conditions is essential.

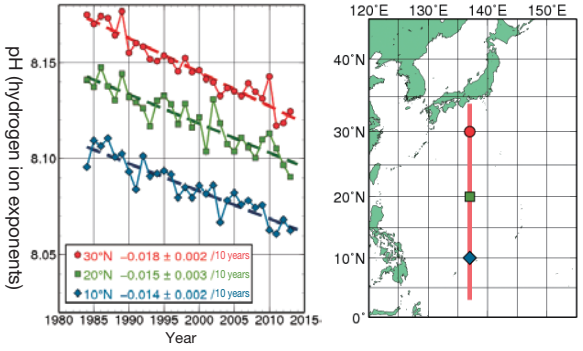
The Japan Meteorological Agency (JMA), under the international cooperative structure, monitors oceanic conditions by carrying out ocean observation with high accuracy from research vessels in the western North Pacific Ocean along with using data from satellites and Argo floats, or profiling floats to automatically observe the ocean interior.

The JMA website "Marine Diagnosis Report" provides information on the present status of the ocean such as ocean temperatures, ocean currents, sea level, sea ice, as well as the prospect for the future.

In order to supplement data obtained from Argo floats, the Japan Coast Guard constantly monitors fluctuations in the Kuroshio Current in waters surrounding the Izu Islands, using high-frequency radar, and publishes the observation data. In addition, the Japan Oceanographic Data Center collects and manages data obtained by Japanese marine research organizations, and discloses it to relevant institutions and to the public.

Figure II-8-7-2 Monitoring the Global Environment by research vessels

The long-term changes in hydrogen ion exponents (pH) in 10, 20, 30 degrees latitude north along the 137th longitude line (left) and the analysis results (right). The numbers in the graph indicate the variation ratio per 10 years. The progression of "oceanic acidification" is indicated by how much the pH decreases.

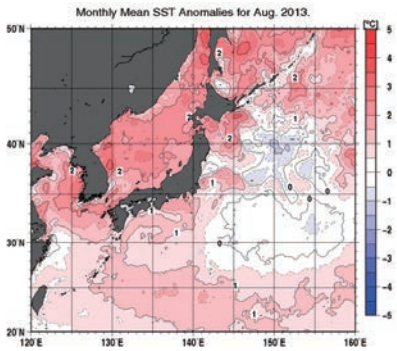


Source) Japan Meteorological Agency

Figure II-8-7-3 Example of a "Marine Diagnosis Report" published on the Japan Meteorological Agency Website

[August 2013 High SST around Japan]
- SST around Japan was much higher than normal in August 2013.
- The average SST for August was 29.2°C (+1.2°C compared to average). Sea off Shikoku and Tokai and 29.0°C (+1.5°C compared to average) in the East China Sea, making it the highest average for August since 1985 (Note).

Note: Statistics based on data for the 29 years since 1985 when observational data by satellite became available.



[August 2013 Distribution of the monthly mean sea surface temperature]

Source) Japan Meteorological Agency

(5) Observing and monitoring the ozone layer

The Japan Meteorological Agency annually publishes the outcome of observations on ozone and ultraviolet radiation. According to these studies, the global amount of ozone continues to be low from a long-term perspective. Additionally, in order to prevent adverse effects to the human body by ultraviolet radiation, information on the topic is published daily using a numerical index (UV index) for easy comprehension of the intensity of ultraviolet radiation.

(6) Promoting routine operational observation in the Antarctic

Geospatial Information Authority of Japan is conducting geodetic observation of the Antarctic regions, creating and updating topographic maps, and managing digital altitude data. The achieved results contribute to the smooth and safe activities of Antarctic research expeditions, and contribute to the research of global environmental changes etc. as well as international activities related to geodetic survey and geospatial information.

The Japan Meteorological Agency continues to conduct observation of the ozone and solar radiation as well as surface and upper-air at the Syowa Station (Antarctica). Accumulated meteorological data contribute to monitor and research the global environment, such as the changes in Antarctic ozone hole and global climate, and are utilized for the formulation of international policies.

The Japan Coastguard is conducting topological studies on the sea floor. The observation data is being used for creating hydrographic charts and also as the basis for research related to past environmental conditions such as glacial erosion and sedimentary environments. In addition, they conduct tidal observations , which contribute to monitor the fluctuations in sea levels, which are closely tied to global warming.

Column

"Guiding Committee for GEBCO" Coast Guard Marine Information Director elected Chairman

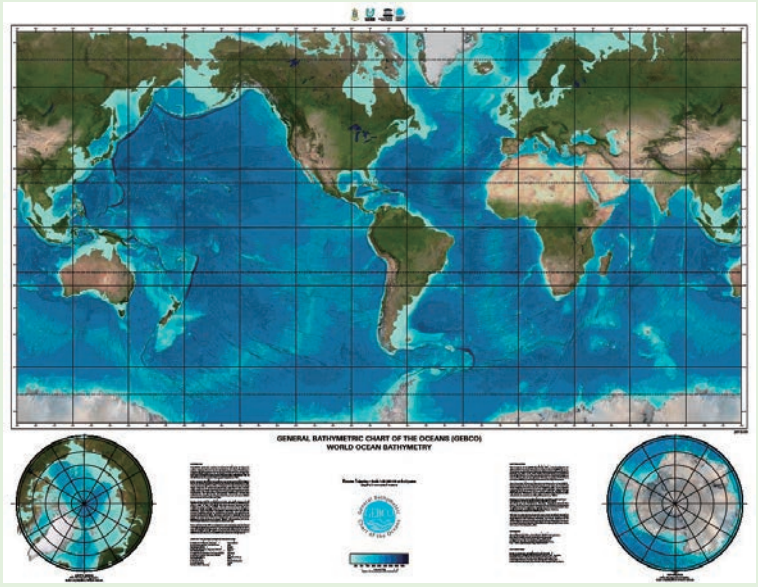
Shin Tani, the Coast Guard Marine Information Director was elected to be Chairman of "GEBCO [Note 1] Guiding Committee for GEBCO [Note 2] " which promotes the bathymetric chart creation project for oceans world-wide.This election is recognition of Japan's deep involvement with the GEBCO project and rich scientific knowledge. Sir Laughton, scientific advisor to Queen Elizabeth, also served as chairman in the past and Director Tani will be the sixth chairman.

Japan, which has one of the most complex undersea features world-wide with 4 global plates clashing as well as a 9,000 meter deep undersea trench in the immediate vicinity of an urban area with a population of 10,000,000, has focused on creating a bathymetric chart and investigating the undersea features from ancient times in order to clarify this undersea phenomenon and elucidate the mechanisms of earthquakes and volcanic eruptions. Even in the continental shelf that spans 310,000 square kilometers corresponding to 80% of the area of Japan which received recognition in 2012, the information of the elaborate undersea terrain features played an important role. Japan is recognized as the world's most advanced country in terms of undersea features investigations and creation of the bathymetric chart.

It has been pointed out that information on undersea features is essential for the scientific clarification and response to natural disasters originating from the sea such as tsunami, earthquakes and volcanic eruptions as well as providing important information in considering climate change on a global scale. Also, information on undersea features is valuable for fisheries and in the development of marine resources (energy and mineral resources of the seabed, renewable energy such as offshore wind and tidal power). These things are leading to the internationally growing interest in precise bathymetric charts.

On the other hand, the sea area for which precise undersea features data is shared is still limited to 10% of all world seas. The promotion of terrain studies for sea areas not yet surveyed and finding data that has been recorded but has yet to be shared are important issues. From now on, the Ministry will be tackling the difficult challenges of enhancing current data, preparing topographical information and topographic maps that meet the needs of the undersea features information and the development of the next generation to continue this work, with the cooperation of various countries, organizations and experts.

Bathymetric Chart Created by the Guiding Committee for GEBCO



Source) Japan Coast Guard

Note 1 About GEBCO (General Bathymetric Chart of the Ocean)
This is the only official enterprise to create a bathymetric chart of the whole word and the International Hydrographic Organization (IHO) and UNESCO's Intergovernmental Oceanographic Commission (IOC) are promoting it together. It was started with a proposal by Archduke Albert of Monaco in 1903.

Note 2 About Guiding Committee for GEBCO
It handles the overall coordination of the GEBCO project and is composed of 5 members each selected from IHO and IOC for a total of 10 committee members.

2 Research and Prediction of the Global Environment

The Japan Meteorological Agency (JMA) and the Meteorological Research Institute (MRI) are developing prognostic models on changes in climate around Japan and the world, and actively participate in international research programs such as the World Climate Research Program (WCRP). MRI conducts research on global warming predictions as well as development of Earth System Models including the carbon cycle processes, and actively contributed to the Fifth Assessment Report (published 2013 – 2014) of the Intergovernmental Panel on Climate Change (IPCC). In addition, JMA published the Global Warming Projection Volume 8 in 2012, which showed a warming prediction around Japan more detailed than any in the past by using a sophisticated regional climate model.

In 2013, the National Institute for Land and Infrastructure Management published the results of research conducted thus far as the "Research on Climate Change Adaptation Policy (Interim Report)" that presented the technical infrastructure that is required in order to consider and establish measures, from a multi-faceted standpoint of irrigation and flood control as well as the environment, which can respond to future climate change.

3 Promoting Global Mapping Project and the world geodetic network

Japan serves as the secretariat for the International Steering Committee for Global Mapping, collaborating with national geospatial information authorities around the world to develop and release the Global Map Version 2 (digital geospatial information covering whole land area), leading Global Mapping Project (182 participating nations and regions as of December 2013), and advancing the utilization for understanding and analysis of the global environment through United Nations Committee of Experts on Global Geospatial Information Management (UNCE-GGIM) and others. In addition, by participating in international observation utilizing VLBI (Very Long Baseline Interferometry, which is a survey technique using radio waves from quasars) and SLR (Satellite Laser Ranging is a method for measuring the range of an orbit by deflecting laser off of retro-reflectors on an artificial satellite), tide observation, absolute gravity measurement, and International GNSS Service (IGS), Japan is conducting observations and research on global crustal deformations. Moreover, Japan conducts the "Environmental Monitoring of Japan", which produces vegetation index related to the activity of plants by analyzing of satellite data.

Chapter 9 Strengthening International Expansion and International Contributions

Section 1 Promoting the Export of Infrastructure Systems

1 General Direction of Government Policy

The international demand for infrastructure, particularly for emerging countries, is enormous and due to rapid urbanization and economic growth, this market is expected to grow even more. For this reason, as part of Japan's growth strategy and international expansion, Japan's strengths regarding infrastructure systems will be utilized to meet the vast infrastructure demands of the world.

On the other hand, international competition for project orders is fierce and for Japanese companies to get orders, the public and private sectors need to work closely to create an environment that enables Japanese companies to receive orders.

Therefore, the government established the "Infrastructure Strategy Economic Cooperation Meeting" in March 2013 and compiled the "Infrastructure System Export Strategy" based on the discussions of policies that the government should undertake by relevant ministers including the Minister of Land, Infrastructure, Transport and Tourism. This strategy was incorporated into the "Japan Revitalization Strategy" in June 14 of the same year to ensure it was implemented without delay.

The Infrastructure System Export Strategy aims to achieve 30 trillion yen (currently 10 trillion yen) in infrastructure-related orders to Japanese companies by 2020. The pillars of this policy in the context of this strategy are: 1) promote public and private sector cooperation to strengthen the global competitiveness of companies, 2) support the discovery and incubation of companies, local governments, and human resources that will lead the overseas expansion of infrastructure, 3) acquire international standards utilizing advanced technology, knowledge, etc., 4) support entry into new frontier fields, 5) promote the securing of stable and inexpensive resources.

2 The Concept of Infrastructure System Exports in the Field of Land, Infrastructure, Transport and Tourism

In accordance with the "Infrastructure System Export Strategy", MLIT will promote infrastructure system exports in the field of land, infrastructure, transport, and tourism but in order for Japanese companies to successfully compete with rival countries and win bids, it is necessary to capitalize on Japan's strengths to create safe and highly reliable systems that integrate hardware and software as well as flexibly accommodate the needs of the target country.

For this, we aim to participate in the upstream stage (conceptual stage) of the project such as through top sales or broadcasting information at international conferences as well as pushing for Japanese technology and standards to be adopted as international standards or local standards in the target country to foster an environment that facilitates participation from Japanese companies. Also, in addition to responding to issues in the field of transport and urban infrastructure such as large initial financial investments and long development periods as well as demand risks, we will also broadly support Japanese company bids and business development by assisting companies encountering difficulties in international expansion and other matters for successful resolutions.

3 Upstream Involvement and Information Dissemination

It is necessary to begin upstream in order to obtain infrastructure projects, by researching the needs of partner countries and making proposals that address them as well as utilize opportunities such as top sales and seminars regarding the safety and reliability of Japanese technology and the total cost-effectiveness when including the operational stages and deepen our understanding with partner countries.

For example, in fiscal 2013, the Minister of Land, Infrastructure, Transport and Tourism visited Myanmar, Singapore, Thailand, Vietnam, and Indonesia for discussions and to exchange opinions with the heads of state as well as minister in charge of land, infrastructure, transport and tourism to conduct top sales for Japanese infrastructure. Also, Deputy Ministers and Parliamentary Secretaries visited a total of 13 countries and for countries with infrastructure needs, talks and other activities were held to promote Japanese infrastructure to prospective countries.

Additionally, opportunities such as foreign ministers and dignitaries visit Japan, hosted seminars, and invitation of dignitaries were actively used to spread the superiority of Japanese infrastructure. In particular, at the "8th APEC Transportation Ministerial Meeting" held in September of 2013 which brings together the transport ministers and officials from 21 APEC member countries and regions (economies), this opportunity was used to introduce land, sea and air infrastructure as part of a "Technical Tour" with five different courses. Around 70 members, including the representative, from the 20 economies represented in the Ministerial Meeting participated to experience Japan's superior infrastructure firsthand.

On the other hand, in addition to spreading information about Japan's infrastructure, international public and private sector councils were established for the infrastructure fields of water, roads, railways, ports, and Eco-city as a forum for the private and public sectors to coordinate the promotion of infrastructure exports. In fiscal 2013, the "Aviation Infrastructure International Development Council" was newly established and the first meeting was held in April of the same year. In addition to this, the "Japan Disaster Prevention Platform" will be established in early fiscal 2014 for the field of disaster prevention.

4 Development of Soft Infrastructure

Japan will actively participate in discussions in the establishment of international standards so that Japanese standards are reflected and promote Japanese standards to become de facto standards[Note] in prospective countries. This will help foster an environment that is advantageous to Japanese companies to enter markets and receive orders and also lobby to reflect the national land and urban structure of Asia-Pacific countries, including Japan, in international standards.

5 Supporting Businesses for Overseas Infrastructure

For overseas infrastructure projects, there is a growing trend for cases where orders include downstream (operations and management stages) aspects. On the other hand, there are differences in regulations and business practices of partner countries, and as a result, there are companies that struggle with issues arising from overseas projects making so that it is necessary to support private sector activities from a diversified perspective.

Specifically,

1) An increasing amount of infrastructure projects in emerging countries are utilizing the private sector to take advantage of private sector project participation and funding under strict budget restrictions. Especially, project in the sectors of transport and urban development come with expectations of long-term returns, but on the other hand it has characteristics such as long development terms, demand risks during the operations phase, and the influence of local government, requiring appropriate measures which are issues for the participation of Japanese companies.

Note A standard in fact. Although the standard is nonofficial, it is seen as a standard due to accounting for a large portion of the market.

For this reason, as part of the Japan Revitalization Strategy, to promote the entry of Japanese project stakeholders into international markets for transport and urban development projects, 58.5 billion Japanese yen will be earmarked for industrial investment within budgetary financing, addressing demand risk, and establish the "Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development. (hereafter JOIN)" to integrate "investment" and "project participation" as per requisite laws establishing the framework passed in April 2014.

JOIN will provide funding and other investments to local project owners in cooperation with Japanese companies as well as dispatch personnel such as executives and engineers in addition to conducting negotiations with the partner country. Also, since the international promotion of infrastructure systems is an important national policy, the Minister of Land, Infrastructure, Transport and Tourism and other ministers involved will coordinate to manage JOIN appropriately.

2) Additionally, an "Overseas Construction Hotline" was established within MLIT to respond to inquiries from Japanese companies for issues faced regarding construction technology and construction management in the context of international construction projects. Also, the inquiries made are used as feedback for things such as discussions with partner country governments so that Japanese construction companies can expand overseas reliably.

3) Furthermore, along with the expansion of the overseas construction market database, the collection of construction industry information from Overseas Establishments , and implementation of strategy formulation for construction and real estate companies to participate in international PPP projects, laws and regulations that foster a business environment conducive to Japanese construction and real estate companies are being developed to support these efforts.

Column

Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development.

Japan is facing a declining birthrate and aging society ahead of the world and in order to continue medium to long term economic growth, it is becoming increasingly important to be competitive in the ever growing and expanding international market. In particular, the global infrastructure market is expected to grow further due to rapid urbanization and economic growth. Since it is difficult to satisfy such a large demand with public investments alone, in recent years, operational projects utilizing PPP that take advantage of private sector finances and expertise and this is becoming a major business opportunity for private sector companies around the world.

Under the "Japan Revitalization Strategy (Cabinet decision June 14, 2013)", a target of achieving 30 trillion yen in infrastructure system orders by 2020 was set and the promotion will be undertaken through the joint efforts of the public and private sector. Operation type projects in the sectors of transport and urban development come with expectations of long-term returns, but on the other hand it has characteristics such as long development terms, demand risks during the operations phase, and the influence of local government, requiring appropriate measures which are obstacles for the participation of Japanese companies.

Within the private sector there is increased interest in expanding into international infrastructure systems. At the "Advisory Panel of Experts Meeting for the Promotion of International Expansion for Infrastructure (Chaired by Professor Hitoshi Ieda)" hosted by MLIT, the discussions compiled February 2013 reflected opinions from private sector experts that policies to reduce project risk were needed.

Based on these government policies and private sector needs, MLIT is moving forward with the initiative of establishing the "Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development. (hereafter JOIN)" to integrate "investment" and "project participation" for international transport and urban development projects. The national budget for JOIN includes provisions of 109.5 billion yen (58.5 billion yen in industrial investment [Note 1], 51 billion yen government guarantee [Note 2]) in the 2014 Fiscal Investment and Loan Program. Also a law for the founding of JOIN was established in April 2014.

JOIN aims to promote the expansion of Japanese companies into international markets for transport and urban development through assistance listed below for the purpose of contributing to the

sustained growth of Japan's economy. Also, it is anticipated that Japanese technology and expertise will benefit the countries and regions where the projects take place.

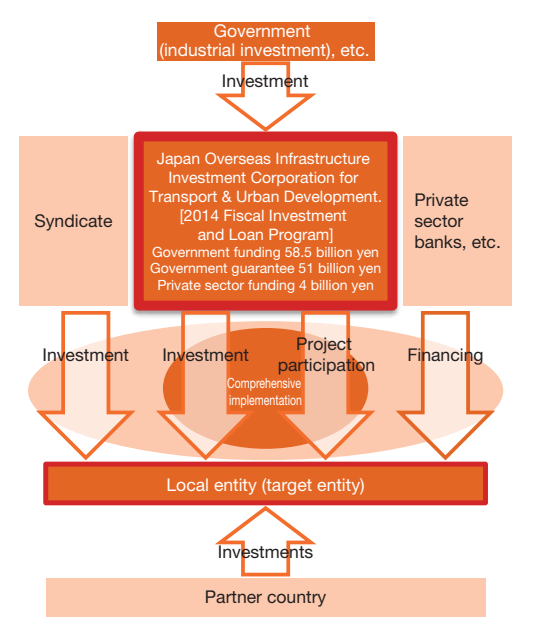
1) Investment

When Japanese companies participate in infrastructure projects abroad, the companies concerned will establish a local business entity to conduct business operations. JOIN will jointly invest in the local business entity with the businesses involved.

2) Project participation

JOIN will participate in the following projects for the invested local business entities:

- Dispatch executives and engineers to take advantage of Japanese technology and experience.
- Negotiate with partner countries as the investing authority of Japanese government.



Note 1 Fiscal Investment and Loan Program (Industrial investment) :
Investments to strengthen the development of enterprise, strategic international expansion of trade, and the promotion as well as strengthening of international contributions using funds from Japanese government such as the dividends from NTT and JT stocks as capital. Its characteristic is that it provides capital for projects that are highly desirable for policy that can expect a return but the risk is too high to procure required funding from the private sector alone.

Note 2 Fiscal Investment and Loan Program (government guarantee):
When organizations such as policy finance institutions and independent administrative agencies procure funding in the financial market, the government provides a guarantee to help ensure that the funds necessary for the project are procured smoothly and favorably.

Section 2 Promotion of International Cooperation and Negotiations

1 Initiatives in the Field of Economic Partnerships

(1) Entering into Economic Partnership Agreements/Free Trade Agreements (EPA/FTA)

Japan intends to strategically promote economic partnerships with the Asia-Pacific region, East Asia region, Europe and others. As of March 2014, there are 13 EPAs/FTAs in effect between various countries and regions. These arrangements will be utilized to strengthen the competitiveness of transport, construction, and other industries as well as promote international expansion; liberalization of the service sector in partner countries such as the abolition or deregulation of foreign capital restrictions; and promote the expansion of participation opportunities related to government procurement.

(2) World Trade Organization (WTO) Endeavors

In the WTO Doha Round negotiations, Japan aimed to further liberalization and chaired multilateral meetings in the fields of maritime transport and the construction services sector among other efforts to actively participate in negotiations regarding land, infrastructure, transport and tourism. From 2012, while Doha Round negotiations are experiencing a general lull, discussions are underway for the purpose of creating a Trade in Services Agreement (TiSA) between Japan and eager countries and regions to further liberalize trade in the service sector with negotiations starting in June 2013.

Also, amendment negotiations for the Agreement on Government Procurement (GPA), which aim to ensure the transparency of government procurement and expand market entry was practically agreed upon and the revised protocol was officially adopted in March of 2012 at the WTO Government Procurement Ministerial Meeting. Through the domestic efforts of countries and regions participating in the GPA pushing for the ratification, on March 7, 2014, the 2/3 majority required of participating countries and regions reached an agreement and the revised GPA entered into force April 6, 2014.

2 Contributions and Strategic Utilization of International Organizations

(1) Asia Pacific Ocean Economic Cooperation (APEC) Endeavors

MLIT is actively involved with APEC Ministerial Meetings and Working Groups in the fields of transport and tourism.

In September 2013, the 8th APEC Transportation Ministerial Meeting was held in Tokyo and the Minister of Land, Infrastructure, Transport and Tourism served as the chair along with the Minister of Transport of Indonesia, the chair of the APEC Economic Leaders' Meeting. At this meeting, discussions revolved around the basic theme of "Enhancing Connectivity through 'High-Quality Transportation' in the APEC Region" and as a result of this meeting, initiatives 1) to develop a transportation "Connectivity Map" that will visualize the ideal transportation network within the APEC region to be reached by the year 2020; 2) to further cooperation and sharing of best practices regarding transportation infrastructure investment, financing and operations in each economy; and 3) to develop a "Quality Transport" vision, encompassing convenience, efficiency, safety, security, and sustainability as priorities were adopted as part of the "Ministerial Joint Statement".

The gist of this statement, was also incorporated into the Leaders' Declaration of the APEC Economic Leaders' Meeting held in October of the same year. Also, regarding the three initiatives listed above in the Ministerial Joint Statement, at the 9th APEC Transportation Ministerial Meeting to be held in the Philippines in 2015, a report of progress will be made.

Also, in the field of tourism, high-level policy discussions were held in Bali, Indonesia in October 2013 regarding the facilitation of travel including discussions about visa facilitation.

(2) Association of Southeast Asian Nations (ASEAN)

MLIT has implemented a variety of cooperation projects under the "ASEAN-Japan Transport Partnership", a framework for cooperation in the transport sector between ASEAN and Japan established in 2003. Various meetings such as the "ASEAN and Japan Transport Ministers Meeting" are held annually to confirm the state of progress for projects under the "ASEAN-Japan Transport Partnership" as well as discuss future directions and new projects.

At "the 11th ASEAN and Japan Transport Ministers Meeting" held in December 2013 in Lao PDR, a new action plan (Pakse Action Plan) was agreed upon. This action plan includes the four policy pillars of 1) transport facilitation, 2) transport infrastructure, 3) quality and sustainable transport, and 4) human resource development to implement cooperation projects. Additionally, at this meeting three new projects: 1) new ASEAN-Japan aviation security project, 2) promotion of ASEAN-Japan road technology exchange, 3) cooperation for promotion of public-private partnership (PPP) as well as to start the discussion for the conclusion of a regional air services agreement between ASEAN and Japan were endorsed.

(3) Organization for Economic Co-operation and Development (OECD)

Of the organizations under the OECD, MLIT participates in the International Transport Forum (ITF), Council Working Party on Shipbuilding, Territorial Development Policy Committee (TDPC), as well as the Joint Transport Research Centre (JTRC) established jointly by OECD and ITF.

The ITF is an international framework of which transport ministers from 54 countries play a central role that meets annually to facilitate discussions with world renowned experts and business people for high-level and free discussions regarding transport policy that previously included discussions on the topics of climate change in the field of transport as well as globalization. At the ministerial meeting in May 2013 on the theme of "transport and funding" including discussions on the utilization of private sector funding as well as the need for procuring budgets. Also, the New Kansai International Airport Company, Ltd., was given the ITF2013 Transport Achievement Award (the highest award) for their undertakings following the theme.

The OECD Council Working Party on Shipbuilding implements policy review to evaluate the soundness of shipbuilding policies to ensure fair competitive conditions in the shipbuilding market as well as the creation of policy assistance lists that compile the status of financial assistance of various countries to carry out policy coordination and mutual monitoring among major shipbuilding nations.

At the TDPC, research and other efforts are actively being carried out such as the policy review of member countries concerning national land and regional policies, evaluation of urban policies concerning green growth strategies, research of compact city policies, sustainable urban policies under an aging society. Japan served as the vice chair of the TDPC Ministerial held in December 2013 in France and contributed to compilation of the chair's statement including the intent to pursue resilient[Note] urban development in the future.

At the JTRC, research studies are being carried out on topics such as road operations, maintenance and management, optimization of financial resources for development, infrastructure adapted to climate change and extreme weather events; Japan also participates in working groups such as those on the adaption of infrastructure to climate change and extreme weather events.

(4) United Nations (UN)

a. International Maritime Organization (IMO) and International Labour Organization (ILO) Endeavors

As one of the leading shipping and shipbuilding countries in the world, Japan actively participates in IMO activities and plays a leading role. In January 2012, a Japanese national became the Secretary-General for the first time and specifically, actively contributes to initiatives involving important issues such as anti-pirate measures, reduction of greenhouse gasses from ships, as well as the organizational and budgetary reform of the IMO.

Also, regarding the "Maritime Labour Convention, 2006" adopted by the ILO was ratified by Japan in August 2013 and will go into effect in Japan in August 2014. Efforts are being promoted to ensure that appropriate labor and living conditions in ships can be provided as required by this convention.

b. Responses to varied requests from International Civil Aviation Organization (ICAO)

ICAO is an international specialized agency of the United Nations, which establishes specific rules in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be operated soundly and economically. Japan makes the second largest financial contribution to ICAO among its Contracting States and has been actively participating in its various activities in order to contribute to the development of

Note Ability, flexibility, and toughness to withstand changes or recover quickly.

the international civil aviation, as one of the 11 Council Members, Part I - States of chief importance in air transport.

In June 2013, the ICAO has launched the APAC Sub-Office in Beijing which belongs to the Asia Pacific Regional Office in Bangkok, with the objective of enhancing ATM capabilities within the APAC region. Japan has been making contributions to ICAO APAC Regional Sub-Office's activities, for instance, by dispatching experts with the perspective of making contribution to ICAO, as well as making strategic use of such opportunities.

Also, during the 38th Session of ICAO Assembly held from 24 September to 4 October 2013, the decision was made to establish a global framework for reducing CO2 emissions against climate change in the area of international civil aviation. Japan contributed towards concluding the agreement by actively participating in discussions to harmonize the various conflicting interests.

c. United Nations World Conference on Disaster Risk Reduction

The United Nations World Conference on Disaster Risk Reduction is an international conference organized by the United Nations to discuss international disaster reduction strategy and the first (Yokohama, 1994) and second (Kobe, 2005) were held in Japan. At the second conference, the "Hyogo Framework for Action", a plan of action for international disaster prevention from 2005 to 2015, was adopted. At the 3rd World Conference on Disaster Risk Reduction held in Sendai in March 2015, the creation of a successor framework to the Hyogo Framework for Action is planned and Japan considers this an important opportunity to make an international contribution to show the world the reconstruction of disaster-stricken areas affected by the Great East Japan Earthquake and share Japan's experience and knowledge regarding disaster reduction with international society.

Also, at international conferences such as the Second Asia-Pacific Water Summit (Thailand, May 2013), High-level Experts and Leaders Panel on Water and Disaster (June 2013, Japan), and Budapest Water Summit (October 2013, Hungary), MLIT emphasized the importance of prevention as well as calling on relevant countries and organizations for high-level participation in the 3rd World Conference on Disaster Risk Reduction. In addition, on occasions such as the bilateral meetings held with the U.S., South Korea, and EU in fiscal 2013, participants discussed the points to be emphasized for the successor framework to the Hyogo Framework for Action based on the lessons learned from many disasters such as the Great East Japan Earthquake.

3 Cross-Sectoral Endeavors

(1) Bilateral Vice-ministerial Level Meetings

a. Myanmar

In March 2013 the "1st Vice-Ministerial Level Meeting between MOT of Myanmar and MLIT of Japan" was held in Myanmar with their Ministry of Transport, Union of Myanmar to confirm the current status and challenges concerning Myanmar's projects in the fields of maritime, ports, aviation, and meteorology and agreed upon strengthening cooperation towards planned infrastructure development including master plan formulation.

Also in December 2013, the "1st Vice-Ministerial Level Meeting between MORT of Myanmar and MLIT of Japan" was held in Myanmar with their Ministry of Rail Transportation and agreed to conduct studies on the current situation of rail infrastructure and automobile transport policy and future challenges as well as evaluate the implementation of cooperation.

In addition, the "1st Japan-Myanmar Construction Vice-Ministerial Level Meeting" was held in 2014 January in Myanmar and information was exchanged on the road, architecture, and housing sector, the legislative system regarding the construction industry, as well as the initiatives, challenges, and technology of both nations.

b. Indonesia

The "1st Japan-Indonesia Construction Vice-Ministerial Level Meeting" was held in Indonesia in September 2013 and at the plenary session, information was exchanged on the life cycle cost/maintenance and management of infrastructure and at the individual working sessions, information was exchanged on efforts, challenges, technology, and other topics in the two countries regarding the fields of roads, erosion control, water resources, sewerage, and architecture.

Additionally, in October 2013, the "4th Vice-Ministerial Level Meeting in the Transport Sector between Indonesia and Japan" was held and progress was confirmed for cooperation projects being promoted by both countries in the fields of logistics, railways, automobiles, ports, maritime traffic, and aviation and exchanged opinions on solutions to issues encountered. In response, Indonesia expressed strong interest in a high-quality logistics system to handle increased trade and the improvement of user convenience (IC cards), safety, and environment in the field of railway services and it was confirmed that both countries would continue to strive for close cooperation and coordination.

c. South Korea

In March 2014 the "9th Japan-South Korea High-Level Transport Meeting" was held in Okinawa and in addition to exchanging information on case studies of logistics policies, safety measures for the transport sector, and substitute driving systems for automobiles, an agreement was reached to continue bilateral cooperation in the transport sector.

d. India

In October 2013, the "7th Meeting of Japan-India Joint Working Group on Urban Development" was held in Tokyo for the purpose of greatly contributing to the further growth and development of economic and social aspects of the cities of Japan and India where information and opinions were exchanged on the urban transportation, urban development, and water environment sector.

(2) Jakarta Metropolitan Priority Area for Investment and Industry (MPA)[Note]

At the "4th Metropolitan Priority Area for Investment and Industry Steering Committee" held in Tokyo in December 2013, the Minister of Land, Infrastructure, Transport and Tourism of Japan and the Coordinating Minister for Economic Affairs of the Republic of Indonesia among other parties agreed to further cooperation to smoothly and swiftly realize projects being promoted through the cooperation of both countries including rail, road, ports, aviation, sewerage, and others.

(3) Initiatives in Other Emerging Countries

In order to establish seamless and highly reliable logistics infrastructure in India, the Director-General level "Japan-India Policy Dialog" was held in October 2012 (1st: Delhi) and July 2013 (2nd: Chennai) and exchanged opinions on the improvement of the logistics environment including the development of southern ports and finished automobile transport schemes.

Regarding Russia, with regard to the "Memorandum of Cooperation in the Transport Sector" concluded between the Ministry of Land, Infrastructure, Transport and Tourism and the Ministry of Transport of Russia, opinions were exchanged using occasions such as the "Japan-Russia Transport Working Group" on topics such as increasing the competitiveness and efficiency of the Siberian railway and the utilization of far east ports. Regarding Russia's urban environmental problems, the "Japan-Russia Urban Environment Problem Working Group" was established as a bilateral cooperation framework and the first meeting was held in April 2013 in Moscow. Also, at the Japan-Russia Forum held in April 2013 when the Prime Minister visited Russia, the urban environment sector was one of the specific sectors mentioned in a speech as one of the sectors where bilateral economic cooperation would be promoted and emphasized that Japan was ready to contribute. Additionally, in September 2013 a meeting for working group chairs was held and in addition to reaching an agreement on specific areas for cooperation among others and in October of the same year, the "Japan-Russia Urban Environment Problem Council" was established as Japan's parent organization of the working group with broad support including that from relevant companies and organizations.

Note A framework based on the "Memorandum of Cooperation on the Cooperation for Establishing Metropolitan Priority Areas" (Signed in October 2010 by the Ministry of Foreign Affairs; Ministry of Economy, Trade and Industry; and MLIT) to discuss Indonesian infrastructure projects and investment policies at the ministerial level with relevant Indonesian ministers in order to accelerate infrastructure development and other aspects of the Jakarta metropolitan area under the coordination of Japan and Indonesia.

4 Multilateral and Bilateral Initiatives in Individual Sectors

(1) Land and Construction Industry Sectors

In conjunction with the Bosphorus Rail Tube Crossing opening ceremony in October 2013, for the purpose of establishing a cooperative relationship in the construction industry sector the Senior Vice-Minister of Land, Infrastructure, Transport and Tourism attended the Japan-Turkey Conference on Construction in Istanbul.

Also, seminars were held with relevant government ministries and agencies concerning the improvement of legislative frameworks in the land and construction industry fields in Myanmar (January 2014) and Vietnam (February 2014).

Column

Japanese Construction Technology Contributes to Fulfilling "Turkish Peoples' 150-Year Dream" - Opening of Bosphorus Cross-Strait Railway -

On October 29, 2013, the 90th anniversary the Republic of Turkey's founding, an opening ceremony for the Bosphorus cross-strait railway was held. Istanbul, Turkey's largest city, is a city that spans from the Anatolian peninsula on the Asia side and the Balkan peninsula on the European side across the Bosphorus strait. Until recently, the only transport means to cross the strait were maritime transport such as ferries or the two bridges, causing chronic traffic congestion. For the purpose of relieving traffic congestion and other issues with the development of an advanced transportation system, the "Marmaray Project" was implemented, involving a construction plan for the cross-strait railway and an improvement plan for existing rail lines. Of this, a consortium led by Japanese construction companies was commissioned with the construction of the cross-strait railway and saw it through completion.

The concept of a cross-strait tunnel dates back to a blueprint drawn 150 years ago. However, the strait's tidal current is not only known as one of the fastest in the world but the upper and lower layers flow in different directions and construction would have to take place in areas with 60 meters of water depth at the deepest points, making implementation impossible until now. For this project, the Japanese construction company used the "sunken tube method" where eleven reinforced concrete blocks were submerged in the seabed and then each connected on the seabed to form a tunnel to complete a cross-strait tunnel known as the "Turkish Peoples' 150-Year Dream".

Also, on 30th the following day, to promote Japanese construction technology, MLIT and Ministry of Transport, Maritime and Communication of Turkey hosted the Second Japan-Turkey Conference on Construction with approximately 150 participants including government officials and people from the private sector of both countries. As an earthquake-prone country like Japan, Turkey is increasingly interested in disaster prevention technology so at the conference, Japanese technology for earthquake resistant, seismic isolation, and vibration control was promoted.

In addition to the Marmaray project, there are a variety of infrastructure development projects planned or in progress such as the long-span bridge

Marmaray Project Opening Ceremony

Statement presented by the Prime Minster Abe at the opening ceremony

Source) Cabinet Public Relations Office

construction project across the Izmit Bay, located 60km southeast of Istanbul, in which Japanese construction companies are involved. Also, from fiscal 2012 to 2013 there were three summit meetings strengthening the cooperative relationship between Japan and Turkey. MLIT will continue supporting Turkey's continuing economic growth so that we can contribute with Japan's superior construction technology.

(2) Urban Sector

In October 2013. a memorandum of cooperation was signed with Vietnam for the promotion of environmental symbiosis type urban development and in March 2014, a seminar on public transport integrated urban development was held.

In addition to this, in fiscal 2013, seminars were held on urban transport systems in India and the Philippines and opinions were exchanged on parking area policies in Myanmar and Vietnam.

Also, bilateral meetings were held with South Korea, EU, and France to build relationships and exchange information on urban policy and other matters.

Additionally, the public and private sectors of Japan worked together to hold the Urban Transportation System International Expansion Research Group in February 2014 to share information, exchange opinions, and disseminate information internationally regarding the international expansion of urban transportation system.

(3) Water Sector

Under the common awareness that water issues are a global scale issue, water issues are discussed to solve it at various international conferences and other occasions. In 2013, various initiatives were carried out under the United Nations "International Year of Water Cooperation" and MLIT actively participated in discussions at international conferences such as The 2nd Asia-Pacific Water Summit (May 2013, Thailand), High-level International Conference on Water Cooperation (August 2013, Tajikistan), and Budapest Water Summit (October 2013, Hungary), The 2014 World Water Day (March 2013, Tokyo) to send a message to strengthen efforts regarding water and sanitation as well as disaster reduction.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) and Network of Asian River Basin Organizations (NARBO) coordinate and in order to support the formulation of Integrated Water Resources Management (IWRM) plans, recognized as an effective method for solving water issues, MLIT contributes to its wide dissemination and promotion through the creation of materials such as the "IWRM Guidelines at River Basin Level", training, and other efforts.

Also, bilateral meetings were held on issues such as rivers, sabo, and water resources management with South Korea and the United States to promote information exchange, technical cooperation, and others.

In Vietnam, the memorandum of understanding on cooperation for water resources facilities management was signed with the Ministry of Agriculture and Rural Development in June 2012 and a workshop was hosted there in March 2014, promoting cooperation in the water resources sector. The memorandum of cooperation in the field of sewerage/drainage and wastewater treatment signed with the Ministry of Construction in 2010 was renewed in March 2014 and support for the formulation of standards for the sewerage pipe jacking method was carried out.

In Indonesia, the cooperative relationship is being deepened through activities such as exchanging opinions in the water resources and sewerage sector at the Japan-Indonesia Construction Vice-Minister Level Meeting held in September 2013.

For South Africa, sewerage engineers from the country's local government were invited jointly with JICA in July 2013 to implement training on maintenance and management. In September 2013, the 3rd Japan-South Africa Water Resources Management Workshop was held and a joint resolution was renewed with South Africa's Department of Water Affairs, strengthening the cooperative relationship.

In Saudi Arabia, inter-governmental consultations for the sewerage sector were held in November 2013 as well as training in Japan, to support technology for the reuse of treated wastewater and privatization, was implemented in January 2014.

In addition, Water Environment Solution Hub, a alliance including Kitakyushu City, Osaka City, Tokyo Metropolis, Yokohama City, Kobe City, Fukuoka City, Kawasaki City, Saitama Prefecture, the Japan Sewage Works Agency, Shiga Prefecture, and MLIT, is providing experience and expertise on sewerage projects through seminars, field studies, and training.

(4) Disaster Management Sector

Efforts are being made to improve the disaster reduction functions of partner countries and contribute to the international expansion of infrastructure, utilizing Japan's superior technology and knowledge on disaster reduction gained from past experiences with disasters.

In particular, developing countries facing issues in disaster reduction are targeted for joint efforts through the working cooperation of the private sector, academia, and the public sector of both countries to pursue technology and solutions that satisfies each others needs through "Disaster Management Collaboration Dialog (DMCD)" with the coordination of relevant organizations, that capture a variety of opportunities in expanding to each individual country in relation to the "infrastructure system export strategy". Currently, documents on the implementation of DMCD have been signed with Myanmar, Thailand, Vietnam, South Africa, Turkey, and Indonesia which provided the basis for hosting a workshop with the private and public sector as part of the DMCD in February 2014 in Myanmar and in March 2014 in Vietnam.

Also, the private sector, academia, and public sector is coordinating to establish the "Japan Bosai Prevention Platform" in early fiscal 2014 for the purpose of promoting the development of internationally competitive products and services in the disaster management sector. In addition, this organization is also expected to function as the domestic portal for DMCD.

On the other hand, to build an international consensus that disaster prevention is the key to sustainable development for the reduction of water disasters in the world, in addition to disseminating Japan's experiences and technology, efforts are being made to establish international solidarity regarding the strengthening of water disaster management. Also, at the Public Works Research Institute's (Independent Administrative Institution) International Centre for Water Hazard and Risk Management (ICHARM) which is recognized as a UNESCO cooperative organization, research and development is being conducted on projects such as the Integrated Flood Analysis System (IFAS) which uses satellite information and analysis technology such as the Rainfall-Runoff-Inundation Model where the fruits of these efforts are used for human resource development efforts such as the master's degree in water-related disaster risk management as well as accepting trainees for short-term training in water-related disaster risk management. Also, technical cooperation and international assistance is being implemented jointly with UNESCO and the Asian Development Bank such as building a flood forecast and warning system and hosting workshops targeted toward Asian countries and regions vulnerable to water disasters.

In addition, in March 2013, for the purpose of mutually enhancing the disaster prevention management, the European Commission's Humanitarian Aid and Civil Protection department and MLIT exchanged letters regarding disaster management cooperation and held both ministerial-level and expert-level meetings. With Brazil, to reduce the potential increased risk of disaster because of the rapid progress of urbanization in recent years, the exchange of information and technical cooperation was promoted to enhance risk assessment capabilities for sediment disaster measures through the Rio Bosai 2013 seminar held in August 2013.

Additionally, when large-scale water and sediment related disasters occur, MLIT dispatches experts to implement assessments of the disaster situation and advise practical measures. For example, when a large-scale landslide dam broke in Indonesia in July 2013, sabo exparts were dispatched immediately and make some expertise to the government on residual risks and measures to avoid secondary disaster and other matters. Also, in November 2013, when the Haiyan typhoon (Number 30) struck central Philippines, experts were dispatched as a specialist team for international disaster relief to advise and lead the assessment of the disaster situation, the basic policy of the reconstruction plan, and other matters in addition to experts to evaluate the disaster.

(5) Road Sector

For the purpose of improving international understanding and reliability toward Japanese road technology, model projects were implemented in Myanmar and Turkey on pavement recycling technology and ITS technology. Also, to discover new projects that may utilize Japan's specialty of tunneling technology, surveys were conducted in Laos and Morocco.

In addition, in 10 countries mostly in Asia, seminars were held on policies and technology in the road sector with the cooperation of expressway companies and road-related private companies, to push Japanese road technology that meets the needs of each of these countries.

Also, regarding the World Road Association (WRA), there is active participation in the various technical committees and the Winter Road Congress held in Andorra to promote technical exchanges and sharing of information with various countries in the various fields including aging structure measures and traffic safety.

Additionally, at the ITS World Congress (October 2013, Tokyo) held in Japan for the first time in nine years, approximately 20,000 people from 65 countries participated in activities such as exhibitions, sessions, and demonstrations where the latest ITS technology could be experienced to promote the latest ITS technology. Also, in conjunction with the congress, ministerial conferences were held and the Senior Vice-Minister of Land, Infrastructure, Transport and Tourism and others met with ministerial delegates of participating countries to exchange information on ITS policies.

(6) Housing and Architecture Sector

Bilateral director-general meetings are regularly held with South Korea, China, France, Canada, and Germany to exchange information on topics such as housing policy, architectural standards, and architectural technology. Opinions were exchanged on the theme of furthering the housing industry with China in October 2013 and on architecture and environmental measures with Germany in March 2014.

Also, with Myanmar, in August 2013 the Japan-Myanmar Architecture and Housing Conference was held as a first for both country governments to discuss architectural standards and other issues in addition to implementing a seminar including the private sector in October to exchange opinions between the companies of both countries.

(7) Railway Sector

In the field of high-speed rail, efforts are being made to push the adoption of bullet train technology in India, Thailand, and other countries. Also, efforts are being made to promote the international expansion of urban rail.

In August and September of 2013, the Minister of Land, Infrastructure, Transport and Tourism visited countries including Thailand, Vietnam, and Singapore to conduct top sales for the adoption of Japan's high-speed rail and urban rail systems. Also, for dignitaries visiting Japan, inspection tours are organized according to individual interests and pitches are made regarding the adoption of Japan's rail system. Also, the Senior Vice-Minister of Land, Infrastructure, Transport and Tourism and Parliamentary Vice-Minister of Land, Infrastructure, Transport and Tourism made overtures to various dignitaries including those from various Asian countries, the United Kingdom, and the United States. In 2013, rail seminars involving the coordination of the public and private sectors were held in countries including India and Myanmar.

(8) Maritime Sector

Regarding the International Maritime Organization (IMO), international initiatives are being carried out on a variety of areas in the maritime sector such as the safety of vessels and marine environment protection. Also, initiatives are being implemented such as bilateral meetings with countries traditionally close to Japan along with international cooperation. Regarding bilateral meetings, in fiscal 2013, director-general level meetings were held with South Korea and the EU to share information and exchange opinions on important topics such as promoting the cruise industry, reduction measures for greenhouse gas emissions, and the safety regulations of passenger ships.

In addition, in fiscal 2013, experts were dispatched to the Philippines on ship safety policy. Also, training for the educators of seafarers were held in Southeast Asian countries such as Myanmar.

(9) Ports and Harbours Sector

The overseas expansion of Japanese port-related industries (port logistics and infrastructure-related companies) is being supported by efforts such as initiatives to introduce Port EDI systems to Myanmar, carrying out surveys for integrated development of coastal industrial area and infrastructure in Mozambique and other areas, and "Conference of Oversea Port Logistics Projects" activities (the 4th held in July 2013 and the 5th in March 2014).

Also, in November 2013, the 14th Northeast Asia Port Director-General Meeting by Japan, China, and Korea was held to exchange information on promoting cruises and other issues regarding recent port policies among others. Also, international conferences including those by the World Association for Waterborne Transport Infrastructure (PIANC) and the International Association of Ports and Harbors (IAPH) are used as opportunities to promote the overseas expansion of Japanese technology standards and exchange information.

(10) Aviation Sector

At the 50th Conference of Directors General of Civil Aviation Asia and Pacific Regions held in July 2013 to exchange information on aviation safety and security in the Asia-Pacific region including countries and regions adjacent to Japan's air space and achieving sustainable growth for international civil aviation. Also, in November 2013, aviation policy talks were held with South Korea and the continuation of broad cooperation in the general aviation field was affirmed.

(11) Logistics Sector

Based on agreements reached at the 4th China-Japan-Korea Ministerial Conference on Transport and Logistics held in July 2012, trilateral cooperation between Japan, China, and South Korea is being promoted to advance mutual transit of chassis, strengthen the Northeast Asia Logistics Information Service Network (NEAL-NET), standardization of pallet quality and cargo handling machinery dimensions, etc.

Also, bilateral talks between Japan and ASEAN countries under the framework of ASEAN-Japan transport coordination, are being conducted to discuss the improvement of the logistics environment in each country among other issues and bilateral logistics policy dialogues were with Thailand in October 2013 and Indonesia in January 2014. Additionally, to improve the quality of logistics in the entire Asian logistics area, in December 2013 Japanese experts knowledgeable about logistics business were dispatched to the Mekong Region Logistics Training Center to implement training for the center's lecturing staff. Also, to improve connectivity within the ASEAN region, substantive studies were carried out regarding the establishment of an intermodal land-sea transport network utilizing international high speed RORO (Roll-On/Roll-Off) ships.

(12) Survey and Mapping Sector

In addition to actively participating in UNCE-GGIM[Note 1] and contributing to the establishment of a global geodetic reference system, for the promotion of Global Mapping Project[Note 2], technical assistance to developing nation to develop Global Map V.2 and promotion activities through international conferences are being implemented. In addition to serving as the Secretary of the UN-GGIM-AP[Note 3], monitoring crustal movements with the cooperation of relevant nations is being promoted.

Aside from this, government representatives are sent to the 10th UNCSGN[Note 4] and the 18th IHC[Note 5] to participate in the debate of proper geographical names. Since the 6th UNCSGN in 1992, South Korea and others have repeatedly insisted on "either renaming the Sea of Japan as the East Sea or listing both names". MLIT along with the Ministry of Foreign Affairs and other relevant ministries are working together to promote the correct understanding and support of the name "Sea of Japan" as the exclusive name within the international community.

Note 1 United Nations Committee of Experts on Global Geospatial Information Management
Note 2 A project in which a fundamental geospatial information database (Global Map data), needed for analyzing global environmental issues and others, is developed under the voluntary cooperation of the National Geospatial Information Authorities of various countries around the world.
Note 3 Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific
Note 4 United Nations Conferences on the Standardization of Geographical Names
Note 5 International Hydrographic Conference

(13) Meteorological and Earthquake/Tsunami Sector

Under the framework of the World Meteorological Organization (WMO), in addition to the mutual exchange of meteorological observation data and technological information, information on typhoons and climate utilizing our nation's technology is provided to various countries to cooperate with the implementation and promotion of meteorological efforts of the world. Also, under the framework of United Nations Educational, Scientific and Cultural Organization/ Intergovernmental Oceanographic Commission (UNESCO/IOC), the Northwest Pacific Tsunami Advisory has been provided to various countries in the region to contribute to the tsunami disaster mitigation.

(14) Research Sector

In anticipation of spreading our nation's superior infrastructure-related technology to Asian nations, based on the research coordination roadmap with Vietnam, Indonesia, India, and others, specifications for construction technology such as environmental pavements modified to better suit local conditions are being jointly developed under the coordination of MLIT and local governmental research organizations among other joint research. Also, in fiscal 2013, joint workshops were hosted with Vietnam and Indonesia for technical discussions regarding coordinated research projects and exchanges of opinion regarding research cooperation. Also, coordination with locally dispatched JICA experts and the invitation of mid-level and young researchers are being promoted among other initiatives.

(15) Coast Guard Sector

Coordination and cooperation between coast guard organizations in the fields such as search and rescue as well as maritime security measures are being promoted through activities such as the North Pacific Coast Guard Forum (the six countries of Japan, Canada, China, South Korea, Russia, and the United States), the Heads of Asian Coast Guard Agencies Meeting (18 Asian countries and one region), and bilateral head-level meetings with Russia, South Korea and India, as well as joint exercises.

Also, active participation in international organizations is being carried out through activities such as serving as the chair of the working group within the Sub-Committee on Safety of Navigation of the International Maritime Organization (IMO), the establishment of standards regarding the creation of hydrographic charts in the various committees of the International Hydrographic Organization (IHO), leading the northwest Pacific Ocean region for the International Cospas-Sarsat Programme, studies concerning the development of next generation Automatic Identification System (AIS) at the various committees of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), and dispatching coast guard staff to the Information Sharing Centre under the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP). In addition, international contributions are being made through initiatives such as improving the ability of the coast guard sector in developing countries.

Section 3 Efforts for International Standardization

(1) Internationalization of Automobile Standards and Certification Systems

To promote the early and cost-efficient adoption of automobiles that are safe with high environmental performance, Japan is participating in activities such as United Nations Economic Commission for Europe's World Forum for Harmonization of Vehicle Regulations (UNECE/WP29) to promote international harmonization of safety and environmental standards and promoting the international spread of Japanese automobiles with superior safety and environmental features as well as new technology. In order to promote such activities, the four pillars of 1) strategic international standardization of Japanese technology and standards, 2) coordination with Asian countries, 3) realization of mutual recognition of vehicle units worldwide, and 4) establishment of a framework to handle the globalization of standards certification as included in the "Action Plan for the Internationalization of the Regulation and Certification System" is being realized to promote the internationalization of regulation and certification systems.

(2) Internationalization and Other Efforts for railways

Just as Europe is actively promoting the international standardization of European standards, for the international expansion of Japanese railway systems, undertaking international standardization is an important issue. If Japan's superior technology is omitted from international standards, there is a possibility that existing domestic standards will be abandoned, adversely affecting the railway industry, therefore requiring a strategic response. For this reason, at the "Railway Technology Standardization Committee ", active initiatives are being promoted, under the cooperation of academic rail technology experts and the railway industry, such as deliberations on the international standardization strategy for railway and coordination of domestic standards with regard to international standards.

The second Plenary Meeting of the International Organization for Standardization's (ISO) Technical Committee for Railway applications (TC269) and contributed to outcomes such as the proposal of individual standards and the operation of committees.

At the National Traffic Safety and Environment Laboratory (Independent Administrative Institution), Japan's first certification body of international standards in the railway sector, has acquired solid certification experience since the establishment of the Certification Office and contributed to the international expansion of Japan's railway system.

(3) Efforts for International Standards Regarding Ships and Mariners

International maritime transport businesses operate through ships and mariners of various nationalities, and regarding the safety of ships and protection of the marine environment, global rules including conventions such as SOLAS, MARPOL, and STCP must be adhered to by these operations. Japan continues to actively participate in the drafting process of these conventions with significant contributions. As one outcome, in fiscal 2013, the International Maritime Organization in (IMO) generally agreed to the new standard proposed by Japan for stability (index for the stability of the ship and difficulty of capsizing).

(4) International Harmonization of Standards and Certification Systems in the Civil Engineering and Architecture Sector

In recent years, in the sectors of civil engineering, architecture, and housing where the internationalization of the market is evolving, legislative operations such as certifying the performance of imported building materials as well as approval of rating agencies and implementation of measures such as technical cooperation and other activities by organizations including JICA are being carried out as well as participation in the drafting of standardization for design and construction technology by ISO for initiatives to promote international harmonization of standards and certification systems for the civil engineering and architecture sector. Also, as part of the efforts to reflect Japan's accumulated technology in international standards, deliberations are being carried forward to develop, revise, etc., domestic technical standards with consideration to trends in the creation of international standards.

(5) International Standardization of Intelligent Transport Systems (ITS)

In order to promote the development of efficient applications, international contributions, and the development of the related industries in the country among others, the international standardization of ITS technology among international standardization bodies such as ISO and the International Telecommunication Union (ITU) is being promoted.

Especially for ITS, standardization activities for the gathering and utilization of probe information via ITS spots are being conducted through participation in the Technical Committee (ISO/TC204) on the international standardization of ITS. Also, at the Europe World Forum for Harmonization of Vehicle Regulations (UN/ECE/WP29), activities are underway toward the international standardization of Advanced Safety Vehicles (ASV). In June 2013, a guideline was formulated for the utilization of ITS.

(6) Standardization of Geographical Information

For the purpose of ensuring compatibility for the interoperability between Geographic Information System (GIS) with differing geospatial information, international standards are being formulated through participation in the ISO technical committee for Geographic information/Geomatics (ISO/TC211). Also, initiatives are taking place to standardize domestic geographic information.

(7) Mutual Recognition of International Technical Qualifications

The APEC Engineer mutual recognition project is for the promotion of the mobility of qualified technical personnel based on the mutual recognition of technical qualifications between participating countries and regions. For the APEC Architect project (architect registration system), in July 2008, the "APEC Architect Bilateral Agreement on Reciprocal Recognition of Registered/Licensed Architects in Japan and Australia to Facilitate Mobility of Architects in the Provision of Architectural Services" was concluded with Australia and in July 2009, the "APEC Architect Memorandum of Cooperation on Registered/Licensed Architects in Japan and New Zealand to Facilitate Mobility of Architects in the Provision of Architectural Services" was signed to promote the mobility of qualified architects.

(8) Sewerage Sector

Based on the "Intellectual Property Strategic Program 2010 (established May 21, 2010), strategic international standardization is being promoted for the purpose of creating an international market where Japanese companies looking to expand internationally in the sewerage sector can be highly competitive. Currently, participation in the technical committee on "Water re-use" (ISO/TC282) and the technical committee on "Sludge recovery, recycling, treatment and disposal" (ISO/TC275) is underway to ensure that Japanese sewerage technology has an advantage. Regarding the ISO55000 series on "Asset management" that went into effect in fiscal 2013, the certification of domestic entities is being supported.

Column

Efforts Toward International Standardization of "Water Re-use"

ISO, which creates many of the international standards, established a technical committee (TC282) to evaluate the international standardization of "Water re-use" in general in June 2013. Japan will lead the discussion as the secretariat nation and this represents the first time becoming a secretariat nation.

For the international standardization of "water reuse", in light of the expanding global water market against the background of developments such as increasing global drought risks due to climate change and global population growth, taking an active lead in the international standardization of Japan's leading water reuse technology such as membrane treatment technology, is expected to contribute to the international expansion of this technology as well as increased international competitiveness.

In January 2014, the first TC282 was held in Tokyo where 41 members from 10 countries (Japan, Israel, China, Canada, Ethiopia, France, South Korea, Singapore, the United States, and Australia) participated and the basic policy of the meeting was confirmed. Following the first meeting, Israel will host the second meeting in November 2014 and efforts will be made to realize efforts for international standardization and accelerate discussions.

Membrane Treatment Technology Seeking International Standardization by TC282

Source) Left: Kubota Corporation, Right: METAWATER Co., Ltd.

The TC282 Meeting (Tokyo)

Source) MLIT

Chapter 10 Utilizing ICT and Promoting Technology Research and Development

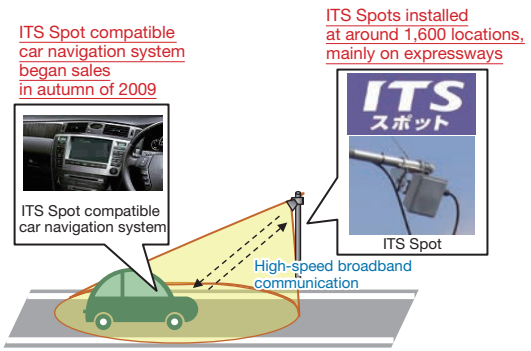
Section 1 Promoting Innovation in the Field of National Land and Transport Utilizing ICT

Information technology initiatives in the fields of land, infrastructure, transport and tourism within the "Declaration to be the World's Most Advanced IT Nation" (Cabinet decision June 14, 2013) are being promoted in coordination with the IT Strategic Headquarters (Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society) headed by the Prime Minister.

1 Promoting ITS

Intelligent Transport Systems (ITS), a system created through the integration of people, roads, and vehicles using the latest Information and Communications Technology (ICT), enables advanced road use, the safety of drivers and pedestrians, dramatic improvement of transport efficiency and comfort as well as solving various social problems such as traffic accidents and congestion, environmental problems, and energy problems and is leading to the creation of new markets in the related fields of the automotive industry and information technology industry among others.

Figure II-10-1-1 Creating a Diversity of Services Through High-Speed Broadband Communication Between ITS Spots and Compatible Car Navigation System



Source) MLIT

Also, in order to realize a road traffic society that is the safest, the most environmentally friendly, and the most economically efficient in the world in accordance with the "Declaration to be the World's Most Advanced IT Nation" decided by Cabinet in June 2013, initiatives for the gathering and dissemination of road traffic information which will be effective for traffic safety measures, congestion measures and disaster countermeasures, etc. are being actively promoted.

a. The Spread of ITS in Society and its Effect

(a) Promotion of ETC and its Effects

Electronic Toll Collection (ETC) is now available on toll roads across Japan and the total number of new setup onboard devices is 44.53 million as of December 2013 and its usage rate on all national expressways is roughly 89.3%. Congestion at tollgates that used to account for roughly 30% of expressway congestion causes is mostly relieved and contributes to reductions in CO_2 emissions and environmental burdens. Additionally, measures utilizing ETC such as Smart IC which is an ETC only interchange and discounts for ETC vehicles are being implemented and in addition to toll roads, its also possible for parking payments and boarding procedures for ferries, showing the spread and diversification of services utilizing ETC.

(b) Improvement of Providing Road Traffic Information and its Effects

Vehicle Information and Communication System (VICS) compatible onboard devices aim at the advanced travel route guidance and as of September 2013 roughly 39.58 million units have been shipped. By providing travel time, congestion conditions, traffic restrictions, and other real-time road traffic information, VICS improves drivers' convenience and contributes to better driving gas mileage that also leads to reducing environmental burdens including the reduction of CO_2

emissions.

b. Technological Development and Popularization of New ITS Services

(a) Nationwide Deployment of Smartways

Industry, academia and government have been working together to further the Smartway project as the next generation of roads that connect people, vehicles, and roads with ITS technology for the purpose of traffic safety, traffic congestion measures, and environmental measures. Specifically, beginning in 2011 a variety of services is being offered nationwide through ITS Spots mainly installed on expressways.

The three basic services of dynamic route guidance (providing wide area congestion information), safety driving support (providing information on fallen objects, the end point of congestion, weather, etc.), and ETC were realized through ITS Spot compatible car navigation system. Also, in some models it is possible to provide local tourism information through an internet connection and there is anticipation for expansion into a variety of services such as cashless payments for parking and other services as well as support for logistics. In addition, investigations are under way regarding driving route confirmations that contribute to the support of vehicle operations.

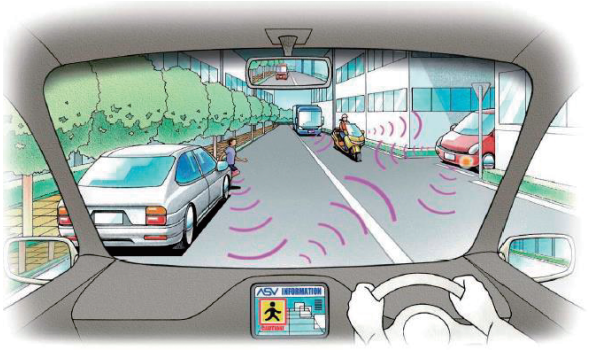
(b) Explorations for the Realization of Next Generation ITS

To realize safe, comfortable, and smooth road traffic, in addition to promoting the spread of ITS spot services, the collection and analysis of big data consisting of large volumes of probe information such as driving history and behavior history of vehicles will promote initiatives that contribute to more fine-grained road management among other improvements. Also, for traffic congestion relief through the use of cars equipped with ACC (Adaptive Cruise Control), technical assessments and other activities through public and private sector partnerships and the results of investigations into issues regarding automated driving on expressways among other matters were compiled.

(c) Promotion of the Advanced Safety Vehicle (ASV) Project

Regarding the ASV promotion plan, efforts are under way for the development, commercialization, and widespread adoption of Advanced Safety Vehicles (ASV) that enable drivers to drive safely by using advanced technology such as ICT technology. Specifically, investigations for the promotion of technical development in areas of driver irregularity response system, drivers' overconfidence, system consolidation, and safe driving support systems using vehicle-to-vehicle/pedestrian-to-vehicle communication among others are under way.

Figure II-10-1-2 Illustration of Telecom Use Type Safe Driving Support Systems (Advanced Safety Vehicle - ASV)



Source) MLIT

2 Realizing a Society that Utilizes Geospatial Information Sophisticatedly

In order to utilize and use location and spot information or "geospatial information[Note]" in a more sophisticated manner through ICT, following the "Basic Plan for the Advancement of Utilizing Geospatial Information" enacted by Cabinet Decision on March 27, 2012, initiatives are being promoted to realize a "G-spatial Society (Sophisticated Utilization of Geospatial Information Society)" where anyone is able to utilize necessary geospatial information anytime and anywhere.

Note Information that represents the position of specific point or area in geospace (including temporal information pertaining to said information) as well as any information associated with this information. Also called G-spatial information (Geospatial Information).

(1) Maintaining and Updating Geospatial Information as the Foundation of Society

The Digital Japan Basic Map[Note 1] and Fundamental Geospatial Data[Note 2] which can be used as the basis for utilizing various geospatial information is being rapidly developed and updated with the coordination of various administrative organizations. Also, various types of information regarding national land are being developed such as aerial photographs, geographical name information, national land numerical information, and continuous monitoring of crustal movements with GNSS-based control stations. Additionally, a framework is being developed to make it possible to quickly grasp and provide information on national land such as gathering parameters to correct reference points and location information for reconstruction following the Great East Japan Earthquake, developing maps, development of information that will serve as a foundation for the development of hazard maps in preparation for future disasters such as landform classifications, and emergency shooting of aerial photography following a disaster.

(2) Initiatives to Promote the Utilization of Geospatial Information

Most of the geospatial information developed is widely provided through the Internet. In addition, initiatives are being taken to further promote Geospatial Information Libraries that allows for searching, browsing, and downloading of various information as well as further improve the GSI Maps[Note 3], which allows for layering of various information on the web, and sharing it widely with society along with promoting initiatives involving the private sector, public sector, and academia to further promote mutual use. Also, guidelines are being publicized regarding the handling of private geospatial information on individuals and the promotion of secondary usage; additionally, industry, academia, and government worked together to host the "Geospatial EXPO 2013 Japan" in November 2013 to raise public awareness and create new industries and services.

3 Realizing an Electronic Government

Following the "New Strategy for Information Communication Technology", various initiatives to realize an electronic government are being implemented. Among these, for online uses, initiatives to promote convenience for citizens as well as improving the efficiency of administrative operations are being taken such as the promotion of business process reform plans.

Regarding automobile ownership procedures, a "One-Stop Service (OSS)" that allows for the execution of various procedures online and at once such as inspection, registration, automobile parking space certification, and payment of various vehicle taxes is being promoted through the cooperation of various ministries and is currently available for the new registration of brand new cars in 11 municipalities. Based on the "Basic Policy Regarding the Reform, etc., of Independent Administrative Institutions" approved by the Cabinet on December 24, 2013, initiatives are under way to realize nationwide expansion and increase the procedures handled by the OSS by fiscal 2017.

4 Development and Opening of Optical Fiber for the Management of Public Facilities and Its Housing Space

In order to facilitate the creation of the world's most advanced information and communications network in response to the "e-Japan Priority Policy Program", the development and opening of optical fiber for the management of public facilities and its housing space was promoted.

Optical fiber for the management of public facilities serves the purpose of making the management of public facilities more efficient as well as fast and stable provision and sharing of large capacity data and is being developed in rivers,

Note 1 Newly electronically compiled maps that serve as our nation's basic maps instead of the traditional paper maps including the 1:25,000 scale topographic maps. In addition to depicting our national territory appropriately, it serves as the most fundamental information of our national land's conditions and this geospatial information is developed by the Geospatial Information Authority of Japan.

Note 2 Serves as a reference for the position determined for geospatial information on the digital map such as positional information for the geodetic control points, coastlines, boundaries of public facilities, and administrative boundaries. Criteria and standards are defined by ministerial ordinances of MLIT. The Geospatial Information Authority of Japan carried out the preliminary development by fiscal year 2011 and it is currently being updated along with the Digital Japan Basic Map.

Note 3 A web map (http://cyberjapan.jp/) that allows for the browsing of maps, etc., over the internet. Geospatial information provided can be overlaid on various map data such as the Digital Japan Basic Map.

roads, ports, and sewage. The optical fiber managed by the nation for the management of rivers and roads is open to private sector businesses within a scope that does not interfere with facility management and in fiscal year 2013 roughly 500km were open to applications for those seeking usage.

5 Sophisticated Water Management and Water Disaster Prevention Utilizing ICT

In light of new developments in information technology of recent years, new technology is being applied to the field to further the sophistication of water management and water disaster prevention.

Regarding the monitoring of rivers and their basins, for rainfall observations, a new radar, XRAIN (MLIT X Band MP Radar Network), which allows for near real-time observation of local rainfall data is being implemented and for the observation of flows and water levels, the introduction and practical application of new technology such as the ADCP (a flow rate meter that uses the Doppler effect of ultrasound) and image analysis (Figure II-10-1-3 Diagram 1) that utilizes CCTVs among other images is being promoted. Also, to assess the extent of inundation when disasters occur, the use of Synthetic Aperture Radars (SAR) and utilization of big data including various location information such as social media activity is being investigated.

Also, in addition to obtaining high precision topographic data through aerial laser profiling (LP), initiatives to improve the efficiency and effectiveness of maintenance and management through the utilization of image data obtained through Mobile Mapping Systems (MMS) are also being promoted.

The information obtained through these such as rain volume, water level, and high precision topographical data was integrated into flood simulations and risk assessment (Figure II-10-1-3 Diagram 2) using the "Distributed Rainfall-Runoff Model", an advanced flood prediction model to further crisis management. In addition to this, a model to visualize the flow of underground water three-dimensionally based on data such as topography, geology, and surface water was created and the results of this was used for the evaluation of future underground water management policies regarding the regions of Chikugo and Saga plains under the land subsidence prevention guidelines.

Also, concerning for the surveillance of sediment-related disasters in the normal time, the abnormal signs are monitored through means such as rainfall radars, volcano surveillance cameras, automated landslide monitoring systems, and other sophisticated tools utilizing ICT. Additionally, in preparation for the occurrence of

Figure II-10-1-3 Example of ICT Utilized for Sophisticated Water Management and Flood Prevention

Diagram 1 Measuring the Water Level and Flow Rate Using Image Analysis of Video

Source) Fujita Lab, Kobe University Faculty of Engineering

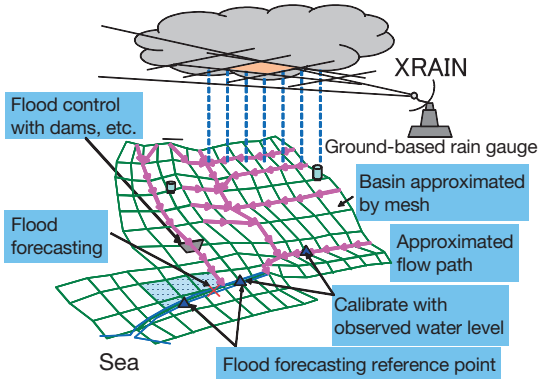


Diagram 2 flood prediction by distributed hydrological model

Source) MLIT

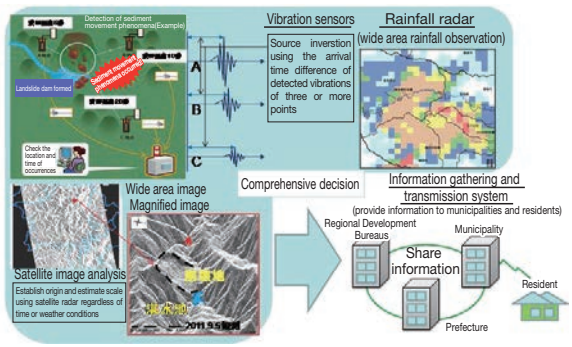


Diagram 3 Catastrophic Landslide Monitoring and Warning System

Source) MLIT

catastrophic landslides, the development of catastrophic landslides monitoring and warning systems[Note] (Figure II-10-1-3 Diagram 3) are being furthered to contribute to rapid emergency restoration measures as well as the prevention and mitigation of damages through appropriate warnings and evacuations.

In the sewerage sector, investigations are under way for the sophistication and increased efficiency of on-site surveys through means such as sensor robots, efficient sewerage operations through technology including the collection and analysis of big data, and appropriate facility operations through technology including simulation and prediction.

Section 2 Promoting the Research and Development of Technology

1 The Position of Technological Research and Development in Technology Policies and Comprehensive Promotion

In the "Japan Revitalization Strategy (Cabinet decision, June 2013)", one of the pillars of the revitalization plan for Japanese industry is the "promotion of science technology innovation" and expectations for the role played by "science technology innovation" is increasing as seen by the intent to vigorously promote the "Science Technology Innovation Comprehensive Strategy (Cabinet decision, June 2013)".

The Ministry of Land, Infrastructure, Transport and Tourism takes into account the government's overall policy including the "Fourth Science and Technology Basic Plan" to further improve the framework for coordination between the private sector, academia, and government as well as comprehensive promotion of cross-sectoral technology research and development in accordance with the Ministry of Land, Infrastructure, Transport and Tourism Technology Basic Plan and is actively reflecting the resulting fruits in public works as well as the construction and transport industry among others.

(1) Initiatives at Facility Organizations, Special Organizations, External Bureaus, and Incorporated Administrative Agencies

Facility organizations, special organizations, external bureaus, and incorporated administrative agencies under MLIT which are mainly tasked with research are as shown in this figure. Incorporated Administrative Agencies serve the public interests and possess transparency and independence; research that meets policy needs are being conducted with priority and efficiency while striving for further coordination with relevant organizations including the private sector and carrying out tasks appropriately and efficiently.

Figure II-10-2-1 Major Initiatives for Fiscal Year 2013 by Facility Organizations, Special Organizations, and External Bureaus

Organizations, etc.	Summary
Geospatial Information Authority of Japan	The Geography & Crustal Dynamics Research Center, Geospatial Information Authority of Japan implemented research and development that contributes to disaster prevention and the environment as well as the realization of a society that actively utilizes geospatial information in an advanced manner are carried out, such as estimating the fixed state of plate boundaries along with changes, ionospheric correction technology for the sophisticated monitoring of crustal movements with satellite interference SAR, and defining the basic technical specifications and efficient ways to develop three-dimensional GIS data for public indoor spaces.
Policy Research Institute for Land Infrastructure and Transport	Conducted studies and research for the purpose of widely contributing to policy creation in the field of land, infrastructure, transport and tourism. In fiscal 2013, studies and research such as "Survey of Competing Countries to Increase Market Share in the Fields of Land, Infrastructure, Transport and Tourism", "Research on Strengthening Regional Vitality through Mutual Cooperation at the Apartment or Regional District Level", "Maintain and Develop Measures for Public Transport", and "Regional Vitalization Measures with the Entry of LCCs" were conducted.
National Institute for Land and Infrastructure Management	In order to contribute to the realization of a beautiful, safe, and vibrant country, research regarding "disaster prevention and mitigation measures" including seismic measures priority evaluation methods and tsunami damage mitigation measures, "strengthening international competitiveness" including international expansion measures for technology and standards, and environmental measures such as evaluation methods for energy-saving technologies were conducted.
Meteorological Research Institute	Conducted research on understanding the phenomena of weather, climate, earthquake volcanoes, and the ocean as well as predictions such as "strengthening measures for typhoons and torrential rains", "strengthening measures for earthquake, volcano, and tsunami disasters", and "strengthening of measures related to climate change and global environment".
Japan Coast Guard	Conducted testing and research for equipment and materials used for coast guard duties, testing and research for forensic science at sea, and research and development of technology for monitoring seafloor crustal movements.

Note Large-scale slope collapse monitoring and warning systems use a combination of:
1) vibration sensors to estimate the location and scale of collapses from the ground vibrations that occur following slope collapses,
2) satellite image analysis to confirm the location of the collapse and measure the scale, and
3) rainfall radar technology to quickly detect the occurrence of large-scale sediment disasters-related and broadcast the information to relevant organizations.

Figure II-10-2-2 **Major Initiatives for FY 2013 by Incorporated Administrative Agencies with a Primary Focus on Research Under MLIT**

Incorporated Administrative Agency	Summary
Public Works Research Institute	Implemented research and development to contribute to the efficient creation of quality social capital and the development of Hokkaido such as "research on prevention, reduction, and early recovery from more intensified and diverse natural disasters," and "research on innovative technology for greener social infrastructure."
Building Research Institute	Conducted research and development on technologies related to housing, architecture, and urban planning such as "Research and Development Related to the Promotion of Low-Carbon Housing, Architecture, and Cities", and "Research and Development on Technology to Improve the Safety of Architecture Against Earthquakes, etc.".
National Traffic Safety and Environment Laboratory	Conducted test research related to the safety assurance of land transport and air transport and environment preservation, including "promoting the development and commercialization of next generation heavy vehicles," and "survey on driver irregularity response system", technical standards conformity assessment of automobiles, and technical evaluations related to recalls,
National Maritime Research Institute	Conducted research on ensuring the safety of marine transport, preservation of marine environment, marine development and advanced marine transport including, "research for advanced analysis technology for high precision reproduction of marine accident occurrence conditions," "research on green evolution of ships that contribute to revolutionary technology to reduce the environmental burden," and "research on advancing and developing a safety evaluation method on renewable marine energy production systems."
Port and Airport Research Institute	Conducted research and development that contributes to the formation of a safe and comfortable society, conservation and formation of a benign coastal environment, and the formation of a vital economic society such as "Development of Prediction Technology for the Degree of Damage Caused by Earthquakes and Tsunamis for Tsunami Disaster Prevention Facilities", "Research, Experiments and Analysis to Establish Measurement Methods for CO2 Absorption and Emissions as well as Carbon Sequestration Volume in Coastal Areas", and "Proposals for Testing Methods Regarding the Strength and Compression Characteristics of Cohesive Soil for the Design of Port and Airport Facilities".
Electronic Navigation Research Institute	Implemented research and development for advancing air traffic management systems such as "expanding the capacity of airways," "expanding the processing capacity of congested airports", and "safety and technology that connects air and land."

(2) Regional Development Bureau Initiatives

Technical and Engineering Offices and Port and Airport Technology Investigation Offices coordinate with relevant offices in their jurisdiction for tests and research of civil works material and water quality, hydraulic tests and design for the effective and efficient development of facilities, development of environmental monitoring systems, and other matters for technology development as well as the utilization and promotion of new technology tailored to the region.

(3) Promoting research and development technologies of constuction, traffic and transportation fields

Regarding important research issues concerning construction technology that are especially urgent, issues that involve a wide range of fields are taken up and the governmental departments take the lead with the coordination of industry, academia and government to implement research comprehensively and organizationally for the "comprehensive technology development projects" where in fiscal year 2013, research and development is being conducted for a total of six issues including the "development of function continuity technology for the disaster site buildings."

Also, for the traffic and transportation fields, technological research and development that contributes to ensuring safety, improving convenience, and protecting the environment are being promoted efficiently and effectively with the coordination of industry, academia and government and in fiscal year 2013 the "promotion of comprehensive technology development for advanced control and management systems in the field of transport" is being undertaken.

(4) Supporting Private Sector Technological Research and Development

To promote private sector investments in research and development, support is given through special tax treatment regarding experiment and research expenses.

(5) Promoting Public Invitation Type Research and Development Subsidy Systems

To promote technological innovation in the construction sector, for the "Construction Technology Research and Development Subsidy Program" that invites the public to make proposals for technological research and development that contributes to the sophistication and strengthening of international competitiveness of construction technology under MLIT's authority, two types of public invitation are made, public invitations for technology development that solves policy issues (aiming to implement in 2-3 years) and public invitations for technology development in response to earthquakes (aiming to implement in 1-2 years) and in fiscal 2013, 3 new issues were adopted and 23 issues were carried over.

Also, in the sector of traffic and transportation, the "Fundamental Research Promotion Program for the Transport Sector" implemented by the Japan Railway Construction, Transport and Technology Agency (Independent Administrative Institution) was abolished in fiscal 2012 and a "Transportation Technology Development Promotion Program" was newly established to focus on the implementation of truly necessary basic research by widely consolidating the knowledge of industry, the public sector, and academia. In fiscal 2013, this program invited the public for research topics regarding five research themes including "Pre-Disaster Prevention and Disaster Mitigation as well as Optimal Maintenance and Upgrading for Transport Infrastructure" and five topics were adopted.

2 Promoting the Utilization and Adoption of New Technology for Public Works

(1) New Technology Utilization System for Public Works

In order to actively utilize promising new technology developed by private sector businesses, a "new technology utilization system for public works, etc." that utilizes the New Technology Information System (NETIS) is under operation. Up to now, there were 21 recommended technologies and 47 runner-up recommended technologies chosen as innovative new technologies that will raise the level of technology concerning public works. Also, to promote efficiency of maintenance and management in the field, for the adoption of new technology in the field and the promotion of further technological development, NETIS is leveraged to set technical themes to use and evaluate the submitted technologies in the field.

(2) Supporting the Utilization of New Technology

In order to promote the utilization of new technology in public works and other areas, utilization is evaluated at every design stage and technology with greatly benefits from utilization is designated by the ordering party when construction is contracted. Also, for new technology that the contracting office is actively considering, a provisional unit price that helps with streamlining the contracting was created for three technologies by fiscal 2013.

Section 3 Improving Construction Management Technology

1 Improving Costing Technology for Public Works

For the purpose of ensuring the transparency of public works, various price data standards are made public. Also, from fiscal year 2012, to improve the efficiency of cost estimation, the "construction package type cost estimation formula" has been implemented on a trial basis and extended to fiscal year 2013. Furthermore, in response to the no-bidder/over-budget issue of recent years, overhead cost corrections for road maintenance projects in large urban areas or costing formulas that allows the reflection of the bidders estimates in expected pricing is being test implemented. Also, from fiscal year 2012 for the purpose of improving the reciprocity between the contractor and contractee, when there is a change to the contract amount, the unit prices and other matters for estimating the monetary amount or partial payments will be agreed upon by negotiations before hand for the purpose of facilitating smother negotiations following design changes or partial payments as part of the "total value contract and unit pricing agreement formula" being implemented.

Also, in addition to stipulating the public works construction costs and estimation standards, the public works construction standard unit price is established and in fiscal 2013, to respond to the aging of social infrastructure, unit prices for bridge repairs were newly established and the unit price of maintenance and repairs were revised and indirect construction cost rate were placed under review. Also, for construction machinery etc., rent, field studies are carried out for the construction machinery, etc., possessed by the contractor and the base value, maintenance and management costs, and operation costs are assessed and revisions implemented.

2 CIM and BIM Initiatives

A three-dimensional model is introduced from the planning, research, and design stages of public works and for the construction that follows, a three-dimensional model is linked and developed at each stage such as the subsequent construction, maintenance, and management so that by sharing information between all the stakeholders of the project, the construction productivity system is made more efficient and sophisticated while initiatives to introduce CIM (Construction Information Modeling) for the quality assurance and environmental performance of public works as well as reduce lifecycle costs are carried out. In fiscal 2013, testing was implemented and expanded for the schematic design, preliminary design, and construction stages for an evaluation of CIMs from both a legislative and technical perspective.

Also for government buildings services projects, it is expected that the efficient and effective utilization of BIM (Building Information Modeling) for the lifecycle of government facilities will contribute to ensuring the quality of government facilities, reduction of lifecycle costs regarding the improvement and preservation of facilities, and contribute to customer satisfaction toward government facilities. For this reason, from fiscal year 2010, tests were begun for three directly managed projects as BIM utilization projects and the effects and issues regarding BIM implementation are being evaluated. In addition, "Guidelines for the Creation and Use of BIM models in Government Buildings Projects", for the basic principles and considerations when using BIMs for government buildings projects, was compiled and published in March 2014.

Section 4 Technology Development for Construction Machinery and Mechanical Equipment

(1) Development and Supply of Construction Machinery

In order to carry out appropriate maintenance and management of rivers and roads managed by national government and quickly respond to disaster recovery, efforts are being made to implement machinery for maintenance and management as well as disaster measure machinery across the nation.

Also, in order to improve the efficiency, conservation of labor, and safety of construction associated flood control projects and road development projects, studies and research and development for construction machinery and construction are being undertaken.

(2) Streamlining and Improving the Reliability of Maintenance and Management of Machinery

For the protection of lives and properties of the citizenry from disasters, the construction of floodgate facilities, storage and drainage pump facilities, and road drainage facilities was furthered starting around late 1965 and many of the facilities are becoming decrepit. For this reason, in addition to preservation to perform overhauls based on the time elapsed from installing the facilities to running time, analysis of vibration values measured during the inspection of facilities and the development of inspection and monitoring technology such as component analysis of lubricating oil are continued to be tested in the field to strive for extending the life of machine equipment and improving reliability.

(3) Utilizing the Fruits of Construction Technology Development

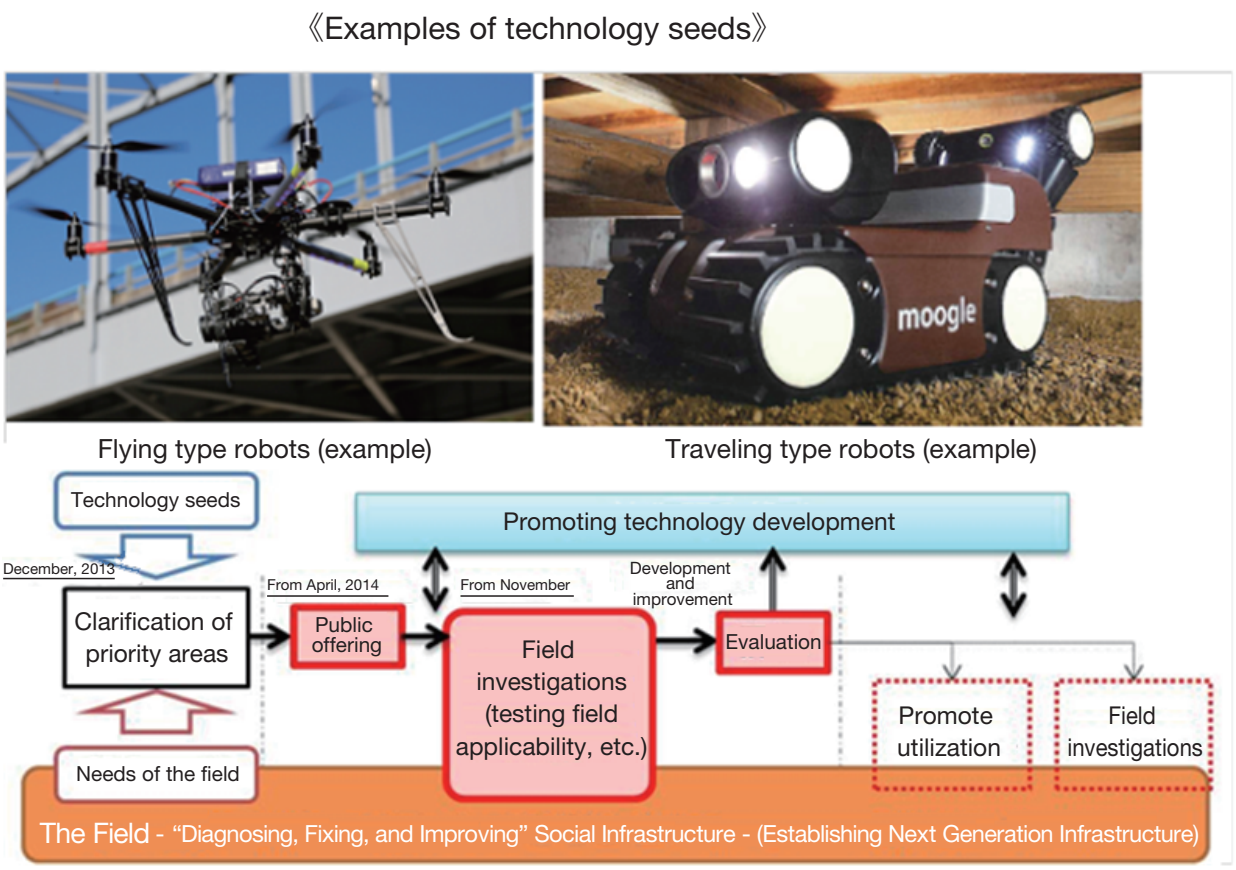
In order to safely and swiftly carry out restoration work at disaster sites where the danger of secondary disasters such as large-scale floods, sediment-related disasters, and slope collapses, a hydraulic shovel that can be remotely controlled as well as taken apart and airlifted was developed. By FY2013, eleven hydraulic shovels have been deployed.

(4) Introduction and Development of Robots for Social Infrastructure

For issues faced by Japan such as aging infrastructure, preparedness for disasters such as earthquakes and floods, as well as population decline, low fertility, and aging society, initiatives to improve the effectiveness and efficiency of the maintenance and management of social infrastructure as well as disaster responses through Japan's strengths in the field of robot technology are underway by striving for development and implementation that is rooted in the field. In fiscal 2013, the "Robot Development and Introduction for Next-Generation Social Infrastructure Study Group" (July 2013) was jointly hosted with the Ministry of Economy, Trade and Industry to create the "Robot Development and Introduction for Next-Generation Social Infrastructure Priority Areas" (December 2013) was formulated. Following this, the newly held five specialized subcommittees (bridge maintenance, tunnel maintenance, underwater maintenance and management,

disaster investigation, and emergency restoration) under the "Robots for Next-Generation Social Infrastructure Field Investigation Committee" the items to be targeted by initiatives for the promotion of development and implementation were fleshed out and goals were debated for the formulation of public offering procedures.

Figure II-10-4-1 Promotion of the Robot Development and Introduction for Next Generation Social Infrastructure



Source) MLIT