# 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, offstreet 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 March 31, 2015)

○Passenger Facilities (over 3,000 persons/day using on average)

| | Total Facilities | Passenger Facilities Compliant with Accessibility Standards for Public Transportation (No Grade Barriers) | Percentage of total number of facilities |
|---|---|---|---|
| Railway stations | 3,497 | 2,964 | 84.8% |
| Bus terminals | 49 | 41 | 83.7% |
| Passenger ship terminals | 15 | 15 | 100.0% |
| Airport passenger terminals | 34 | 29 | 85.3% (100%) |

(Notes) 1 Regarding the "elimination of steps" , it is calculated in accordance with conformity to Article 4 (which covers width of the travel path, ramps, elevators, escalators, etc.) of the "Standard for Smooth Transport, Etc., with Public Transportation" based on the Barrier-Free Law.
2 The installation of elevators, escalators, and slopes that can be used by the disabled in airport passenger terminals had already reached the 100 percent level by March 2001.

○Vehicles

| | Total Number of Vehicles, etc. | Vehicles Compliant with Accessibility Standards for Public Transportation | Percentage of total number of vehicles |
|---|---|---|---|
| | End of FY 2014 | End of FY 2014 | End of FY 2014 |
| Railway carriages | 52,203 | 32,389 | 62.0% |
| Low-floor busses (excluding exemption-certified vehicles) | 44,874 | 21,074 | 47.0% |
| Lift-equipped busses (excluding exemption-certified vehicles) | 15,105 | 856 | 5.7% |
| Welfare taxis | — | 14,644 | — |
| Passenger ships | 674 | 217 | 32.2% |
| Airplanes | 574 | 543 | 94.6% |

(Notes) 1 "Compliance with smoothness of transport vehicles" is calculated based on each vehicle's compliance with the Accessibility Standards for Public Transportation.
2 Since the way in which targets for buses are formulated has changed between the old and new versions of the basic policy, items differ as outlined in Exhibits 1 and 2.
Source) MLIT

#### (2) Accessibility of Living and Housing Environments

##### (i) Accessibility of Housing and Architecture

In order for those such as the elderly and disabled to lead a secure, safe, and comfortable housing life within the region, the conversion of housing to be barrier-free is supported by measures, for example, the financing interest of the Japan Housing Finance Agency's (Independent Administrative Institution) "Flat 35 S Loan" is reduced for obtaining housing

that fulfills a certain barrier-free level:; subsidies are provided for barrier-free renovations; public housing and Urban Renaissance Agency rental housing which are newly supplied on the basis of the housing rehabilitation project are rendered 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 architectural structures used by the general public, including those such as the elderly and disabled, architecture 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 facilities that are used by unspecified but many users, development is promoted in accordance with the standards for encouraging smooth travel for buildings based on the "Barrier-Free Law," thereby ensuring that all people including the elderly and disabled can use the facilities safely, comfortably and smoothly. For this, initiatives are being carried out to reflect the opinions of facility users such as the elderly and disabled in facility development.

**Figure II-7-1-2 Approvals of Architecture 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 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 174 | 208 |
| 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 | 5,140 | 5,348 |

Source) MLIT



### (ii) Accessibility of Walking Spaces

In accordance with the Barrier-Free Act, areas, such as roads and station squares, that are connected to facilities, such as stations, government facilities, and hospitals, must ensure that everyone, including the elderly and disabled, are able to pass through comfortably. This is achieved by promoting the barrier-free design of pedestrian spaces through measures that include the following: creating wide sidewalks, reducing unevenness, slopes, and grades, eliminating utility poles, and laying down guiding blocks for the visually impaired.

### (iii) 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, development of waterfronts and renovation of passenger ship terminals for better accessibility are promoted as an integral part of town planning.

## (3) Promoting Universal Design for the Olympics and Paralympics

In order to promote the development of a society that adheres to the precepts of universal design (in terms of a full recognition of the need for accessibility and urban planning) in response to the impending arrival of the Tokyo Olympics and Paralympics in 2020 and implement measures to leave behind a concrete legacy after the Games come to an end, a network of ministries and agencies with ties to Universal Design 2020 was set up in February 2016 under the purview of the Headquarters for the Promotion of the Tokyo Olympic and Paralympic Games. This network will organize hearings involving the participation of disabled advocacy groups and is slated to issue, in August 2016, an interim summary for which feedback from disabled persons will be taken into account. By the end of 2016, a final summary for Universal Design 2020 is expected to be released.

## 2 Creating an Environment that Supports Child-rearing Under an Low Birthrate Society

### (1) Supporting the Balance of Work and Child-rearing

#### (i) 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.

#### (ii) Promotion of Teleworking

Teleworking, a flexible work style that uses information and communication technology for the freedom to work anywhere, promotes workforce participation by various persons including women, contributes to vitalization of communities such as local cities through creation of new workplaces, and requires promotion. In addition, teleworking promises to reduce the burden of commutes by combining work and living arrangements, realize harmony of work and life (work-life balance), and ensure business continuity during disasters and other events.

The "Declaration to be the World's Most Advanced IT Nation" decided by Cabinet on June 30, 2015, 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.

The MLIT has quantitatively ascertained the actual conditions associated with the teleworking style of work and the population of teleworkers and conducted a study of policies for promoting the development of locations at which teleworking can be deployed.

### (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 (Edition 2)" 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 2014 is implemented at 1,007 housing projects (25,523 housing units).

Also, in order to promote development of the "Housing and City for smart wellness" where various families with the elderly and small children can live and act actively, the promotion projects for the housing for smart wellness supports the development of housing with service for the elderly, welfare facilities etc. in housing developments etc. and pioneering living and town planning measures for the elderly.

### (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] is being promoted and as of the end of FY2014, 16,612 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 FY2012, 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, as of the end of FY2014, 3069 organizations are providing fee-based passenger transport services to allow municipal governments and NPOs to provide fee-based transport services using private vehicles in the case where the parties of the regional residents agree that services by bus or taxi companies are deemed difficult to provide and the private fee-based passenger transport services are required to ensure the passenger transport which is necessary for the living of the local residents.

## 4 Promotion of the dissemination of pedestrian mobility support

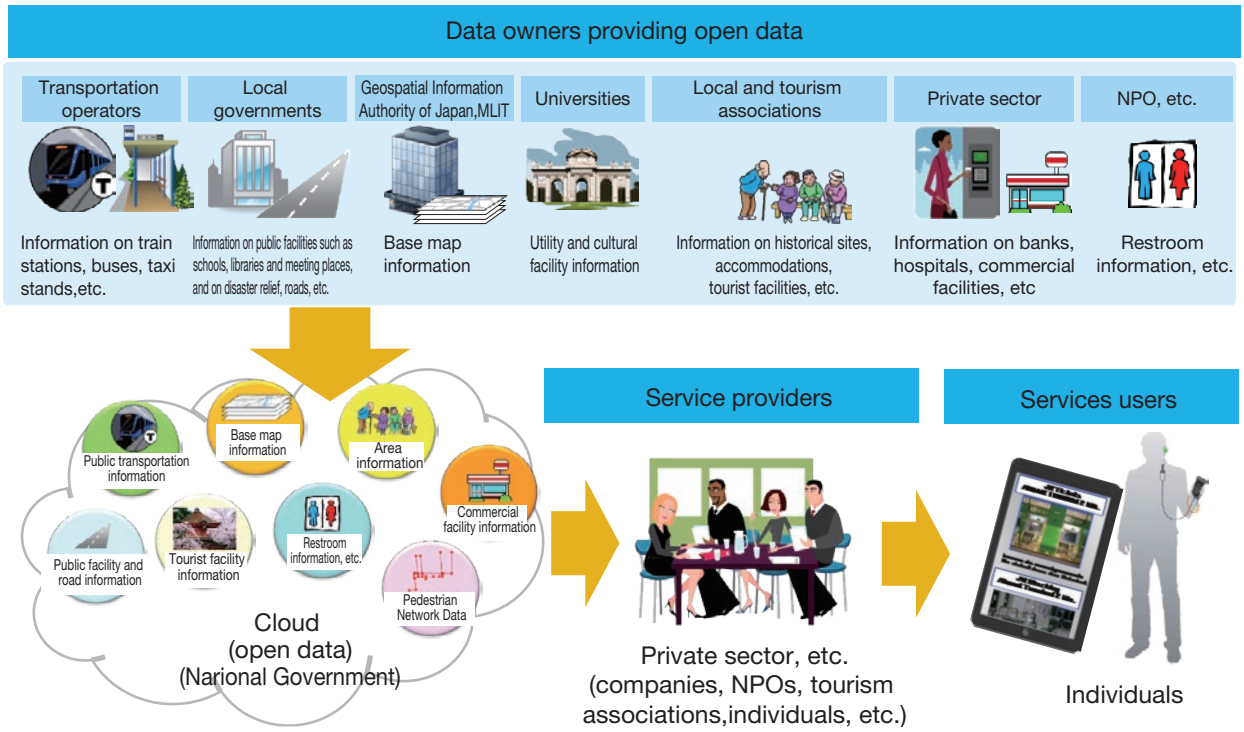
It has been promoted that the dissemination of pedestrian mobility support service that utilizes ICT toward the establishment of a society where anyone including foreign visitors, elderly and physically-challenged people can participate in social activity freely and without stress.

The Study Committee for Promoting ICT-assisted Pedestrian Mobility Support (led by Prof. Ken Sakamura of the Graduate School of the University of Tokyo), which was established in June 2014, studied the requirements for full-scale promotion of pedestrian mobility support, and prepared proposal in April 2015. The proposal recommends that it be necessary to actively promote the concept of "open data" to disseminate the pedestrian mobility support service. Based on the proposal, "Data site for pedestrian mobility support service" has been has set up in July 2015, In September 2015, "Guidelines for the approaches to pedestrian mobility support service that utilizes open data" to local governments" has been published.



**Note** 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.

Figure II-7-1-3 Illustration of the establishment of services based on the use of open data




Source) MLIT

## Section 2 Natural Disaster Measures

Japan's national land is subject to severe conditions in such terms as climate, geography, and geology. Such natural disasters as earthquakes, tsunamis, floods, and sediment-related disasters occur almost yearly. The year 2015 also saw a series of natural disasters occurring throughout the country, including the volcanic eruption on Kuchinoerabujima Island and torrential rains falling in the Kanto and Tohoku regions. The importance of natural disaster measures is more urgent than ever before because there is concern over water disasters that are occurring more frequently and to a heavier extent due to climate change as well as over the occurrence of giant earthquakes that are expected to strike, including the Nankai Trough Mega Earthquake and Tokyo Inland Earthquake. To this end, disaster prevention, disaster mitigation, and dilapidation measures must be fundamentally bolstered, and structural and non-structural measures are being taken to protect lives and living standards.

### 1 Responding to Weather Disasters Getting More Serious and Imminent Giant Earthquakes

#### (1) Ideal Way of Disaster Prevention and Mitigation for Coping with New Stage

Recently, more than 50 mm of rainfall per hour has occurred frequently, showing the increasing tendency of localized, concentrated, and heavy rain. In September, 2014, Ontakesan (Mt. Ontake) erupted, presenting a situation waiting powerful volcanic eruption to occur. These situations were considered as "a new stage" and the direction of future study thereof was summarized in January, 2015.

An ideal way of engaging in disaster prevention and mitigation for the new stage basically entail the protection of human lives using facilities to deal with heavy rainfall and other forms of disasters that occur relatively frequently. In dealing with the extraordinarily heavy rainfall and other forms of disasters that occur rarely, the policy minimally aims to protect human lives and avoid catastrophic damage to society and the economy and seeks to deal with such contingencies primarily through non-structural measures. Specifically, it is believed that, (i) in order to protect lives, it is necessary to ensure that residents are able to evacuate autonomously and on their own initiative according to status updates on

precipitation amounts and other data points rather than just evacuate by way of an approach that involves waiting for evacuation instructions; and, (ii) in order to prevent catastrophic damage to society and the economy, a collective societal response is necessary, whereby worst-case scenarios are envisioned and the national and local governments, business operators, and other concerned parties all share a sense of impending crisis. Various initiatives are underway based on this understanding.

### (2) Preventing and Mitigating Water Disasters

Large-scale water disasters caused by tropical cyclones or the like (for example, disasters caused by Typhoon Wipha visited Izu Oshima Island and other regions in Japan in 2013 and storm surge disasters caused by Hurricane Sandy in US in 2012) are getting more frequent and serious. With this situation in mind, the "Underground Mall, Subway, Etc. Working Group" and "Disaster Action Plan Working Group" have been set up under the "Water Disaster Prevention and Mitigation Headquarters, MLIT" chaired by the Minister of Land, Infrastructure, Transport and Tourism in January, 2014, to study the measures to be taken when water disasters occur.

The Underground Malls, Subways, Etc., Working Group has summarized responses to issues concerning underground settings and disseminated this summary to the relevant organizations. Accordingly, flood measures have been applied on a coordinated basis to underground malls, subways, and connected buildings in the three major metropolitan areas.

The Disaster Action Plan Working Group provides support to enable the heads of municipalities to issue evacuation instructions at appropriate times and has formulated timelines focused on the issuance of evacuation instructions for rivers under the direct jurisdiction of the national government, as well as timelines for bringing together twenty organizations and thirty-seven departments and agencies, including local governments, railways, electricity power operators, telecommunications operators, and welfare facilities, in the downstream basin of the Arakawa River. Modeled on this approach, councils have been established for Ishikari River (Hokkaido), Kuma River (Kumamoto), and other blocks throughout the country to commence studies on timelines for bringing together many concerned parties.

In August 2015, the third Conference of the MLIT Headquarters for Disaster Prevention and Mitigation Measures In Connection With Water Disasters was held where it was decided that Regional Development Bureaus would primarily organize hearings to be attended by companies and other concerned parties in order to study the establishment of a Catastrophic Damage Prevention Working Group and initiatives that could be undertaken in collaboration with companies and other concerned parties. With the objective of minimally protecting lives and preventing catastrophic damage being caused to society and the economy in the context of an ideal way of engaging in disaster prevention and mitigation for the new stage as declared in January of the same year, this working group was established under the purview of the MLIT Headquarters for Disaster Prevention and Mitigation Measures In Connection With Water Disasters for the purpose of studying measures to prevent catastrophic damage caused to society and the economy in accordance with an indication of orientation as to the necessity of a collective societal response informed by a shared sense of crisis. The Kanto, Chubu, and Kinki Regional Development Bureaus have set up councils in different areas and have been conducting hearings attended by companies and studies of the projected impact of disasters in terms of damage.

### (3) Responding to Climate Change

There are growing concerns about the intensified frequent occurrence of water disasters (river water flooding, inland water flooding, storm surges) and sediment-related disasters, droughts caused by natural hazards that exceed the capacity of facilities. In August 2015, a report was issued by the Infrastructure Development Council entitled "Approach to Climate Change Adaptations in the Field of Water-related Disasters".

Regarding natural hazards that could occur relatively frequently, continue to steadily promote improvements that have been ongoing to date for the construction of levees, flood control structures, and sewer systems. Regarding natural hazards that exceed the capacity of facilities, endeavor to reduce risk by making improvements in facilities' operations, design and implementation procedures. For natural hazards that significantly exceed the capacity of facilities, aim for the protection of human life to the greatest extent possible and avoid catastrophic damage to the society and the economy, considering worst-case scenarios, and by developing measures with an emphasis on nonstructural measures.

### (4) Responding to the Nankai Trough Mega Earthquake and Tokyo Inland Earthquake

If the Nankai Trough Mega Earthquake occurs, it is predicted that a wide Pacific-side area from the Kanto region to

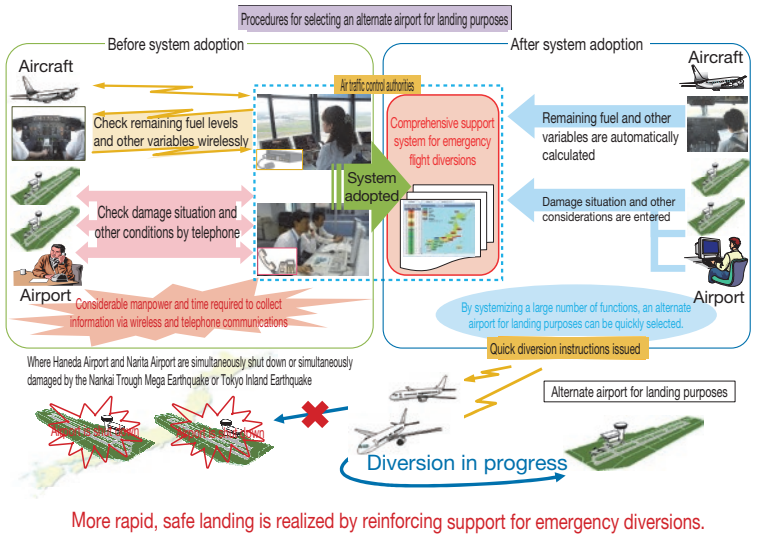
Kyushu will experience strong shaking with a seismic intensity of 6-7 and a huge tsunami will attack the wide Pacific-side coastal area within a short period of time. Deaths will reach a maximum of about 320,000 people, a critical situation including the interruption of transport infrastructure and paralysis of urban functions along the coast will be created, and the lives and economic activities of Japanese citizens are expected to suffer extremely serious effects all over Japan.

If the Tokyo Inland Earthquake occurs, it is expected to cause strong shaking with a seismic intensity of 6-7 along the entirety of the Tokyo Metropolitan area. In the Tokyo Metropolitan area, population, buildings, economic activities and others are concentrated extremely compared with other areas, and so it is expected that human, property, and economic damages become tremendous. In addition, in the Tokyo Metropolitan area, political, administrative, and economic functions of the capital are concentrated, and so it is expected that the Tokyo Inland Earthquake exerts impacts upon national economic activities and others as well as overseas countries.

In order to cope with such a national crisis, the Ministry of Land, Infrastructure, Transport and Tourism—which is in charge of the development and management of a lot of infrastructures and the protection of human lives and properties at sea and which has many field agencies all over Japan—established the Ministry of Land, Infrastructure, Transport and Tourism Nankai Trough Mega Earthquake and Tokyo Inland Earthquake Response Headquarters and a Response Plan Making Working Group in 2013, and formulated the Ministry of Land, Infrastructure, Transport and Tourism Nankai Trough Mega Earthquake Response Plan and Ministry of Land, Infrastructure, Transport and Tourism Tokyo Inland Earthquake Response Plan on April 1, 2014, in order to determine the reality-based responses to be taken by collective effort. Regarding the Nankai Trough Mega Earthquake, more specific and practical Regional Response Plans were developed for each regional block along with the abovementioned plans. In July of the same year and in August 2015, the Nankai Trough Mega Earthquake and Tokyo Inland Earthquake Response Headquarters determined the priority measures to be carried out after taking into account the status of the implementation of both response plans to date.

As a specific example of a priority measure for FY 2016, it was determined that, in order to implement the Tokyo Inland Earthquake Road Obstacle Elimination Plan formulated last fiscal year—in other words, in order to reinforce multidirectional strategies and secure transportation modes immediately after a disaster strikes, (i) an emergency river-utilization plan whereby rivers would be harnessed to facilitate the multiplexing of transport routes shall be formulated, (ii) a plan for the immediate and reliable transportation of relief goods after a disaster strikes shall be formulated, (iii) and a system for comprehensively supporting emergency flight diversions and transportation to enable any airplane to land at an alternate airport selected immediately in the event that the intended destination airport is shut down because of an earthquake shall be fully activated.

**Figure II-7-2-1** Responding to the Nankai Trough Mega Earthquake or Tokyo Inland Earthquake




<Reference> Priority measures (representative examples)

| Fiscal year | Priority measures for the Nankai Trough Mega Earthquake or Tokyo Inland Earthquake (representative examples) |
|---|---|
| 2015 | Faster and more precise delivery of emergency earthquake alerts, tsunami warnings, and tsunami observation data |
| | Elimination of road obstacles through multifaceted tactics |
| | Faster consolidation and sharing of disaster information through the use of the Integrated Disaster Information Mapping System (DiMAPS) |
| 2016 | Realization of faster, safe landings through the reinforcement of support for emergency diversions |
| | Multiplexing of rescue and emergency routes according to a plan for the use of rivers in emergencies |
| | Reliable, rapid transportation of disaster relief goods according to a plan for transportation of goods on a rapid-response basis |

Source) MLIT

## (5) Rebuilding Society to Raise Flood Prevention Awareness

### (i) Damage from and the emergency response to torrential rains in the Kanto and Tohoku regions

Record levels of torrential rains falling in the Kanto and Tohoku regions in September 2015 caused the floodwalls along a stretch of approximately 200 meters of the Kinugawa River in Misakamachi, Joso-city, to collapse, resulting in flooding that submerged about forty square kilometers of land and the loss of the lives of two individuals in the drainage area. This massive disaster also necessitated the rescue of 4,300 local residents.

The MLIT provided Joso-city with information on the dangers of flooding and maps of the area expected to become submerged prior to the collapse of the levees. In addition, the regional office head provided information on the state of rivers to the mayor (via a hotline).

The MLIT dispatched a liaison officer (local contact person for disaster countermeasures) to the local affected governments of Joso-city and other nearby municipalities prior to the collapse of the levees to adjust channels of communications, dispatched TEC-FORCE (emergency disaster countermeasures detachment), conducted status surveys and drainage activities, and, on the day on which the levees collapsed, commenced the drainage of water, accepted up to fifty-one drainage pump trucks per day from across Japan, and proceeded to more or less remove flood waters completely from homes and public facilities over the next ten days. Emergency work to restore the collapsed levees commenced on the day of the collapse. A week later, provisional levees (embankments) were completed and the emergency restoration work was wrapped up in two weeks.

### (ii) Emergency Actions to Induce Evacuations

In response to this flood, emergency actions to induce evacuations in response to the insecurities and concerns of municipal mayors and residents living near riverside levees nationwide were publicly announced on October 5, top-level seminars were held with municipal mayors, flood plain zones where houses are at risk of collapse if rivers were to overflow were publicly announced, and other initiatives were advanced for rivers under ministerial jurisdiction and areas alongside such rivers.

### (iii) Vision for the Restructuring of Society to Raise Flood Prevention Awareness

This flood caused many houses to collapse or become washed away from the overflowing of rivers, as well as the flooding of wide areas for an extended period of time. Floods in recent years have seen unprecedented numbers of isolated persons emerge because of a combination of these factors and delayed evacuations. Climate change also gives rise to concerns that flooding that exceeds the capacity of such facilities to respond appropriately will occur with greater frequency.

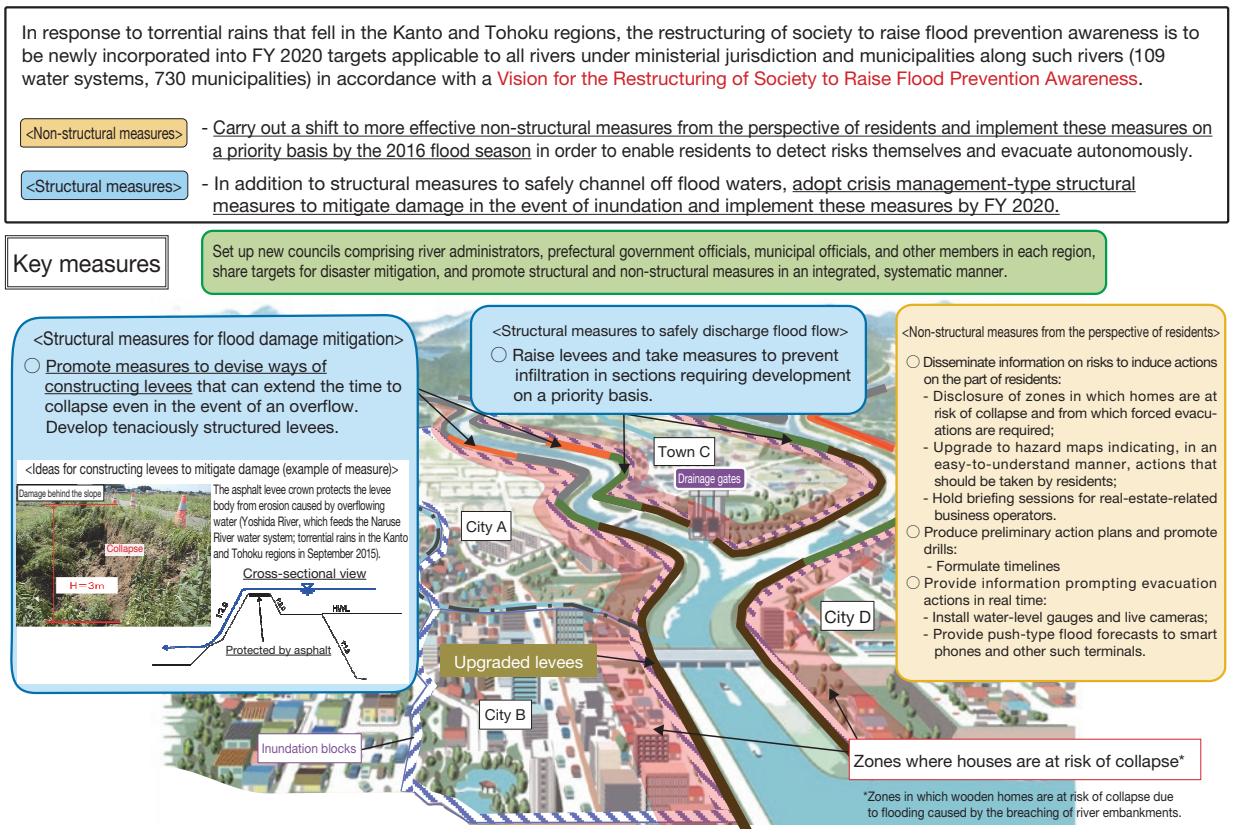
Upon considering these circumstances, a Subcommittee to Study Flood Control Measures to Mitigate the Impact of Large-Scale Inundations was established under the purview of the Infrastructure Development Council to discuss ways of implementing flood-control measures in the future. On December 10, a report was issued in which the following was stated: “We believe that it is simply a matter of time before an incident of large-scale flooding which exceeds the capacity of the

facilities occurs; it is thus necessary to restructure society to ensure that there is awareness of the need to prevent floods."

In accordance with this report, the MLIT determined that it would newly endeavor to restructure society into one that is aware of the need to prevent floods by FY 2020 based on a Vision for the Restructuring of Society to Raise Flood Prevention Awareness through initiatives carried out for all rivers under ministerial jurisdiction (109 water systems) and municipalities at risk of flooding from the overflowing of such rivers (numbering 730 in total). With respect to non-structural measures, efforts will be undertaken to transition to more effective non-structural measures to be implemented in accordance with the perspective of residents in order to enable residents to detect risks themselves and evacuate on their own accord. To illustrate, the transmission of push-type flood forecast notifications with smartphones will be progressively introduced beginning in the flood season of 2016. As for structural measures, we will steadily promote conventional structural measures to safely discharge flood flow in areas requiring upgrades on a priority basis, such as areas with significantly inadequate downstream capacity and areas with a history of water leakage. In addition, we will for now introduce structural measures for flood damage mitigation, including ideas for the construction of levees that can extend the time to collapse even in the event of an overflow, to be implemented in areas that have not yet undertaken levee upgrading on account of the need to strike a balance between upstream and downstream flows irrespective of the extent to which there is a considerable risk of an overflow.

For the Kinugawa River, where extensive damage was caused because of the recent flooding, emergency flood control measures integrating both structural and non-structural elements for the first time in the country will be implemented as part of the Kinugawa River Emergency Measures Project. In different regions, councils consisting of river administrators, prefectural governments, and municipalities will be newly established for the shared objective of mitigating disasters and in order to promote the aforementioned structural and non-structural measures on an integrated, systematic basis.

**Figure II-7-2-2** Vision for the restructuring of society to raise flood prevention awareness




Source) MLIT

## 2 Shaping National Land that is Safe and Resilient to Disasters and Enhancing and Strengthening the Framework of Preparedness for Crisis Management

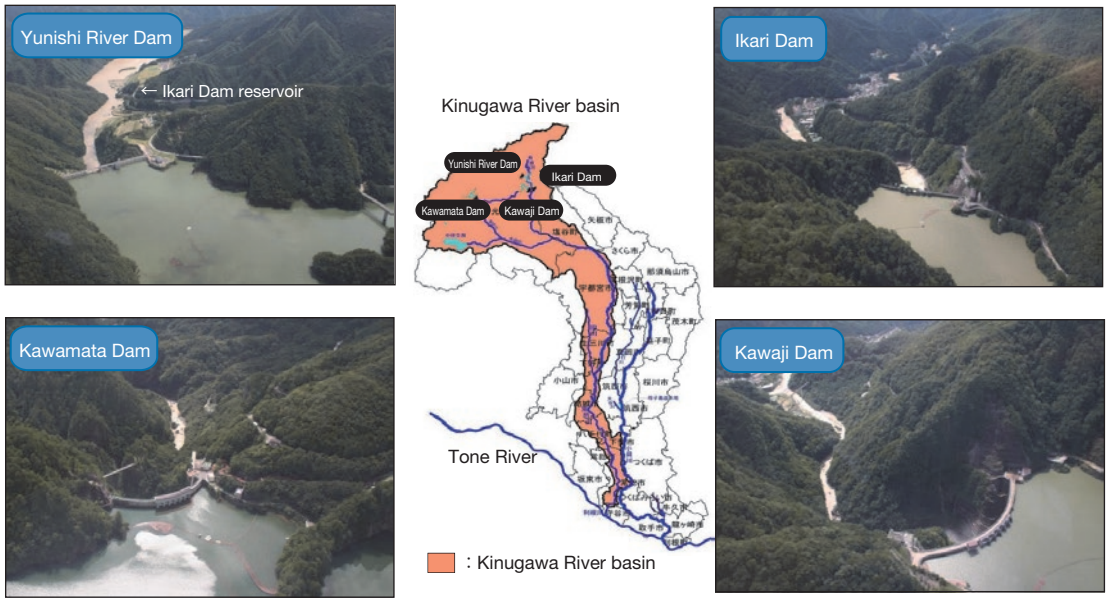
### (1) Flood Measures

Many of Japan's major cities are positioned on low-lying districts that are lower than the river level during flooding,

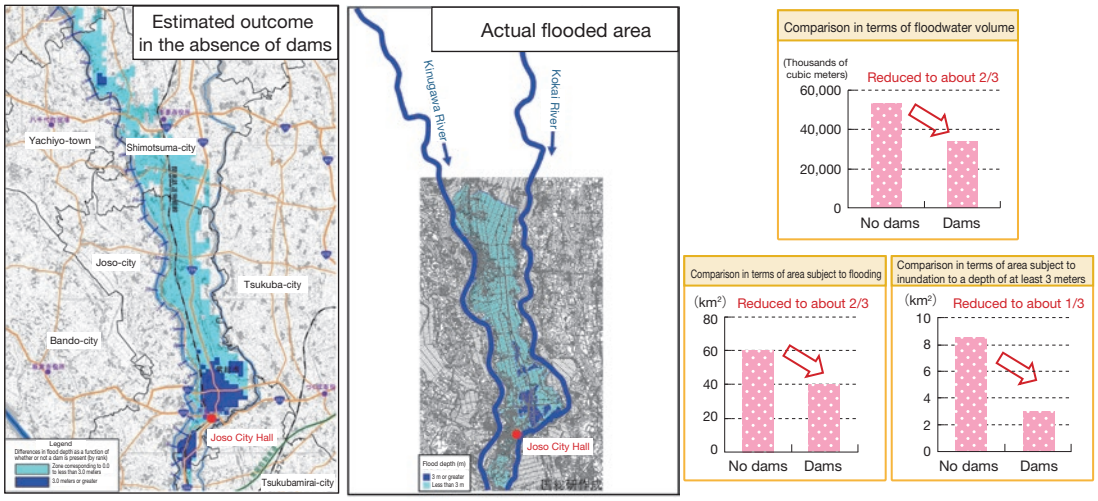
making the latent danger of flood inundation quite high. Water control measures, such as those involving the expansion of the river channel to safely flush away floods, embankments, the development of discharge channels, dams to temporarily hold back floods, and artificial ponds, have steadily improved the degree of water control safety. However, flooding occurred in various locations throughout the country in 2015, including the flooding that arose from the collapse of the embankments of the Kinugawa River from torrential rains in the Kanto and Tohoku regions. In order to mitigate and reduce damage caused by torrential rains and other factors, structural measures such as preventative flood control measures and measures to prevent re-occurrence as well as non-structural measures such as strengthening of the flood defense system and provision of river information are being promoted in a comprehensive manner taking into account the recent disaster forms and the influence of climate change.

In incidents involving inundation and other forms of flooding that occurred in 2015, the value of flood control projects implemented previously was demonstrated. For example, flood control for approximately 100 million tons of water was carried out through four dams established in the upstream reaches of the Kinugawa River, as a result of which it is estimated that the water level corresponding to breach points shifted approximately twenty-five centimeters downwards, the volume of overflowing water was reduced by about two-thirds, and the overflow area shrank by around two-thirds (around 1/3 for the area where flood waters rose to a depth of three or more meters).

**Figure II-7-2-3** **Conditions and effects of upstream dams on the Kinugawa River during the torrential rains that fell in the Kanto/Tohoku regions**




*These photographs of different dams were taken on September 11 from positions upstream from each dam.




*Based on simulation results.

Source) MLIT

### (i) 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 disasters from occurring. For this reason, water control facilities, such as levees, excavating river channels, dams, and discharge channels, are developed systematically. Also, in order to use the existing facilities effectively, the redevelopment of existing dams is carried out to enhance the water control function through increase in height and restructuring of the capacity of the existing dams. In addition, existing levees that are not sufficiently safe from permeative destruction or erosion due to floods are being strengthened.

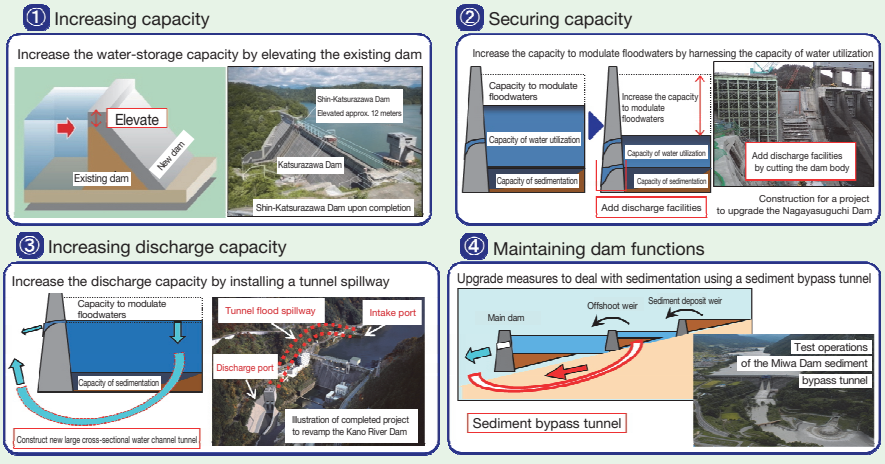
Additionally, for areas with a high likelihood of grave human casualties due to levee collapses in densely populated areas, in coordination with town planning projects, a safe and pleasant living environment that protects the human lives of local residents will be formed and to increase the safety of 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.

## Column

## Technology development in upgrading dam projects ~The Monodzukuri Nippon Grand Award ~

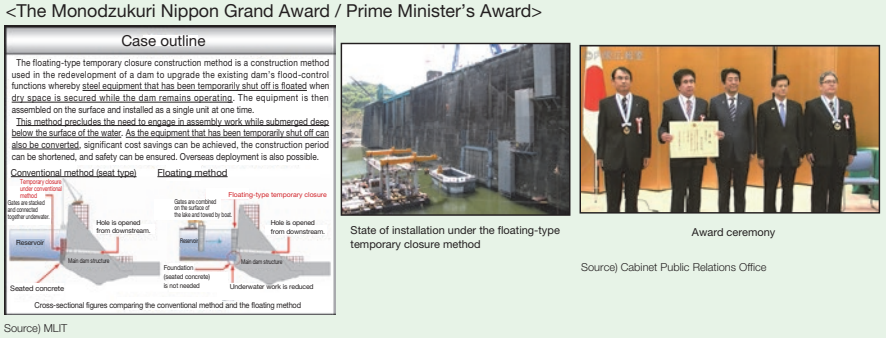
As a measure to use existing facilities, the dam project is required to further utilize existing stocks to deal with the increased frequency of heavy rain and the future climate changes. Therefore, upgrading dam projects are mainly focused on (i) the increase in capacities of existing dams by raising dam body, (ii) the improvement in flood control ability by reorganizing reservoir capacity, (iii) the improvement in discharging ability by constructing of new tunnel spillways, and (iv) permanent measures against sediment such as sediment bypass tunnels.

<Case examples of dam-regeneration>




Source) MLIT

<The Monodzukuri Nippon Grand Award / Prime Minister's Award>






State of installation under the floating-type temporary closure method



Award ceremony

Source) Cabinet Public Relations Office

Source) MLIT

Today in Japan, 20 or so projects are in progress, including (i) the embankment raising by approximately 12 meters for the existing Katsurazawa Dam, (ii) the modification to increase the capacity of flood control and add spillways by cutting out the dam body for the Nagayasuguchi Dam, (iii) the project to increase the capacity of flood control and newly construct a tunnel spillway for the Kanogawa Dam, and (iv) the project to newly construct a sediment bypass tunnel for the Miwa Dam.

Especially in the Tsuruta Dam redevelopment project, the floating cofferdam construction method has been developed as a technique for construction while operating the reservoir, in which temporary steel facilities are floated and constructed on the water, and then mounted onto the dam body in bulk. The method was recognized for cost reduction, shortening of construction periods, and safety realized by eliminating deep sea diving operations and diverting the cofferdam facilities to other purposes, and for the possibility of overseas development, so the Prime Minister's Award in the Monodzukuri Nippon Grand Award was granted to the engineers.

### (ii) 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.

### (iii) 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 damage, 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.

#### (A) Comprehensive Flood Control Measures

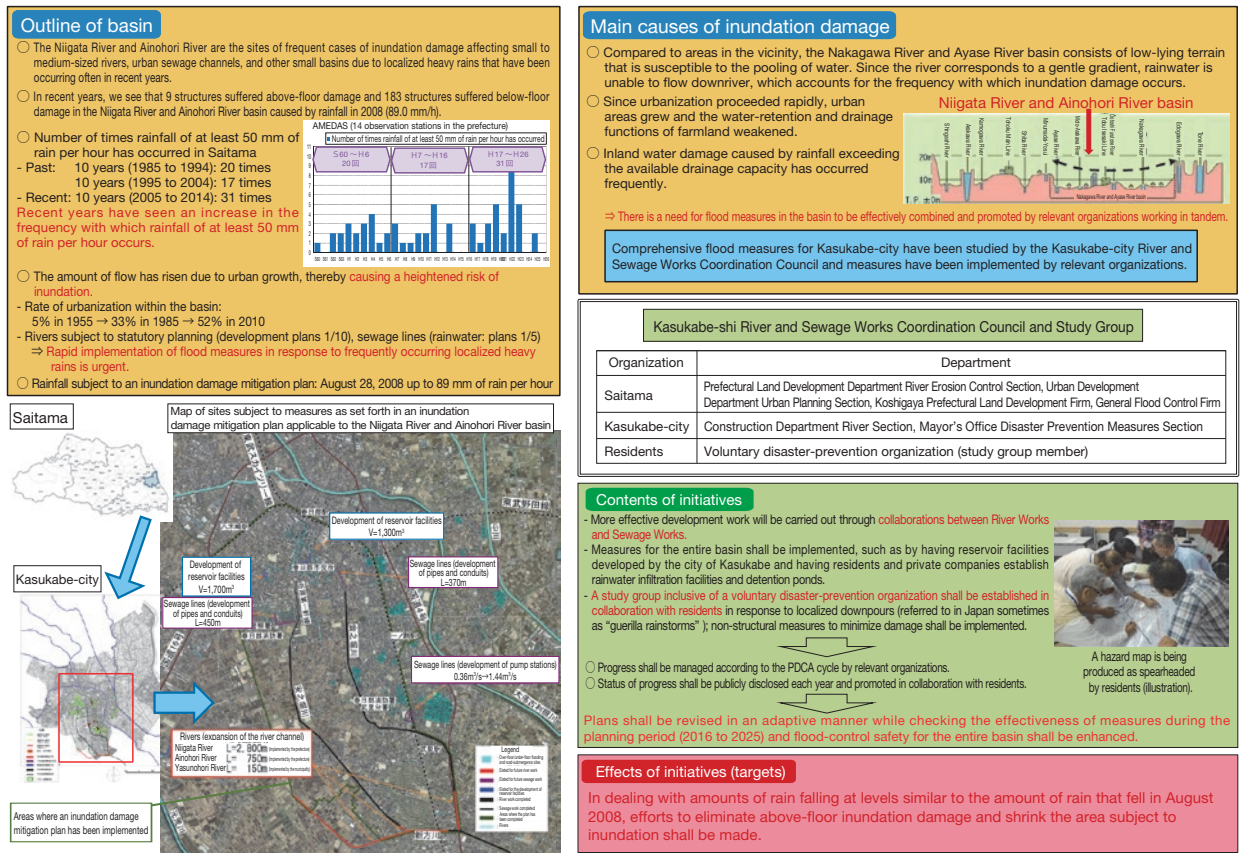
With factors, such as an increase in the impermeable land area following the development of urban areas and peripheral areas, as well as an increased discharge from flooding rivers, for urban rivers where flood control safety is significantly compromised, it is important to carry out comprehensive flood 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 high 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 damage.

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 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 security 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-7-2-4 Examples of measures based on a 100 mm/h security plan in Kasukabe-city, Saitama




Source) MLIT

## (C) Integrating Flood Control Measures with Land Use

In accordance with land use conditions, if it is an area prone to inundation 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 flood control measures.

## (D) Inland 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 inland water emergency measures are being utilized with the cooperation of relevant parties including regional authorities and affected residents to carry out structural measures such as proactively implement rainwater drainage reduction facilities; non-structural measures such as providing rainfall information, land use regulations, and creation of inland 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. In May 2015, the Flood Prevention Act was partially amended, and a system of areas that are expected to become submerged in connection with local runoff, a system of sewage lines tied to the public disclosure of water levels, a system of areas subject to measures to address inundation damage, and a system of public sewerage for dealing with rainwater have been established in order to further reinforce

Note A levee that surrounds districts with housing and other structures

our response to inundation damage in terms of both structural and non-structural elements.

### (iv) Revising the Flood Prevention Act and the Sewerage Act

In recent years, we have seen many instances of inundation damage exceeding current expectations due to flooding, local runoff, and storm surges. There is thus a growing need to enhance and reinforce evacuation systems and other responses to such inundation damage.

In areas in front of train stations and other locations where urban functions are concentrated, additional improvements to sewerage systems are difficult to carry out because of the congestion of underground space and other factors and it is required to promote flood measures with the corporation of private sectors.

In light of these issues, the Flood Prevention Act and Sewerage Act were amended in May 2015.

These amendments called for the establishment of a system of areas that are expected to become submerged in connection with conceivable maximum-scale flooding, local runoff, and storm surges; the establishment of a system of publicizing water levels corresponding to runoff and storm surges; the establishment of a system of areas subject to measures to address inundation damage; and cooperative measures for dealing with flood prevention as undertaken by sewage works administrators.

### (v) Strengthening the Flood Prevention Framework

In collaboration with prefectural governments, flood prevention administrative bodies, neighborhood associations, and other stakeholders, we have been implementing joint inspections of sections at high risk of flooding prior to the arrival of flood season, carrying out information-transmission drills, holding flood-prevention technical workshops and flood-prevention drills, endeavoring to disseminate flood-prevention technologies, and otherwise providing support for the strengthening of the flood prevention framework in order to minimize damage caused by flooding.

In order to reinforce the ability of local areas to prevent floods with the participation of various key players, we are also supporting initiatives tied to plans for the securing of voluntary evacuations and the prevention of inundation in underground malls (including those slated to be constructed and those that are under construction) situated in areas expected to become submerged, facilities for people with special needs, and large-scale factories. With respect to underground malls, we are promoting initiatives for the production of plans for the securing of voluntary evacuations and the prevention of inundation jointly with adjacent facilities into which water is expected to infiltrate and through which users are expected to evacuate.

### (vi) Publicizing Forecasts and Warnings of Flooding and Providing River Information

The Minister of Land, Infrastructure, Transport and Tourism or the Prefectural Governor designate rivers with large river basins that are at risk of causing great damage to the nation's economy or other great losses as flood forecast rivers and issue flood forecasts 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 flood-warning levels (special caution water levels of flood), this information is also released. As of the end of March 2015, there are 419 flood forecast rivers and 1,568 water level alert rivers.

The water level, rainfall volume, flood forecasts, flood prevention warnings 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 (Kawa Boh) [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 2016, 51 broadcast stations nationwide are providing such services. In observing rainfall levels, conventional radar rain gauges (C-band radar) and a ground-observation network, as well as the XRAIN network (MLIT X-band MP radar network) [Note 2], which is capable of observing local rainfall patterns virtually in real time in order to help facilitate appropriate river management and disaster-

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.

prevention activities in response to flood damage and landslides caused by concentrated downpours and localized heavy rainfall that are becoming increasingly frequent in recent years, are being developed. Rainfall information is also available on the Internet, and an observation system consisting of 38 radars was established as of the end of March 2016.

### (vii) Designation of Areas that are Expected to Become Flooded and Submerged

To reduce the flood damage by means of smooth and rapid evacuation and prevention from inundation when a flood occurs, districts that are likely to be inundated when the river floods (flood inundation forecast districts) are designated and information such as the depth of inundation is publicized in accordance with the Flood Control Act. With the 2015 amendments to the Flood Prevention Act, areas that are expected to become flooded and submerged because of conceivable maximum-scale rainfall will be sequentially designated and publicly disclosed.

In order to provide support for the production of hazard maps for the benefit of users that are directly tied to more effective evacuation actions in municipalities included in areas that are expected to become flooded and submerged, we will revise procedures for the production of hazard maps based on discussions carried out at meetings of expert panels that were held in FY 2015 as well as provide support tools to simplify the production of hazard maps and technical support for dissemination and utilization.

Areas expected to become flooded and submerged have been designated and publicly disclosed for approximately ninety-seven percent [Note] of flood-forecasted rivers and rivers for which water levels are publicly disclosed. Flood hazard maps have been produced for approximately ninety-eight percent [Note] of municipalities included in areas that are expected to become submerged.

The MLIT not only allows for tax subsidies for inundation prevention facilities obtained by the underground malls, etc. in inundation forecast areas in accordance with inundation prevention plans and supports voluntary flood defense initiatives carried out by underground malls, facilities for people with special needs, and large-scale factories via 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.

### (viii) Strategic Maintenance and Management of Rivers

The condition of river channels 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 advancing. Also, for river infrastructure, migration to condition-based maintenance is being implemented where degradation conditions are monitored through inspections so that measures are taken at appropriate moments to as move to extending facility life cycles and renewal in a planned manner. In addition, the Priority Plan for Social Infrastructure Development states that major river infrastructure administered by the nation will have lifetime extension plans by FY 2016. In addition, necessary technological development for extending lifetime will be furthered and technical standards for middle to small rivers will be studies in cooperation with prefectures for appropriate maintenance and management. In addition, technical support is provided through permanent consultation services made available by regional development bureaus.

The River Law revised partially in 2013 clarifies the need for the administrator of river management facilities or authorized structures to maintain river management facilities or permitted structures in good condition through maintenance and repair, stipulates the absolute minimum technical standards that must be adhered to by all administrators regarding the maintenance and repair of river management facilities and others by decree, and also revise the Technical Criteria for River Works: Maintenance (River) for promotion of appropriate maintenance.

### (ix) Measures Against Illegally Moored Vessels in Rivers

Since illegally moored vessels in rivers can impede flood control measures (such as by impeding river construction work, blocking the downstream flow during flooding, and damaging river management facilities) and otherwise impede the management of rivers (such as by causing water pollution through the leakage of fuel and impeding river usage), river

**Note** As of the end of March 2015.

administrators are providing guidance on the lawful mooring of unlawfully moored vessels and on the relocation of unlawfully moored vessels to proper storage facilities and otherwise working to remove unlawfully moored vessels.

In May 2013, the Plan for Promoting Comprehensive Measures for the Proper Management of Pleasure Boats and Improvements to Their Usage Environment was formulated. In June 2015, the results of a nationwide survey on the conditions surrounding pleasure boats that was conducted on a consolidated basis for three areas of water (ports and harbors, rivers, and fishing harbors) in order to verify the effects of measures implemented under this plan were publicly disclosed. In accordance with the 2013 amendments to the Order for the Enforcement of the River Act, river administrators are proceeding with measures to prohibit the abandonment of vessels inside river areas.

### (x) Road Submergence Measures

Road underpasses in Tochigi and Hiroshima Prefectures were submerged in water due to the concentrated heavy rainfall that occurred in August and September of 2008, causing vehicles to sink. To prevent such accidents, information concerning submergence risk locations is shared with road administrators, police agencies, fire departments, and other relevant authorities. The framework for information exchange and passage prohibition is established, and the development and installation of submergence alert systems and monitoring facilities, as well as the publication of submergence risk locations that are publicized on the website [Note], are promoted.

### (xi) Developing Hills Using Construction-Generated Soil

The Koto Delta, an expansive low-lying zone with a maximum subsidence of 4.5 meters that was created by pumping out the subterranean water that had previously existed here, is presently home to approximately 2.5 million people. As this zone sits below sea level, there is considerable concern that a stretch of this zone will become submerged in a large-scale flood, thereby forcing large numbers of residents to travel long distances for evacuation purposes. At the same time, there is a lack of locations for processing construction-generated soil in urban centers, such that the effective utilization of this soil is also a pressing matter. For this reason, a project to get businesses that produce construction-generated soil to create hills for parks and other land features at their own costs as one approach to processing this soil has been launched. An invitation for public participation by businesses that produce construction-generated soil has been commenced for Shinkoiwa Park, the first site to be tackled for this project.

## Column

### Start of construction work to heighten the ground level in zero meter areas utilizing construction generated soil

On the Koto delta in Tokyo, a large zero meter area expands, and the residents are living on the land lower than the water surface. When Typhoon Kathleen struck the area in 1953, the houses in front of Shinkoiwa Station on the Sobu Line flooded to the eaves (Photo 1), and water did not subside for several weeks. A person said that they had to live on the roofs for three weeks at that time. Today, as many as 2.5 million people are living in the area as the result of advancement in land use, so if a serious flood occurs, it is expected that many people would fail to escape and enormous damage would be inflicted.

For residents in such zero meter areas, the heightening of the ground level is an earnest wish. In the meantime, land to dispose of construction generated soils is insufficient in the Tokyo metropolitan area, which is an urgent issue for relevant enterprises.

Thus, a system has been established, in which the government temporarily provides its owned land such as parks, and enterprises that generate soils through construction work make embankments with the soils and restore the original forms.

This is a win-win business because, for the government side, higher ground that can be used as evacuation places is constructed without its cost burden, and, for the enterprises generating soils, the soils can be disposed of.

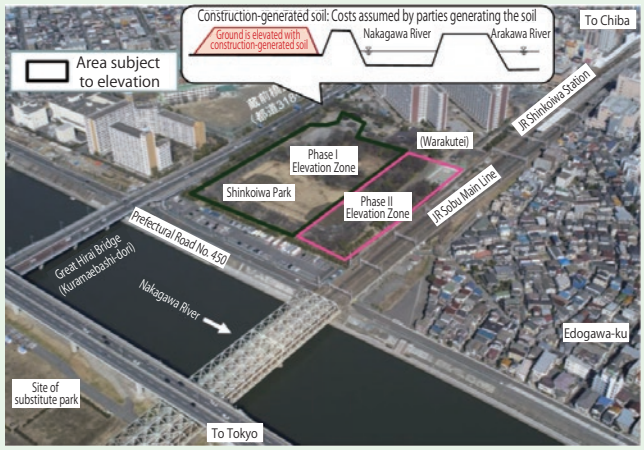
**Note** "Road Disaster Information Web Map" web site: http://www.mlit.go.jp/road/bosai/doro_bosaijoho_webmap/

As the first project using the new system, the ground level is to be heightened in Shinkoiwa Park controlled by Katsushika Ward (Photo 2). Following the public invitation, the partner enterprises in the construction will be selected in July 2016. After the selection, the ward and the partner enterprises will have consultations to start the construction work scheduled by next spring or later.

It is expected that the first project will trigger more ground-raising construction work with effective use of construction generated soils, which will contribute to protection against disaster and higher safety in zero meter areas.

Photo 1: Katsushika-ku experiences flooding up to the eaves of houses during Typhoon Kathleen.

Photo 2: Shinkoiwa Park in Katsushika-ku is elevated.



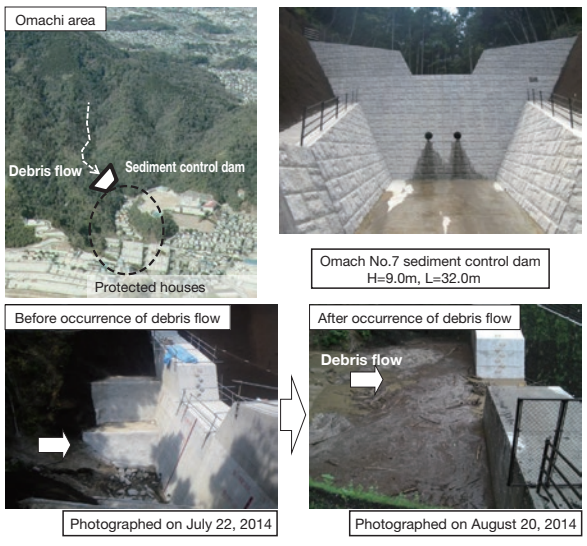

Source) MLIT

## (2) Countermeasures against Sediment-related Disasters

Japan has a steep geography and vulnerable geology over a wide area. In addition, Japan has a low number of plains and development of residential land has extended to hills and piedmont slopes along with the development of economy as well as the increase in population. As a result, there are about 520,000 areas vulnerable sediment-related disasters such as debris flows, landslides, and slope failures where a lot of people are forced to live cheek by jowl with a risk of sediment-related disasters. There have been 1,000 cases of sediment-related disaster caused by heavy rain and earthquake annually on average in the past 10 years (from 2006 to 2015). In 2015, there were 788 cases, causing great damages such as 2 deaths.

In order to prevent and mitigate the damages by sediment-related disasters, combination of non-structural and structural measures, such as construction of sediment-related disaster prevention facilities and improvement and enhancement of early warning and evacuation systems are being promoted.

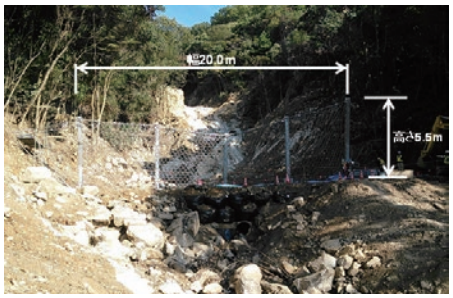
Figure II-7-2-5 Effect of Sediment Control Dams against Heavy Rain in August 2014




Source) MLIT

The heavy rainfall in August 2014 caused a lot of sediment-related disasters in Hiroshima City, Hiroshima Prefecture, accompany significant damages such as 76 deaths. In Omachi area, Asaminami-ward, the existing sediment control dams blocked debris flows, succeeding in protection of 32 houses and 80 families living in apartments from sediment-related disasters, the MLIT has been carrying out development work on sediment-control dams and other such facilities through specific emergency sediment-control facility projects since FY 2015.

Figure II-7-2-6 Status of the implementation of the construction of sediment control facilities in stricken areas




Resilient wire netting is installed

Commercial roads developed

Sediment control dam built

Source) MLIT

## Column Sediment-related disasters caused by Kanto-Tohoku Heavy Rainfall in September, 2015

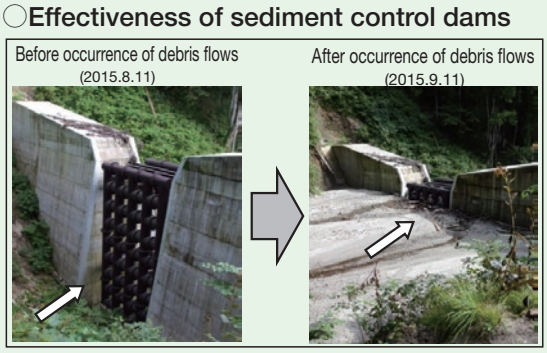
Torrential rain triggered by the season's 17th and 18th typhoons caused 177 sediment-related disasters in 17 prefectures around the nation. In Hiyoshi-town of Kanuma-city, Tochigi, a slope behind a house collapsed, causing one death and other damage. In the Serisawa District of Nikko-city, Tochigi, debris flows occurred in nine places in eight mountain streams, inflicting damage, such as seven totally or partially destroyed houses, and the split of the city road Serisawa-sen, which was the only evacuation route, temporarily isolated 25 residents.

In the same district, Takimukaisawa suffered serious damage, including totally destroyed residences. In the meantime, in Tamozawa where two sediment control dams had already been provided, the dams fully captured sediment and driftwood, preventing any damage to settlements downstream.

### ○Position map


Source) MLIT

### ○Effectiveness of sediment control dams





Source) MLIT

Directly after the disaster, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) removed overflowing sediment, contributing to early resolution of isolated settlements, and then provided new sediment control dams and other facilities to mountain stream areas that were seriously destructed by debris flows.

In addition, MLIT conducted an aerial survey to confirm the damage status by helicopter, and researched mountain streams with specialists in sediment-related disasters. MLIT reported the research results and offered advices on the alert and evacuation system to the Mayor of Nikko.

### (i) Fundamental Countermeasures against Sediment-related Disasters

Large-scale sediment discharge from devastated mountainous areas can cause serious damages to important community facilities such as downstream towns, roads, and railways. Construction of sediment-related disaster prevention facilities is being promoted to prevent large-scale sediment discharge from devastated mountain areas and riverbed rise in the downstream area, and to protect lives, property, and important community facilities from the damages by sediment discharge.

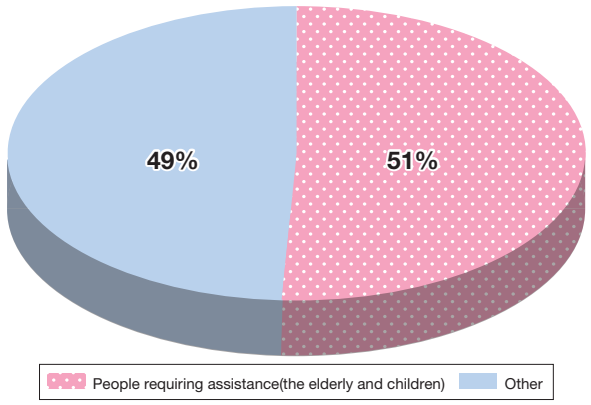
### (ii) Emergency Countermeasures against Sediment-related Disasters in Sediment Disaster Affected Areas

In order to ensure safety and security, and to maintain and promote socio-economic vitality in the areas where sediment-related disasters caused loss of life and great damages to people's living, concentrated construction of sediment-related disaster prevention facilities for preventing recurrence of disasters is being promoted.

### (iii) Countermeasures against Sediment-related Disasters to Protect Those Requiring Assistance during Disasters

People requiring assistance during disaster such as the elderly and children who cannot evacuate by themselves are liable to suffer the damages by sediment-related disasters. Among the dead and missing of sediment-related disasters, the percentage of people requiring assistance is high. So, in order to protect social welfare facilities, medical facilities, etc., for people with special needs, construction of sediment-related disaster prevention facilities such as sediment control dams is promoted in a focused manner.

Figure II-7-2-7 Percentage of People Requiring Assistance among Sediment-related Disaster Dead and Missing (2011-2015)




Source) MLIT

In accordance with the Act for Promotion of Measures to Prevent Sediment Disasters in Sediment Disaster Alert Areas, etc., (Sediment Disaster Prevention Act), measures combining structural and non-structural elements are being promoted, such as by restricting development pertaining to facilities used by persons with special needs and stipulating the names and addresses of facilities used by persons with special needs in sediment-related disaster hazard areas and matters relating to the transmission of information on sediment-related disasters in municipal plans for the prevention of local disasters.

### (iv) Countermeasures against Sediment-related Disasters for Urban Areas Near Mountain Base Slopes

For urban areas near mountain base slopes, forestry bands are fostered as green belts on the mountain base slopes adjacent to urban areas to enhance sediment-related disaster safety and maintain and create urban environments and landscapes with abundant greenery.

### (v) Countermeasures againt sediment-related disasters for Slopes Near Roads

Slope disaster prevention measures are taken for the slopes which have a risk of landslide near roads.

### (vi) Countermeasures against Sediment-related Disasters to promote Regional Disaster Prevention

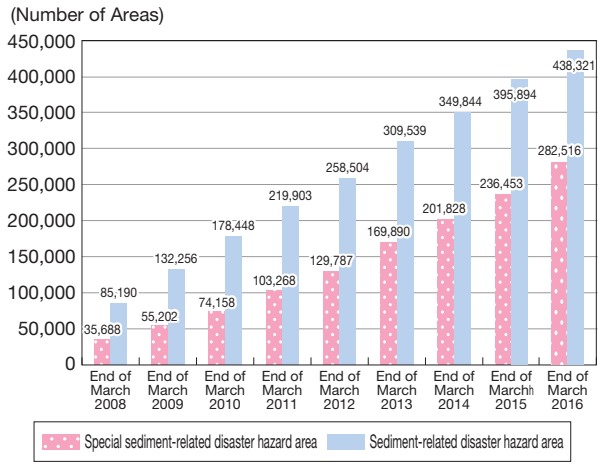
In hilly and mountainous areas at high risk of sediment-related disasters which has a large impact on community people, construction of sediment-related disaster prevention facilities for protecting people's lives, as well as maintaining the important facilities, such as evacuation shelters, evacuation routes, and town offices, that play an important role in regional disaster prevention is promoted for sustention and development of regional society.

### (vii) Promoting the Countermeasures against Sediment-related Disasters Based on the Sediment Disaster Prevention Act

#### (A) Promoting the Sediment Disaster Prevention Measures through Designation of Sediment-related Disaster hazard Areas

In accordance with the Sediment Disasters Prevention Act, areas vulnerable to sediment-related disasters that cause harm to residents are designated as sediment-related disaster hazard areas, warning and evacuation systems will be developed. Also, areas vulnerable to sediment-related disasters that cause damage to architectural structures and serious harm to residents are designated as special sediment-related disaster hazard areas, and non-structure measures are taken to restrict certain development activities and restrict on building structures. Also, guidelines and case studies are released for the development of warning and evacuation systems as well as the creation of hazard maps, further the development of warning and evacuation systems as well as the creation of hazard maps against sediment-related disasters are being promoted in the municipalities.

Figure II-7-2-8 Designated Sediment-related Disaster Hazard Areas Nationwide (end of the March, 2015)




*Estimated total number of sediment-related disaster hazard areas nationwide: 651,320

Source) MLIT

The Sediment Disaster Prevention Act, which was amended in response to sediment-related disasters that occurred in the city of Hiroshima from torrential rains in August 2014, was enacted in January 2015 and mandated the public disclosure by prefectural governments of the results of basic surveys, imposed an obligation on prefectural governors to provide notifications of sediment-related disaster warning information to municipal mayors and disseminate such information to the general public, and called for matters stated in municipal local disaster prevention plans for areas designated as sediment disaster alert areas to be put into effect and for other such measures to be taken.

#### (B) Prompting the Relocation of Housing at Risk

Houses near cliffs vulnerable to slope failures are prompted to relocate using the program for relocating at-risk housing located near cliffs. In FY 2015, this program decreased risky houses by 29 and 16 new houses were built to replace risky houses.

### (viii) Countermeasures for Large Scale Sediment-related Disasters

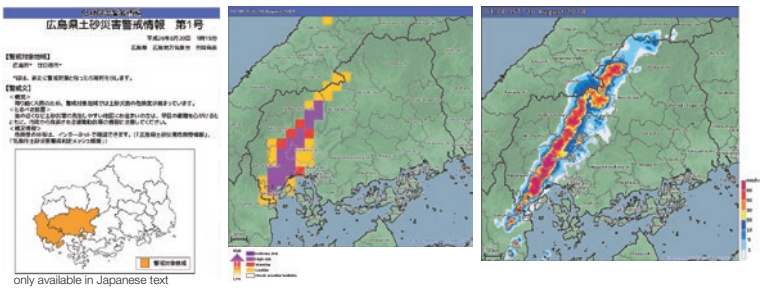
In order to reduce the damages caused by deep-seated catastrophic landslide, combination of structural and nonstructural measures are taken by, for example, development of sediment-related disaster prevention facilities as well as strengthening of the warning and evacuation system by use of deep-seated catastrophic landslide risk evaluation maps.

If there is a risk of a natural damming of a river (landslide dams) or debris flows following volcanic eruptions, urgent survey are conducted in accordance with the "Sediment Disaster Prevention Act" to provide municipalities with information on the land areas vulnerable to sediment-related disasters as well as the timing of occurrence. In recent years, sediment-related disasters have occurred frequently due to localized rainfalls more concentrated and intensified and volcano getting more active. So, training for enhancing the ability to respond for implementation of urgent survey and strengthening cooperation with relative organizations are promoted.

### (ix) Issuing Sediment Disaster Alert

In case that the risk of sediment-related disasters increases due to heavy rainfall, Sediment Disaster Alert is jointly issued by prefectures and the Japan Meteorological Agency over the respective-municipalities. Issuance of the Sediment Disaster Alert is expected to lead issuance of evacuation orders announced by the municipalities and/or self-evacuation of residents. In order to support such operation, the Agency also provides detailed mesh-data indicating the risk of sediment-related disasters as well as detailed precipitation data.

**Figure II-7-2-9** Sediment Disaster Alert, and Risk of Sediment Disaster and "High-resolution Precipitation Nowcasts"




Source) Japan Meteorological Agency

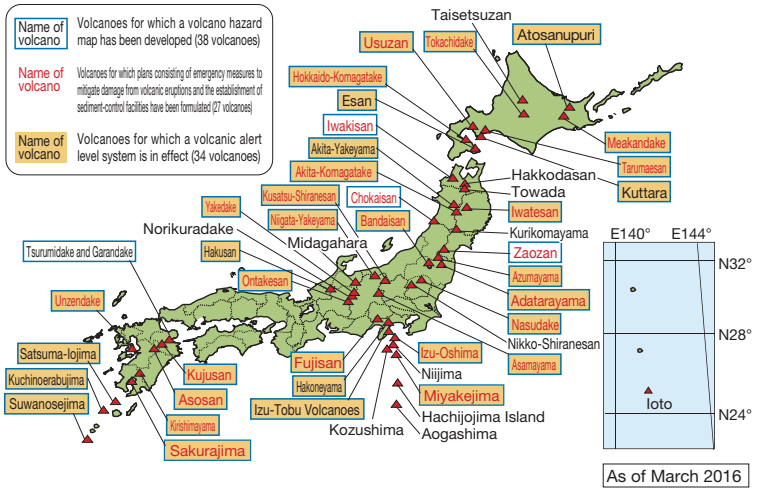
## (3) Volcanic Disaster Countermeasures

### (i) Countermeasures for Sediment-related Disasters Following Volcanic Activity

In preparation for the volcanic mudflow caused by volcanic eruptions and the debris flow caused by rainfall, sediment control dams, training dikes, and so on for preventing or reducing damage are being constructed. In addition, for facilities that are unable to properly maintain their functions due to continued and massive debris flow, removing sediment deposition and other measures are being carried out to keep effectiveness.

Sediment-related disasters following volcanic eruptions could lead to large-scale disasters. In addition, it is very difficult to predict the position or scale of the eruption with good accuracy beforehand, causing serious damage. For this reason, a sediment-control plan for the emergency mitigation of the effects of a volcanic eruption is being formulated in order to mitigate damage through agile responses to volcanic conditions in combination with the development of facilities in advance; this plan targets forty-nine volcanoes that exhibit active volcanic activity and that are at risk of causing sediment-related disasters in the wake of an eruption. The amended Active Volcanoes Act came into force in December 2015 and prefectural governments, Regional Development Bureaus, and other sediment-control departments, as members of the Volcanic Disaster-Prevention Council, decided that they would study volcano hazard maps from the standpoint of sediment-related disasters caused by eruptions. Thus, by developing volcanic sediment-control hazard maps (volcanic hazard maps that relate to sediment-related disasters), support was provided for a series of studies on alerts and evacuation systems by the Volcanic Disaster-Prevention Council.

**Figure II-7-2-10** Development of volcano hazard maps, formulation of volcanic eruption emergency disaster-mitigation measures and sediment-control plans, and the state of the operations of eruption warning levels for fifty volcanoes that have been selected by the Coordinating Committee for the Prediction of Volcanic Eruptions as volcanoes requiring an upgraded system of monitoring and observations for the prevention of volcanic disasters




Source) Materials provided by the Cabinet Office

In response to the eruption of Kuchinoerabujima in May 2015, a survey of conditions conducted by helicopter revealed that small debris flows were being generated in Mukaehama River; relevant information was provided to the relevant local authorities. Surveys have also been conducted to ascertain local conditions, such as in terms of ash fall deposit, in and around Asosan (Mt. Aso), Hakoneyama (Mt. Hakone), Asamayama (Mt. Asama), and other such volcanoes that either

erupted or otherwise exhibited volcanic activity in 2015. Once again, relevant information was provided to the relevant local authorities.

### (ii) Measures Against Ash Falling due to Active Volcanoes

Since the ash falling on roads due to volcanic eruption has a great social impact, such as traffic obstruction, a framework is being developed in order to remove ash quickly and appropriately from roads using street sweepers.

### (iii) Japan Meteorological Agency Initiatives

To prevent and mitigate volcanic eruption disasters, domestic volcanic activity is monitored and volcanic warnings are issued in a timely manner. Especially for the fifty volcanoes in need of more intensive monitoring/observation for volcanic disaster mitigation selected by the Coordinating Committee for Prediction of Volcanic Eruption observation facilities have been deployed and volcanic activity is being monitored around the clock (volcanoes subject to continuous observations [Note]).

Also, Volcanic Alert Levels are being applied and improved through coordination of evacuation planning at local Volcanic Disaster Mitigation Councils (applied to thirty-four volcanoes as of the end of March 2016).

In accordance with recommendations (March 2015) issued at an investigative meeting of the Coordinating Committee for Prediction of Volcanic Eruption held in response to the disaster caused by the eruption of Ontakesan (Mt. Ontake) in September 2014, the Japan Meteorological Agency (JMA) commenced the issuance of "Details of Volcanic Activity", which was clearly identified as being provisional in nature, and "Eruption Notice" designed to promptly report the fact of an eruption in progress, changed references to the key phrase "Normal" corresponding to Volcanic Forecasts and Volcanic Alert Level 1 to "Potential for increased activity," and have otherwise been promoting improvements to volcanic information. In addition, JMA has sought to reinforce the system of volcanic observations and monitoring, such as by constructing new volcanic observation facilities.



## Column

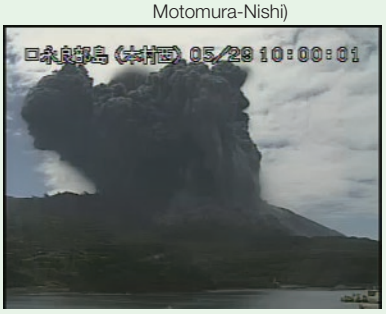
## Major volcanic activities in 2015, and responses by the Japan Meteorological Agency

Looking back on 2015, there were intensified volcanic activities on Kuchinoerabujima, Hakoneyama (Mt. Hakone), Asosan (Mt. Aso), etc. This column describes the statuses of these volcanic activities and how the Japan Meteorological Agency (JMA) responded to them.

**○Kuchinoerabujima**

On Kuchinoerabujima, an explosive eruption occurred at 9:59 a.m., on May 29. JMA issued a Volcanic Warning at 10:07 a.m. on the same day, and raised the Volcanic Alert Level from 3 (Do not approach the volcano) to 5 (Evacuate) for the first time since the application of the Volcanic Alert Level. Following this, Yakushima-town officially issued an evacuation directive, and all residents in Kuchinoerabujima fled to the outside of island.

May 29, 2015
Kuchinoerabujima Island
Eruption (as taken with a distant camera in Motomura-Nishi)




Source) Japan Meteorological Agency

At the end of March, JMA stationed its staff on the island, who explained the results of field studies by the JMA Mobile Observation Team (JMA-MOT) and the volcanic activity status to the residents. After the eruption, the staff remained on Yakushima island and provided support related to the access to the island, such as explanations of the volcanic status, etc. They also installed more volcanic observation equipment such as seismometers and low-frequency microphones.

**Note** This program will eventually encompass fifty volcanoes, including Hakkodasan (Mt. Hakkoda), Towada, and Midagahara.

On October 21, JMA, while maintaining the Volcanic Alert Level 5, issued a Volcanic Warning to limit the area where strict alerts are necessary to about the 2 km range from Shindake Crater and to 2.5 km range on the west side. Following this, Yakushima-town lifted the evacuation directive, except some districts on Kuchinoerabujima, on December 25, and the refugee residents returned to the island.

Response by the Meteorological Agency

Source) Japan Meteorological Agency

**○Hakoneyama (Mt. Hakone)**

Around Owakudani, volcanic activity intensified at the end of April. As the possibility increased of a small-scale eruption that would affect the surroundings, JMA issued a Near-crater Warning at 6:00 a.m. on May 6 and raised the Volcanic Alert Level to 2 (Do not approach the crater).

After that, since a very small-scale eruption was observed on Owakudani on June 30, JMA issued a Near-crater Warning at 12:30 p.m., and raised the Volcanic Alert Level from 2 to 3 (Do not approach the volcano). On June 30, JMA stationed its staff in Hakone-town, and they conducted field studies and explained the status of the volcanic activity to the town.

Later, as the volcanic activity subsided, JMA issued a Near-crater Warning on September 11, downgrading the Volcanic Alert Level from 3 to 2, and then lifted the Volcanic Warning on November 20, bringing the Volcanic Volcanic Level down to 1 (Potential for increased activity).

**○Asosan (Mt. Aso)**

On Asosan, a small-scale eruption occurred in the Nakadake No.1 Crater at 9:43 a.m. on September 14. Following the eruption, JMA issued Eruption Notice at 9:50 a.m. and issued a Near-crater Warning at 10:10 a.m., which raised the Volcanic Alert Level from 2 to 3. It was the first time for JMA to issue the Eruption Notice since the operation of the notice system on August 4.

Afterward, since the volcanic activity abated, JMA issued a Near-crater Warning at 2:00 p.m. on November 24, downgrading the Volcanic Alert Level from 3 to 2.

### (iv) Japan Coast Guard Initiatives

Airborn observations are routinely conducted on submarine volcanoes and volcanic islands, and the information on eruptions or discolored water as a precursor phenomenon of eruptions is immediately 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 seafloor topography, geological structure and so on. Continuous GNSS observations in the Izu Islands area are also conducted to monitor crustal movements.

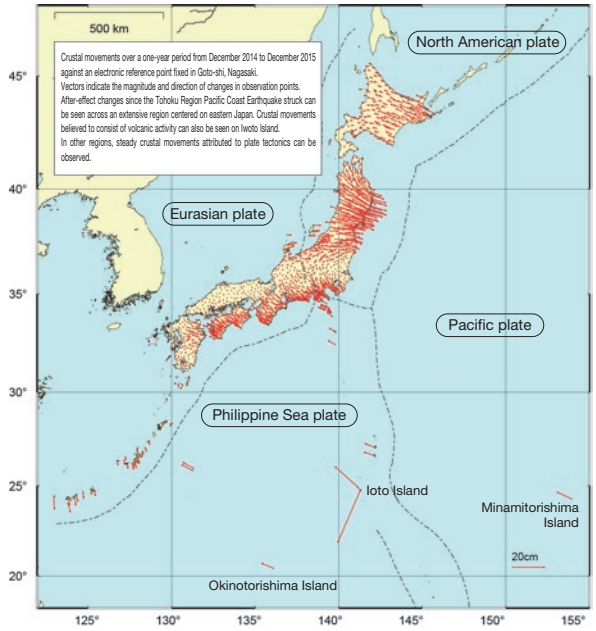
With respect to Nishinoshima Volcano, for which two years had passed since it began erupting in November 2013, ocean surveys around the island were conducted in June and July 2015 using survey vessels for the first time since the eruptions began. These surveys revealed changes in the seafloor topography caused by the eruptions. The area of the island increased to approximately 2.6 square kilometers as of March 2016 (inclusive of the former Nishinoshima). Monitoring of volcanic activity and the changing conditions on the island using aircraft is ongoing.

(v) Geospatial Information Authority of Japan Initiatives

(A) Improved Observation and Monitoring of Volcanic Activities

At active domestic volcanoes, continuous three dimensional crustal deformations are monitored by GNSS-based control stations (continuous GNSS observation network called GEONET), automatic distance and angle measurement devices, and Remote GNSS Monitoring System (REGMOS). In addition, the GNSS observation data conducted by other institutions are integrated into the analysis to monitor the crustal deformation around of volcanoes in more detail. Ground surface deformation of volcanoes are being monitored with SAR interferometry Note 1 , by using the data of Advanced Land Observing Satellite "Daichi-2".

Figure II-7-2-11 Movements of Japan Archipelago Captured by Continuous Observation with GNSS




Source) Geospatial Information Authority of Japan

(B) Research on Natural Disasters Following Volcanic Eruptions

Research and development is being conducted to improve precision of observation by use of GNSS and SAR interferometry as well as to reveal the mechanism of volcanic activities by analysis of the abovementioned observation data.

## (4) Storm Surge and Coastal Erosion Measures

(i) 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 structural and non-structural measures are being promoted, such as the development of coastal levees and the issuing of flood prevention warnings. In May 2015, the Flood Prevention Act was partially amended. In order to further reinforce measures in terms of both structural and non-structural elements, a system for the designation of coastal areas for which water levels pertaining to storm surges are publicly disclosed and areas vulnerable to inundation has been established.

(ii) 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 2 and sand recycling Note 3.

(iii) Providing Disaster Prevention Information Regarding Storm Surges

To enhance 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.

Note 1 Technology that monitors ground surface deformation from artificial satellites in space.
Note 2 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 3 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.

### (5) Tsunami Measures

#### (i) Promoting Tsunami Measures

In preparation for the large scale tsunami disasters created by earthquakes, such as the massive earthquake that occurs along the Nankai Trough, region building for tsunami disaster prevention through multiple defenses that combine structural and non-structural measures against the biggest tsunami is being promoted through support extended to local governments for matters such as establishing tsunami inundation projections, designating warning areas, and drafting evacuation plans.

For the tsunami measures for coasts, structural measures are taken to develop coastal levees and so on necessary for resisting tsunami with relatively high frequency of occurrence, take earthquake and liquefaction measures, enable automatic/remote operation of floodgates, and develop coastal levees and seawalls with a tenacious structure that includes various structures, such as green coastal levees, in addition to non-structural measures taken to assist creation of tsunami and storm surges hazard maps and manage and operate floodgates and others effectively. In light of the fact that many operators of floodgates lost their lives during the Great East Japan Earthquake, the formulation of operating rules relating to floodgates shall be mandated. Studies have also been conducted by the Investigative Committee for the Promotion of the Safe and Appropriate Management and Operations of Floodgates and Land Locks since December 2015 for the construction of a system for safe and appropriate management and operations.

For tsunami measures for harbors, in order to maintain the harbor functions when a large-scale tsunami occurs, development of seawalls with a tenacious structure, creation of plans for elimination of obstacles in sea routes (reservation of sea routes in case of emergency), and other disaster prevention and mitigation measures are promoted. For the three major harbors where population and functions are concentrated, a study is conducted to ensure a sufficiently high protection level considering the height of tsunami that exceeds the tsunami with a relatively high frequency of occurrence.

Also, specified ports (86 ports) under the Act on Port Regulations have established Councils on Tsunami Measures for Ships to further improve tsunami measures for ships at each of the ports with the cooperation of relevant organizations.

With respect to tsunami measures applicable to rivers, the bulking up of river embankments, quakeproofing, and liquefaction measures are being advanced in areas at significant risk of flooding from a tsunami in order to prepare for the imminent arrival of a massive earthquake or tsunami.

With respect to tsunami measures applicable to roads, agreements have been concluded with local governments in tsunami-prone areas. To provide embankment as temporal evaluation locations, stairs and open spaces are developed for the evacuation purpose. Efforts to reinforce disaster prevention functions have also been made by developing a system of signs providing evacuation guidance and by providing user training to local residents.

Regarding tsunami measures for airports, 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 has been drafted, and tsunami evacuation training and other matters will be carried out in accordance with these plans. 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 is being promoted.

For the tsunami measures of railways, the conditions of evacuation guidance when tsunamis occurred after the Great East Japan Earthquake are being 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 Nankai Trough Mega Earthquake is being reflected in the response guidelines and case studies compiled for passenger railways to secure safety when tsunamis occur to promote initiatives by railway companies.

#### (ii) Providing Disaster Prevention Information Regarding Tsunamis

In order to strive for the prevention and mitigation of disasters caused by tsunamis, the Japan Meteorological Agency (JMA) is monitoring seismic activities across the nation around the clock in order to make quick and appropriate issuance for tsunami warnings/advisories and information. Based on the lessons learned from the tsunami disaster caused by the 2011 Great East Japan Earthquake, JMA started new tsunami warning system operation in March 2013, in which, for example, the word of “huge” for Major Tsunami Warnings was introduced as an expression of estimated tsunami height in the case of large earthquakes with magnitude 8 or more to emphasize that it is an emergency situation.

As of the end of March 2016, JMA monitors tsunamis with 38 Ocean-bottom tsunami meters, 18 GPS wave gauges, and 173 coastal tsunami gauges for issuance of tsunami information and update of tsunami warnings/advisories.

To facilitate tsunami measures for vessels, the Japan Coast Guard creates and publishes a tsunami disaster prevention information map (65 maps) depicting the expected behavior of tsunamis in port areas based on new assessments of the massive earthquake that occurs along the Nankai Trough (Cabinet Office, August 2012).

#### (iii) Tsunami Evacuation Measures

Given concerns over tsunami damage occurring in the wake of the Nankai Trough Mega Earthquake or any other massive earthquake that is expected to arrive sometime in the future, technical guidelines summarizing ways of properly allocating evacuation facilities based on the use of basic urban planning data were formulated and publicly disclosed in June 2013.

Efforts are being made to make a tsunami evacuation plan taking into account the special characteristics of ports so that workers and others active on waterside land can safely evacuate and retreat during disasters such as tsunamis. 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. In addition, the Private Urban Organization is assisting private enterprises in developing distribution facilities with a function of evacuating from tsunami and other disasters.

#### (iv) 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.

#### (v) 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 combination of structural and non-structural measures for tsunami measures indicated by the "Basics of Ensuring the Function of Government Facilities in Preparation for Tsunamis, etc" prepared by the Council for Social Infrastructure will be used in coordination with the organizations that operate and maintain government facilities to promote integrated and effective tsunami measures.

### (6) Earthquake Measures

#### (i) Improving the Earthquake Resistance and Safety of Housing and Architecture

Based on the amended Act on Promotion of Seismic Retrofitting of Buildings that went into effect in November 2013 to achieve goals of making at least 95 percent of housing and architecture used by many people earthquake-resistant by 2020, the reporting of earthquake-resistance diagnosis results for large-scale architectural structures and others used by an unspecified number of people has been mandatory, and the creation of display requirements for the earthquake-resistance has been implemented among other measures in its aim to promote earthquake-resistance.

Regarding the earthquake proofing of housing and buildings, Social Capital Development Integrated Grant and other measures are implemented for support but from FY 2013, for architectural structures requiring mandatory seismic diagnosis, intensive and emergency assistance is being implemented in addition to usual subsidies.

#### (ii) Promoting the Earthquake Resistance of Housing Land

In order to prevent damage caused to existing residential areas by landslides and ground liquefaction in the wake of a large earthquake, we are providing support for the conducting of change-prediction surveys and prevention measures carried out by local governments.

#### (iii) Implementing Danger Assessments for Housing Land in Disaster Stricken Areas

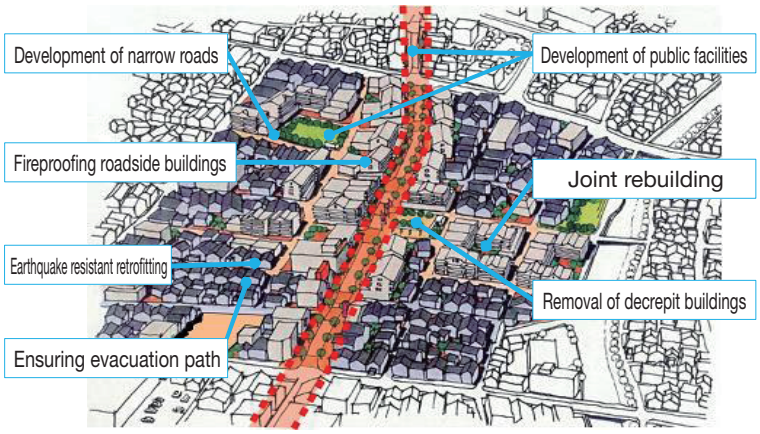
To prevent secondary disasters and ensure the safety of residents, frameworks are being developed in cooperation with

the Disaster Stricken Housing Land Danger Assessment Liaison Council consisting of prefectures and designated cities to evaluate the degree of danger of housing land swiftly and accurately after disaster strikes.

### (iv) Development to Improve Densely Built-Up Areas

Development activity to rapidly improve densely built-up areas that are problematic in terms of disaster prevention and the residential environment is a pressing matter to be generally resolved by ensuring a minimum level of safety for densely built-up areas that are highly vulnerable in the event of an earthquake (approximately 4,435 hectares) by FY 2020.

Figure II-7-2-12 Development Illustration of Densely Built-Up Areas




Source) MLIT

To realize this, fireproofing architectural structures along trunk roads to cut off fire paths and serve as evacuation paths in combination to form a skeletal disaster prevention axis (disaster prevention axis) 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.

### (v) Securing Open Space

To improve disaster prevention functions and strive for safer and more comfortable town buildings, 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 supplies, and as an evacuation area to protect the lives of evacuees form urban fires. A project for developing disaster-prevention parks and urban areas is being carried out to develop and upgrade disaster-prevention parks and urban areas in an integrated manner.

### (vi) Promoting Construction and Improvement of Government Buildings as Disaster Prevention Centers

Government buildings need to secure comprehensive seismic performance to ensure the safety for visitors and to be able to function fully as centers for disaster emergency activities in the occurrence of large-scale earthquakes. Therefore, MLIT is setting a target to improve their seismic resistance and promoting construction and improvement of government buildings in a systematic and prioritized way, and in FY2014, Central Government Building No.4 (Chiyoda-ku, Tokyo) was renovated for earthquake resistance.

### (vii) 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 taking into account facility functions, degrees of importance of areas behind levees and other factors to prevent large-scale submergence of zero-meter areas due to damage to levees caused by earthquakes and to prevent the functions of levees and other protective facilities from being impaired before arrival of tsunamis when earthquakes such as the earthquakes along Nankai Trough occurs.

For road works, to ensure smooth emergency and rescue activities, transport emergency supplies, and deploy emergency transport essential to recovery efforts when earthquake disasters occur, seismic strengthening of bridges and undergrounding of cables are implemented to important roads, such as emergency transport roads. In seeking to eliminate utility poles, according to the amendment of Road Act and other acts on June 2013, a system to enable road administrators to ban and restrict exclusive use and a system to enable the national government to provide interest-free loans to power-cable

administrators through local governments have been created for emergency transport roads and other roads that are important for disaster-prevention purposes.

With respect to projects concerning ports and harbors, we are endeavoring to increase the quake and tsunami resistance of port facilities and fortify industrial ports and harbors constituting locations within domestic and overseas wide-area networks according to the level of disaster imminence and the importance of the given port functions in order to ensure a socioeconomic system that remains workable, improve the competitiveness of our country, and earn international trust as we prepare for an earthquake occurring along the Nankai Trough, an inland earthquake originating immediately below Tokyo, or any other disaster expected to give rise to considerable damage.

For airport works, in addition to serving as the base of emergency transport when earthquakes and other disasters occur, seismic strengthening of government facilities to ensure necessary control functions and basic facilities that are absolutely essential is being implemented for airports considered important for maintaining air transport as well as the aviation network and ensuring the continuity of hinterland economic activity.

For railway works, in preparation for the Nankai Trough Mega Earthquake and Tokyo Inland 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 will be steadily implemented to avoid and reduce damage due to the Nankai Trough Mega 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 water pipeline infrastructure and water treatment facilities that connect disaster prevention bases with treatment plants and disaster mitigation that aims to minimize damage in anticipation of disasters striking are being combined for the promotion of integrated earthquake measures.



### (viii) Countermeasures against Sediment-related disasters to Large-Scale Earthquakes

In preparation for large-scale earthquakes such as the Nankai Trough Mega Earthquake, implementation of effective sediment-related disaster countermeasures with combination of structural and non-structural measures are being promoted for the areas at risk of sediment-related disasters where important facilities and important transportation networks will be damaged and communities will be isolated by the landslides.

In the wake of a major earthquake, it will be important for us to collaborate with relevant organizations and entities, promptly ascertain disaster conditions, and properly carry out emergency measures. For this purpose, we are reinforcing ties to relevant organizations, carrying out practical training, and otherwise promoting the development of a crisis-management system.

### (ix) Japan Meteorological Agency Initiatives

To prevent and mitigate disasters caused by earthquakes, seismic activities in and around Japan, as well as crustal deformation in the Areas under Intensified Measures against Earthquake Disaster (Tokai Region), are being monitored on a 24-hour basis to provide Earthquake Early Warnings, earthquake information, and information on the Tokai Earthquake as swiftly and accurately as possible.

With respect to Earthquake Early Warnings, the Japan Meteorological Agency is developing the calculation system software with a view to introducing techniques to precisely estimate the epicenters of earthquakes even when multiple earthquakes strike at the same time and techniques to forecast ground motion appropriately even for a significantly large earthquake for which ground motion forecasting is difficult by the current method. In order to improve the precision with which the epicenter of an earthquake is pinpointed and increase the rapidity with which information can be released, the use of data provided by seismometers installed in sea areas and deep underground by relevant organizations began at the end of FY 2014. The use of land and submarine-based seismometers by relevant organizations will continue to be promoted.

With regard to long-period ground motion, information on observation of long-period ground motion is being issued on a trial basis from March 2013 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. In addition, studies are being conducted to provide a forecast of long-period ground motion.

### (x) 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 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.

### (xi) Geospatial Information Authority of Japan Initiatives

#### (A) Observing Crustal Movements and Strengthening Monitoring Frameworks

Across the nation and earthquake disaster prevention measure regions, the monitoring of crustal movements is boosted by continuous GNSS observations at about 1,300 GNSS-based control stations, GNSS surveying, and leveling (GEONET). Also, monitoring of ground surface deformation crustal movements started using the interferometric SAR of the Advanced Land Observing Satellite "DAICHI-2".

#### (B) Research on Natural Disasters Resulting From Earthquakes

From the results of geodetic observations, such as GNSS, SAR interferometry and geodetic leveling, the mechanism of earthquake occurrence is being elucidated and research is being conducted to improve observations and analysis. We are engaging in research and development work and trial operations as concerns the rapid provision of information during disasters through analytical processes that combine basic geospatial information corresponding to Japanese territory and earthquake intensity. Additionally, for exchanging information on surveys, observations and research outcomes regarding earthquake prediction between relevant government organizations and universities, as well as to conduct academic deliberations based on this, the Coordinating Committee for Earthquake Prediction is operated. Moreover 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.

### (xii) Measures for Stranded Commuters

If a major earthquake were to strike a major metropolitan area, it is expected that urban functions would become paralyzed and that there would be more stranded commuters than there were in the wake of the Great East Japan Earthquake. Thus, in order to ensure the safety of people in areas where there is a concentration of people and urban functions, a system based on plans for promoting urban regeneration and ensuring safety was established in 2012. In areas subject to urban regeneration and emergency development measures (sixty-three areas nationwide as of the end of March 2016), efforts are being undertaken to improve urban disaster preparedness through public-private partnerships by way of the production of plans for promoting urban regeneration and ensuring safety, the conclusion of agreements concerning facilities for promoting urban regeneration and ensuring safety, and the easing of various regulatory constraints. Comprehensive support for the production of plans for promoting urban regeneration and ensuring safety and for both structural and non-structural elements based on such plans is being provided through projects for ensuring and promoting urban safety for which areas around key stations are also regarded as areas subject to aid. Special measures concerning the imposition of taxes have also been taken for stockpiling warehouses mentioned in plans for promoting urban regeneration and ensuring safety.

### (xiii) Ensuring Operational-Continuity Functions In the Event of a Disaster

If the supply of energy during a disaster is suspended in areas where urban functions are concentrated, there is a risk that economic activities will become paralyzed and disaster measures will be impeded, thereby causing a huge socioeconomic impact on this country.

In order to address these vulnerabilities in our cities, a project for the urgent promotion of the development of operational-continuity zones in case of disaster was established in FY 2015. We are accordingly promoting the development of area-wide energy networks to ensure operational continuity during disasters.

### (xiv) Safety and Security Measures of the Underground Malls

Underground malls serve as important public spaces within the city, but there are concerns that evacuees will be disordered 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.

### (7) Snow Damage Measures

#### (i) Securing Winter Road Transportation (Snow and Cold Weather 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. The Cabinet made this decision, along with promoting projects for removing snow, preventing snow, snow and frost damage on roads (snow and winter works). 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. We are reinforcing clearing snow systems, such as by establishing clearing snow priority zones, removing snow rapidly by imposing road closures, and promoting collaborations among road administrators and with relevant organizations. In the event that vehicles become stuck in traffic, the Basic Act on Disaster Control Measures (amended on November 2014) will be applied and measures to move the vehicles that block the road will be promptly taken to quickly restore the flow of traffic.

#### (ii) Avalanche Disaster Measures in Heavy Snowfall Regions

In Japan, 21,000 areas are prone to snow avalanche and the development of avalanche prevention facilities is being promoted to protect human lives from avalanche disasters in settlements.

#### (iii) 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.

### (8) Sophistication of Disaster Prevention Information

#### (i) Aggregation of Disaster Prevention Information

The "MLIT Disaster Prevent Information Center [Note 1]" 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.

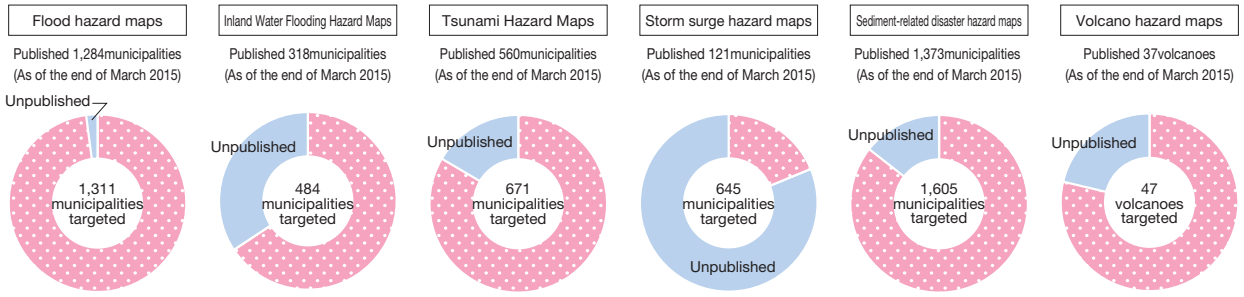
#### (ii) Development of Hazard Maps

In order to enable residents to take appropriate evacuation actions when a disaster strikes, we are promoting the production of hazard maps by municipalities and their dissemination and use by residents, as well as opening an Internet portal site that allows users to browse hazard maps developed by municipalities across the country [Note 2].



Note 1 "MLIT Disaster Prevention Information Center" web site: http://www.mlit.go.jp/saigai/bosaijoho/
Note 2 "MLIT Hazard Map Portal Site": http://disaportal.gsi.go.jp/

Figure II-7-2-13 Present Status of Hazard Map Development




Source) MLIT

### (iii) Improvement of Disaster Prevention Weather Information

In order to take precautionary measures against many kinds of weather disasters, the Japan Meteorological Agency issues information such as Emergency Warnings, Warnings, Advisories, and Bulletins related to weather conditions. The Agency also provides detailed mesh-data indicating the risk of sediment-related disasters. With the help of these data, Sediment Disaster Alert and flood forecasts for designated rivers are jointly issued by the MLIT, prefectural governments and the Agency.

In July 2015, the Meteorological Subcommittee of the Council of Transport Policy received recommendations to proactively announce the possibility that a large-impact weather event, however unlikely, may occur and to convey the level of risk and the level of imminence involved in an easy-to-understand manner. Initiatives are accordingly being advanced with a view to the implementation of these recommendations.

## Column Transmission of Emergency Warnings via Early Warning Mail service

Early Warning Mail service is a service provided by cellular phone operators (NTT DOCOMO, KDDI and Okinawa Cellular Telephone Company (au), and SoftBank) for free to send bulk email of disaster and evacuation information issued by the government and local governments, to cellular phones in the target areas.

The Japan Meteorological Agency (JMA) started the transmission of emergency warnings on weather (heavy rain, storm, storm surge, high waves, snow-storm, and heavy snow) and volcanic eruption via Early Warning Mail service on November 19, 2015, in addition to the earthquake early warnings and tsunami warnings already in service.

As the result, all the emergency warnings issued by JMA are sent through Early Warning Mail service. Such email is directly transmitted to individual users of cellular phones, so this is an effective measure to convey emergency warnings that are extremely urgent.

Emergency warnings are issued to alert people to the significant likelihood of catastrophes caused by natural phenomena. When the warnings are issued, disasters may already have occurred, so people should pay attention to information from television, radio, local governments, etc. If it is difficult to check such information, people need to heed the surroundings and try to take all measures to protect themselves. It is also important not to wait for an emergency warning to be issued, but to take refuge proactively while paying attention to disaster prevention weather information announced by JMA by stages, such as advisories and warnings, and information from local governments, etc.

Early Warning Mail service regarding heavy rain

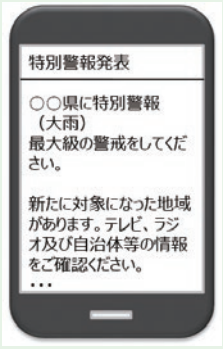



Image is for illustration purpose. Only available in Japanese text.
Source) Japan Meteorological Agency

### (9) Strengthening the Crisis Management System

In response to natural disasters, forecasting natural phenomena that could lead to disaster (Japan Meteorological Agency), in addition to 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.

#### (i) Disaster Response by TEC-FORCE (emergency disaster countermeasures detachment)

In order to respond to the occurrence or likelihood of large-scale natural disasters, the TEC-FORCE (Technical Emergency Control Force) was established in FY 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 expansion of damage, and rapid recovery of affected areas. In FY 2015, TEC-FORCE dispatched approximately 1,100 members rendering approximately 3,200 man-days of service to eighty-eight municipalities in twenty-three prefectures that sustained damage as a result of a number of serious weather events, including the volcanic eruption at Kuchinoerabujima Island in May, heavy rains that began on June 24, Typhoon No. 11 that struck in July, Typhoons No. 15 and 16 that struck in August, torrential rains that fell in the Kanto and Tohoku regions in September 2015, and heavy snow that fell on January 23, 2016. From the time disaster struck, technical support was provided in each case, such as by ascertaining damage conditions and preventing damage from spreading.

#### (ii) Improving Business Continuity Systems

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).

#### (iii) Deploying Information and Telecommunication Systems and Machinery in Preparation for Disasters

To secure information communication systems in the event of a disaster, the MLIT headquarters, Regional Development Bureau, 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 response helicopters, satellite communication vehicles, drainage pump vehicles, illumination vehicles, and other disaster response machinery is being developed at regional development bureaus across the nation, so that in the event of a large-scale disaster, the framework will be able to execute rapid deployment.

#### (iv) Implementing Practical and Wide-Area Disaster Prevention Training

Assuming the worst-case scenario that can occur, realistic and wide-area training was actively carried out including coordination with relevant organizations and wide-area dispatching of the TEC-FORCE from Regional Development Bureaus. Also, mainly in flood fighting months (particularly in May), in addition to realistic trainings in flood fighting activity conducted by flood prevention teams, integrated and realistic evacuation trainings combining together the evacuation training, information communication training, and other trainings were conducted by various organizations such as self-defense flood control organizations.

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, firefighting 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.

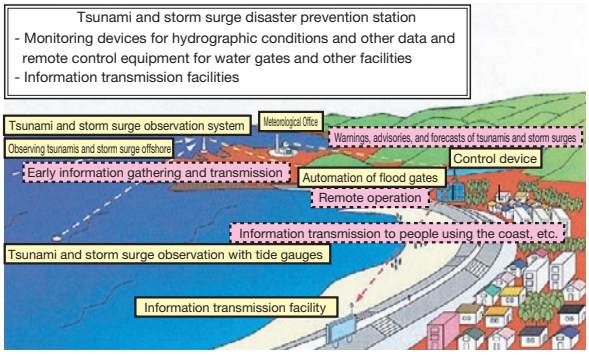
### (v) Preparing for Initial Response at Sea

The Japan Coast Guard deploys patrol vessels and aircraft 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 and aircraft for an immediate and appropriate response.

## (10) Management of Existing Stock with ICT (Information and Communications Technology)

An optical fiber network is being used to enable the management of public facilities and the 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 of optical fibers 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-7-2-14** 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 stations to prevent tsunami and storm surge damages is being supported through disaster prevention and safety grants and other means.

## (11) Disaster Recovery of Public Works Facilities

Damage caused to public civil-engineering facilities under the jurisdiction of the MLIT (including rivers, roads, coastal areas, and sewage systems) in 2015 is reported to have totaled approximately 185 billion yen (at 6,819 sites) due to the frequent occurrence of disasters nationwide, including a disaster caused by record amounts of torrential rains in the Kanto and Tohoku regions in September 2015 attributed in part to the arrival of Typhoon No. 18 and inundation damage caused to Anan-city, Tokushima, as a result of the arrival of Typhoon No. 11 in July.

In response to the damage caused by these natural disasters, technical advice to facilitate rapid restoration and reconstruction and the prevention of secondary damage as well as other forms of support for affected local governments were provided, such as by dispatching TEC-FORCE to local areas immediately after each area was visited by a disaster and by dispatching specialists registered with the Association of Nationwide Disaster Prevention to local areas as requested by local governments under a system for dispatching technical disaster recovery experts in order to support the formulation of disaster recovery and rehabilitation plans.

In order to help local governments dealing with an especially heavy concentration of damage recover quickly, administrative procedures up to the point at which a project is adopted have been significantly reduced through the simplification of the assessment process in order to accelerate disaster recovery. For example, the maximum amount of a project that can undergo a paper-based assessment rather than an on-site assessment has been increased from less than JPY three million in ordinary cases to less than JPY ten to thirty million, depending on the local government.

Costs for disaster countermeasures and the promotion of other emergency projects have been administered for (thirty-five) areas that have been damaged by natural disasters, including the torrential rains that fell in the Kanto and Tohoku regions as well as other examples of torrential rains, landslides, heavy snow, and avalanches attributable to Typhoon No. 11 and other such weather events. In order to help ensure the safety and security of residents, disaster-prevention measures have been carried out again on an emergency basis.

## Column

### Support being offered, such as technical advices on disaster recovery and improved recovery projects

When a serious disaster occurred, prompt and proper responses are required at the disaster site. The local government in the disaster area needs to develop a plan for recovery of facilities and improved recovery, quickly and smoothly. However, as a matter of fact, they face a shortage of engineers well experienced in disaster sites, so their responses tend to be slow. Many local governments are racking their brains over how to deal with disasters.

With this situation in mind, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has been offering technical support for disaster recovery to local governments in disaster areas, in addition to the system of TEC-Force.

**○Emergency survey of disasters**

In the emergency survey of disasters, when the disaster level is extraordinary, such as a catastrophe or human damage occurring in a large area, disaster appraisers are dispatched to the sites so as to swiftly understand the disaster status and to give instructions on stopgap measures and establishment of recovery policies to the public civil engineering facilities.

**○System to dispatch experts of disaster recovery engineering**

In the system to dispatch experts of disaster recovery engineering, when a public civil engineering facility suffers a disaster, experts registered on the Association of Nationwide Disaster Prevention are dispatched to disaster sites in order to give support for disaster investigation and advises on recovery construction methods.

Emergency disaster survey (conducted in Kanuma-city, Tochigi)

Emergency disaster survey (report submitted to Joso-city, Ibaraki)

Dispatching of disaster recovery engineers (survey conducted in Minamiaizu-town, Fukushima)

Source) MLIT

In FY 2015, upon requests from local governments (Miyagi, Fukushima, Tochigi, and Ibaraki) in areas hit by Kanto-Tohoku Rainfall Disaster in September 2015, the emergency survey of disasters and the system to dispatch experts of disaster recovery engineering were effectively utilized, and efforts were made toward early recovery.

### (12) Promoting non-structural Measures Including Information and Public Relations for Safety and Comfort

To ensure safety and comfort, non-structural measures were promoted in addition to structural measures for natural disasters and the status of progress was subject to annual inspections in accordance with the "MLIT General Framework of Non-structural Measures Promotion for Safety and Comfort", however, the Great East Japan Earthquake brought to light the need for congruent and integrated evaluations of structural and non-structural aspects and currently deliberations are in progress following the re-evaluation of the Social Capital Improvement Priority Plan/MLIT Disaster Prevention Operation Plan.

## 3 Secure Transportation Systems Resistant to Disasters

### (1) Ensuring Redundancy and Substitutability

Rails, ports, airports, and other facilities are being made disaster resistant and an emergency transport framework for rescue, restoration activities, business continuity is being established to ensure redundancy and substitutability efforts are being made to secure the safety of users.

The road network functions as emergency transport during disasters to facilitate early relief, fulfilling its function as a "lifeline".

### (2) Road Disaster Prevention Measures

To support the emergency lifesaving and restoration assistance activities in the event of large-scale disasters, development of missing links for securing substitutability, disaster measures (measures for slopes, embankments, etc.), earthquake disaster measures (seismic reinforcement, etc.), and snow/cold region measures (development of anti-snow facilities) are being promoted. Additionally, supplementing traffic facilities with disaster prevention functions (turning Michi-no-Eki, service and parking areas into disaster prevention bases, as well as developing emergency lines of communication and fire escapes) were promoted. Disaster alliances with private sector businesses to implement swift road openings are concluded, and a council for road administrators to create a framework that keeps roads open was established. In addition, based on the Disaster Countermeasure Basic Act amended in November 2014, development of the system and equipment that allow road administrators to smoothly move vehicles for swift removal of road obstacles is being promoted.

Also, big data such as ETC 2.0 probe information and private probe information are used effectively to grasp early damage situations, thus enhancing initial responses.

Meanwhile, for regions that sustained devastating damage 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. Additionally, as one measure to reduce tsunami damage, sea level indicator sheets are being added to road signposts to promote the provision of sea level information to road users.

### (3) Accelerating removing of utility poles

We are committed to removing utility poles to prevent them from falling down and blocking the traffic of emergency vehicles in the event of earthquake. We started working on the procedures to prohibit from building new utility poles on emergency transport roads and special measures for the property tax.

### (4) 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 secure the port functions and maintain regional economic activities during disasters as well as achieve early restoration of facilities affected by disasters, a Port BCP has been created and the Wide Area Port Disaster Councils and others have been established for the national government, port authority, port users, and others to work together to promote the establishment of a cooperative framework.

For airports, disaster countermeasures that take into account disaster prevention-related plans for the area in which an airport is located and links to other airports have been studied. According to the results of these studies, templates for formulating evacuation and rapid recovery plans in the event of an earthquake or tsunami striking the given airport have been drafted.

### (5) 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 (1,254 locations nationwide, as of February 29, 2016) 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.

The Minister of Land, Infrastructure, Transport and Tourism inquired the Panel on Infrastructure Development about the ideal for future standards policies in August 2012, and review was proceeded on the items that were requested most for review by priority at the Building Standards Sub commission established at the Building Subcommittee of the same Panel in September of the same year. 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 2013. Accordingly, the Act to Partially Amend the Building Standards Act came into force in June 2015.

As measures pertaining to architects, initiatives to optimize operations to design and construction administration in accordance with the Act to Partially Amend the Kenchikushi Law, which came into force in June of the same year, have been undertaken.

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.

Backed by key persons, a research committee for newly developing a housing defect warranty performance system was launched in FY 2015 as a fresh opportunity for engaging in ongoing studies for future reviews of this system. Issues to date have been subject to follow-up action and opinions have been exchanged for future reviews.

### (2) Ensuring the Safety of Elevators and Play Facilities

While surveys to elucidate the causes of accidents involving elevators, escalators, and play facilities and the training of the staff members of regional development bureaus in terms of safety and accident measures continue to be carried out, initiatives for ensuring safety have been advanced by partially revising the system of periodic inspections and publicizing guidelines for the appropriate maintenance and management of elevators and escalators in the Building Standards Act and relevant ordinances.

# 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 damage, but also has an enormous impact on society so various measures are being undertaken to prevent accidents from occurring.

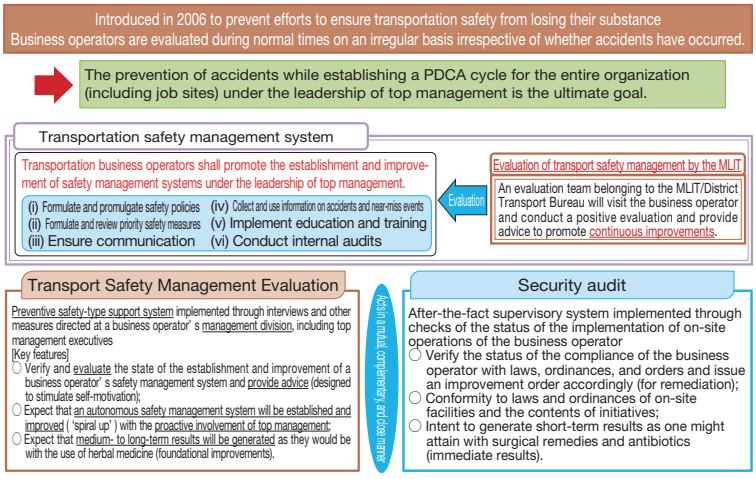
## 1 Building and improving the safety management system in public transportation

In October 2006, Transport Safety Management System was introduced in the wake of frequently occurring troubles and accidents, which was seen to be caused by human error in each transportation mode. This is to build and strengthen the safety management system, which will be united with the organization, including the fields, which are under the proactive involvement of the top management, in the transportation business, coupled with election system of safety managers and creation of safety management regulations. The country has to check the system through advice and evaluation, which is intended to continuously improve the safety management system using the PDCA cycle.

In FY 2015, 534 parties (77 railway parties, 198 automobile parties, 244 shipping parties, and 15 airline parties) were subject to a transport safety management evaluation.

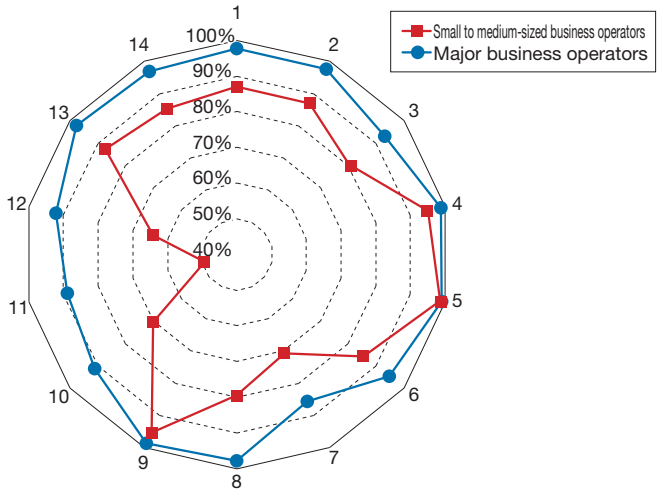
In light of the fact that the mandate to carry out the same system was expanded to cover all chartered bus business operators (approximately 4,200 parties) in October 2013, efficient and effective evaluation techniques to be applied to what has been to date a large number of small chartered bus businesses were newly investigated. Upon implementing these techniques on a trial basis, small chartered bus business operators will be subject to full-fledged evaluations through the use of these efficient and effective evaluation techniques beginning in FY 2016.

**Figure II-7-4-1** Outline of the transportation safety management system




Source) MLIT

**Figure II-7-4-2** Differences in terms of the status of initiatives between major business operators and other business operators (FY 2014)




(Note) Numbers (1) through (14) in the radar chart correspond to item numbers in the "Guidelines for Promoting Safety Management by Transport Operators: Further Improving Transportation Safety", which were formulated and publicly released in March 2010, and indicate the extent to which initiatives for each item have been fulfilled.
Source) MLIT

In FY 2015, a transportation safety management seminar hosted for transportation operators by the national government in order to deepen understanding of this system was attended by 2,468 persons. In FY 2015, 6,874 persons attended seminars as part of an accredited seminar program established in July 2013 for the purpose of further disseminating and shedding light on this system for small to medium-sized business operators (a program through which transportation safety management seminars organized by private-sector organizations are accredited by the MLIT).

For the transportation safety management system, the MLIT will improve the effectiveness of the system and

disseminate it's concept to all the operators for enhancement and strengthening in the future.

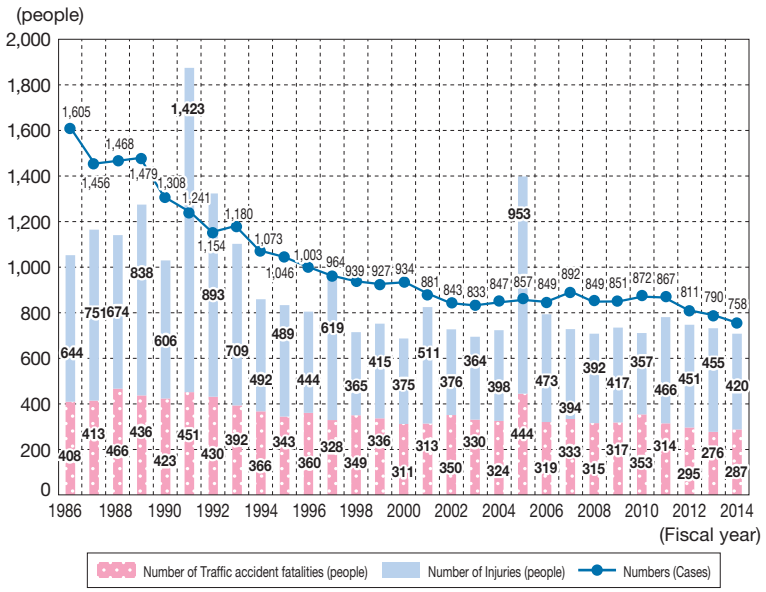
## 2 Railway Transportation Safety Measures

Driving accident numbers for railway traffic show a declining trend over the long term [Note] due to factors like 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.

### (1) Improving Railway Safety

In the light of past accidents, measures, like creation of 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, and give feedback on audit results for further implementation of measures to improve the safety of railways.

Figure II-7-4-3 Transition in number of causalities and number of driving accidents in railways




Source) MLIT

#### (i) Measures that were triggered by the JR West Fukuchiyama line derailing accident

The "Ministerial ordinance to define the technical standard related to the Railways" was revised to make the installation of Automatic Train Stop (ATS) devices, with functions to limit speed on the curves, driver anomaly detection, and train stopping devices; and driving condition recording devices mandatory.

#### (ii) Measures Taken in the Wake of the Derailment of a Japan Freight Railway on the Hakodate Line

JR Hokkaido has been instructed to implement the Measures to be taken by JR Hokkaido as business improvement order and supervision order, in January 2014, and carryout supervision and guidance through periodic reports, permanent audit systems (for five years) to reliably execute the same.

In accordance with the results of an investigation pertaining to reviews of the approach taken for security audits conducted in FY 2014, railway operators are subject to modulated, more effective security audits, including planned security audits and provisional security audits conducted whenever similar types of problems occur.

**Note** In 2005, JR Fukuchiyama line derailment accident occurred, after which, for years the number of causalities and human losses have increased due to operation accident.

### (2) Promotion of Railway Crossing Measures

Unopened grade crossings [Note] primarily in urban areas are a factor behind crossing accidents and chronic traffic congestion and measures to promptly address this problem are needed. For this reason, the road administrators and railway operators work together to prevent railroad crossing accidents, by developing crossing facilities, such as flyovers, structure improvement, and pedestrian bridges, and through the maintenance of railroad crossing safety equipment, such as railway crossing barriers, based on the Improving the Railway Crossings Act and the 9th traffic basic traffic safety plan.

In FY 2015, immediate measures were implemented for the development of safety equipment and expansion of sidewalks and drastic measures for railroad crossing disposals, through continuous steric intersection measures. This was pursued along with developing safety equipment, which was specified in all three railroad crossings, based on the Railroad Crossing Improvement and Promotion Act.

In collaboration of road administrators and railway operators, the production of safe grade crossing passage records has commenced in accordance with crossing elements, the state of countermeasures, the conditions behind the occurrence of accidents, and other examples of objective data. It was determined that crossing measures shall be promoted on a priority basis by summarizing future measures and policies while visualizing the current state of crossings and roads.

In FY 2016, crossing measures will be further promoted based on the Act on Promotion of Railway Crossings by utilizing a system operated by the Minister of Land, Infrastructure, Transport and Tourism for designating crossings and roads that should be improved in order to designate problematic crossings even in the absence of an agreement by railway operators and road administrators as to the methods by which improvements will be carried out and by undertaking a general mobilization of measures in both structural and non-structural terms, including immediate measures involving the use of colored pavement and measures affecting areas surrounding crossings, such as by way of the development of parking spaces.

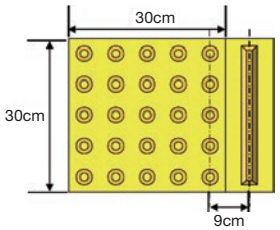
### (3) Promoting the Development of Platform Doors

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 621 stations as of the end of September 2014). In accordance with the Basic Policy on Promoting the Facilitation of Mobility (March 2011), Basic Plan on Transport Policy (February 2015), and Priority Plan for Social Infrastructure Development (September 2015), we are implementing structural measures, such as by promoting the development of platform doors and tactile paving with boundary lines and the development of technologies for new types of platform doors to address the problem that arises when train doors do not line up properly with the platform, as well as non-structural measures, such as by deploying a campaign for improving the behavior of train users through a catch phrase that encourages users to reach out to and help guide visually-impaired riders to where they are supposed to go.

Figure II-7-4-4 Platform door

Source) MLIT

Figure II -7-4-5 Tactile Paving with Boundary Lines




- 25 truncated domes (5 x 5)
- Line shaped protrusion indicating the inside of the platform(boundary line)

Source) MLIT

Figure II-7-4-6 Friendly Manners Campaign


Source) MLIT

**Note** Railway crossings that are closed for more than 40 minutes/hour, during the hours when the train frequency is high.

## 3 Safety Measures for Maritime Traffic

In the sea areas surrounding Japan, around 2,500 vessels are involved in marine accidents every year. Once a marine 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

#### (i) Improving Ship Safety

In order to ensure ship safety globally, the international regulations and standards have been developed at the International Maritime Organization (IMO), and MLIT has been participating actively in discussions at IMO. In particular, MLIT proposed IMO in 2015 to improve the large containerships' structural safety measures, which were developed by MLIT based on the investigation and analysis of the large containership breakage accident happened in 2013, and that proposal was decided to be reflected to the international unified regulation of classification societies.

Regarding newly established or amended regulations or standards at IMO, in December 2015, MLIT revised relevant domestic regulations, in accordance with the amendments to the Annex of the International Convention for the Safe of Life at Sea (SOLAS): reviewed requirements on the means of escape in machinery spaces, such as door and ladder, and new requirements on fire-extinguishing appliances for ships designed to carry containers on or above weather deck.

In terms of securing compliance with the international regulations and standards of foreign ships which entering into ports in Japan, and eliminating substandard ships globally, Port State Control (PSC) has been conducted by MLIT.

As specifically focused on domestic approach to ensure ship safety, in response to a fire accident on board a ferry off the coast of Tomakomai, Hokkaido, in July 2015, the investigation under the Marine Transportation Act was conducted by MLIT in parallel with the investigations conducted by the Japan Coast Guard and the Japan Transport Safety Board. As the MLIT's investigation revealed problems in terms of firefighting, the committee to discuss firefighting on board ferry, which consists of experts on fire and firefighting, was established in September 2015. In March 2016, a manual summarizing effective firefighting procedures to reinforce preparations for engaging in firefighting to be undertaken by ferry operators, the features of firefighting equipment, training methods, and other pertinent matters was compiled and publicly released. This manual is currently being used to provide guidance to ferry operators nationwide.

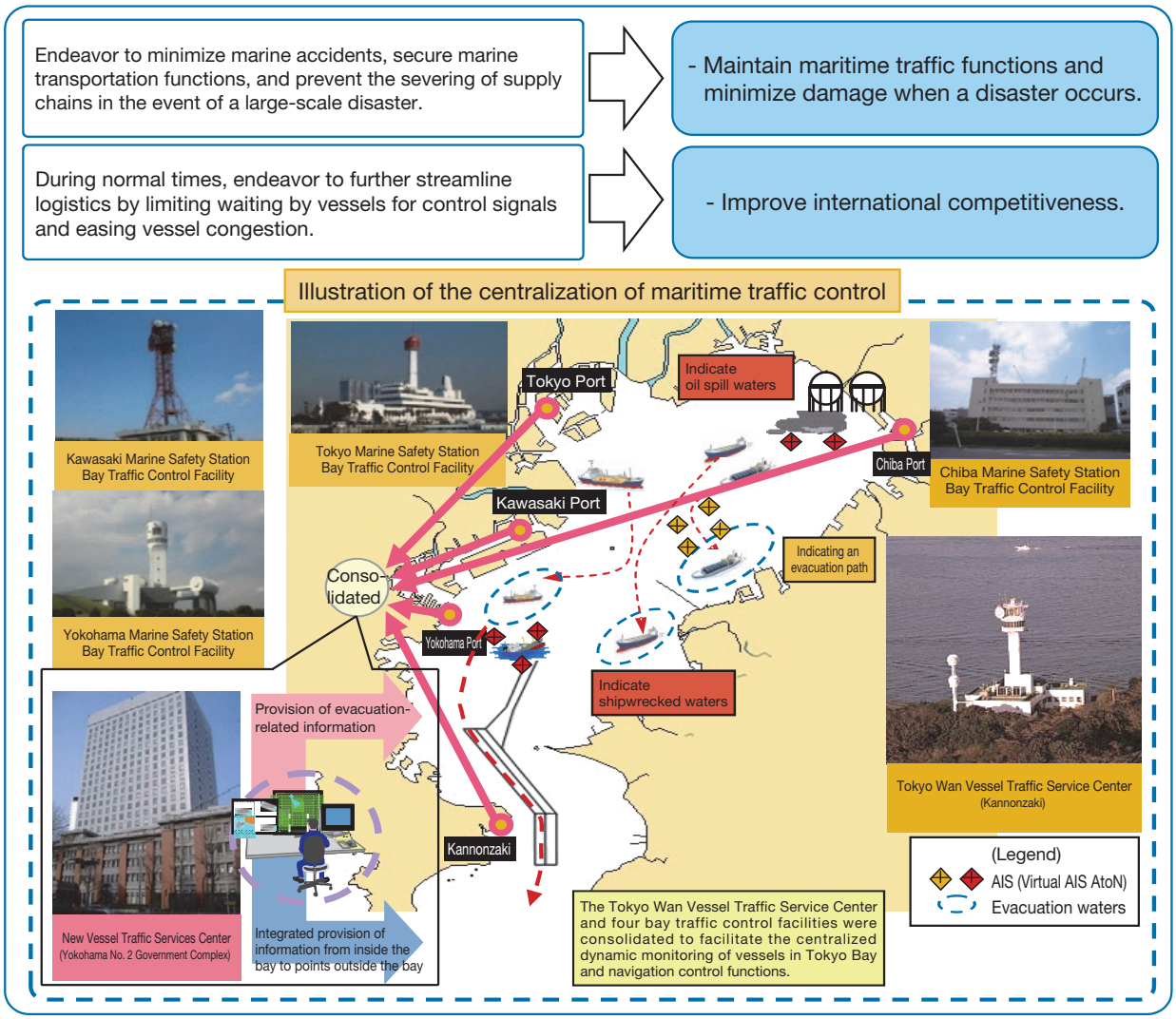
#### (ii) Ensuring Ship Navigation Safety

In accordance with the "Law for Ships' Officers and Boats' Operators" which complies with the STCW Convention [Note]", the qualifications for seafarers are defined to ensure ship navigation safety from human factors. In June 2010, the revised STCW Convention (Manila Amendments) with amendments stipulating additional competencies required for seafarers was adopted and publicizing the partial amendments to domestic Ministerial Ordinances came into force in April 2014 is being carried out. In accordance with the Pilotage Act, qualifications for people who can perform pilotage are defined for the safety of vessel traffic. Based on the report of the Basic Policy commission established at the Council of Traffic Policy Maritime Subcommittee, to secure a stable supply of pilots who will be needed in the future, initiatives to facilitate the acquisition of licenses required for the provision of mutual assistance among neighboring small to medium-sized pilotage districts are being carried out.

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 2015 there were 347 cases of determinations and a total of 483 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** 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.

Figure II-7-4-7 Establishing a centralized maritime traffic control system in bays




Source) MLIT

Various measures to prevent marine accidents have been developed and deployed, such as by holding liaison conferences attended by relevant ministries and agencies for the prevention of marine accidents for the purpose of providing information through the Maritime Information and Communication System (MICS), for which a new smartphone app was developed, and by organizing a national campaign to underscore the need to prevent marine accidents in collaboration with relevant organizations. In addition, a marine accident prevention workshop, in cooperation with relevant ministries and organization was held, and has implemented a variety of marine accident prevention campaign in the region, for marine accident prevention for small boats.

The Japan Coast Guard works to quickly and smoothly escort vessels to safe sea areas when a tsunami or other emergency disaster occurs. During non-emergency periods, it coordinates the Vessel Traffic Service Center in Tokyo Bay with port traffic controls offices and is building a system to carry out these operations in an integrated fashion in order to ease congestion and ensure the safe and efficient operations of vessels. It is also engaged in efforts to update systems required to maintain maritime traffic functions when an emergency disaster strikes.

In addition, to improve efficiency of safety and navigation of the ship in the narrow waterways, Kurushima Strait was subjected to tidal observation, and it provides tidal information on the Internet through entire region simulation.

With respect to nautical charts, we are endeavoring to upgrade electronic navigational charts, which have gained in importance thanks to the dissemination of the Electronic Chart Display and Information System (ECDIS). Moreover, for the area where complex navigational rules apply the English version of the routing guide was published to promote the understanding of the navigational rules, along with, publishing the nautical charts in just English for the foreign seafarers

as part of provision for prevention of the marine accident. Nautical charts corresponding to fifteen major ports affected by the Great East Japan Earthquake underwent complete revisions based on the results of surveys conducted after the earthquake. These revisions were completed by October 2015.

Regarding the navigation warnings and notices to mariners, visual information that constitutes beneficial information displayed on a map is provided over the Internet.

For Aids to Navigation, development is performed effectively and efficiently in accordance with the vessel traffic environment as well as needs and in FY 2015, improvements and renovation was carried out in 388 locations. The operations of virtual aids to navigation as provided through Automatic Identification System (AIS), which displays icons on radar screens for vessels with the use of AIS, began in November 2015 in the Akashi Strait and Tomogashima Channel.

The Marine Accident Analysis Center established under the National Maritime Research Institute (National Research and Development Corporation) conducts highly specialized analysis of accidents as well as rapid analysis and transmission of information when major marine accidents occur, and contributes to consider measures to prevent its recurrence.

Ensuring the safety of ship navigation in the Straits of Malacca and Singapore, highly important maritime transportation routes through which eighty percent of crude oil imported to Japan passes, is important. Cooperation for the financing of the Aids to Navigation Fund [Note 1] is being provided under the cooperative mechanism [Note 2] with the involvement of littoral states and users. In addition, new hydrographic surveys on the straits have been conducted since October 2015 jointly by Japan and three littoral states (Indonesia, Malaysia, and Singapore). Japan has provided technical cooperation through the provision of financing and the dispatching of experts, by maritime stakeholders. Japan will continue the cooperation for safety of navigation and protection of environment in the straits through public-private partnership, along with the good relationship with the littoral states.

### (2) Promotion of safety measures for the passengers

About 44% of cases reported about the dead or missing passengers are due to fall accidents into sea. In order to survive after the fall, first thing to do is to float, and then promptly request a rescue. For this, the Japanese Coast Guard is working to disseminate and enlighten self-rescue measures based on the three principles: wear a life jacket at all times, ensure appropriate contact means such as a portable telephone packed in a waterproof package, and effectively use the emergency call number “Dial 118”. In addition, the passenger mortality due to fall in the sea from small boats (fishing boats or pleasure boats), is five times higher in the passengers who do not wear a life jacket, than those who do, therefore, life jackets contributes greatly in saving the passengers from the fall. Thus, the Japan Coast Guard is endeavoring to raise awareness of the need to wear a life jacket through the provision of support for LGL [Note 3] activities, workshops on the prevention of marine casualties, and other initiatives.

### (3) Strengthening the Rescue System

In order to engage in prompt and precise rescue activities, the Japan Coast Guard operates the 1-1-8 emergency telephone hotline and endeavors to rapidly ascertain information on the occurrence of accidents, such as by receiving information on marine accidents at any time, day or night, through the Global Maritime Distress and Safety System (GMDSS). Also, along with improving the rescue technology and capabilities of those such as special search and rescue units, mobile rescue workers, 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 vessels 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.

**Note 1** A fund established to cover costs incurred to replace or repair lighthouses and other facilities used for aiding navigation installed in the Straits of Malacca and Singapore.

**Note 2** A mechanism that substantiates, for the first time in international history, the cooperation of littoral states and states using these straits in accordance with Article 43 of the United Nations Convention on the Law of the Sea. This mechanism comprises three elements: the Cooperation Forum, the Project Coordination Committee, and the Navigation Aids Facilities Fund.

**Note 3** Refers to the family members of fishermen who are calling for life jackets to be worn. Stands for ‘Life Guard Ladies’.

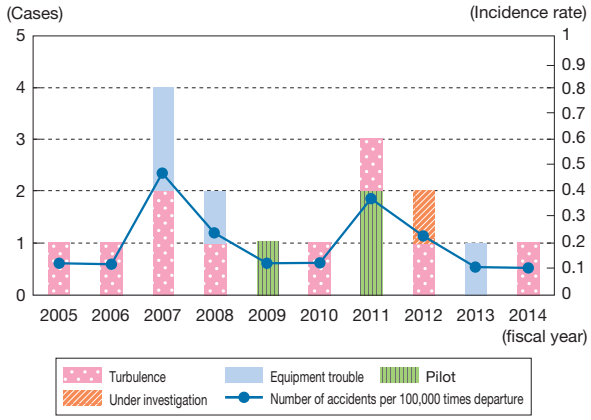
## 4 Air Traffic Safety Measures

### (1) Strengthening Aviation Safety Measures

#### (i) State Safety Program (SSP)

Since April 2014, the Civil Aviation Bureau, as the authorities in charge of the safety of civil aviation, has been implementing the State Safety Program (SSP), which sets forth targets for civil aviation safety and measures to be taken for their attainment, in accordance with Annex 19 of the Convention on International Civil Aviation. In FY 2015, the Civil Aviation Bureau, formulated a "Medium-term orientation for the administration of aviation safety" for which the orientation of safety targets for the next five years and of safety measures that should be implemented for their attainment has been outlined. [In going forward, a plan for the implementation of the SSP will be formulated each fiscal year based on the midterm orientation and that efforts will be made to attain the given safety targets.]

Figure II-7-4-8 Number and Frequency of Accidents on Domestic Airlines




Source) MLIT

The Voluntary Information Contributory to Enhancement of the Safety (VOICES) program has been operated since July 2014 in order to collect more information relating to aviation safety that is not subject to mandatory reporting and harness such information for the improvement of safety. Recommendations such as improving airport operations have been obtained through this program. While dissemination activities have been yielding results and more reports were issued in FY 2015 than in the preceding year, attempts will be made to further increase the number of issued reports through continued work to highlight the importance of safety information. Efforts will also be made to improve safety by making use of obtained recommendations.

#### (ii) Air Transport Safety Measures

While passenger deaths aboard specific Japanese air carriers [Note] have not occurred since 1986, efforts are being made to reinforce the safety management system adopted by airlines and preventive safety measures are being promoted to appropriately deal with safety-related issues. As well, preliminary reviews upon the launch or expansion of a domestic airline and strict (including unannounced) and systematic on-site audits are properly conducted. 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.

#### (iii) Certification of Domestic Jetliners

With the development of Japan's first domestic jetliner, the MLIT, 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. The MLIT carried out safety evaluation to determine whether to allow test aircraft to undergo test flights based on the results of strength tests, function tests, and analyses conducted for the first flight by designers, which included taxing tests began in June 2015. Special flight permit was issued at the end of October 2015. Subsequently, the first flight was successfully completed in November of the same year. Test flights are slated to be carried out using five different test aircraft to certify compliance with standards and performance and the MLIT will proceed the safety assessment.

#### (iv) Safety Measures Applicable to Unmanned Aircraft

Nowadays, we are seeing unmanned aircraft such as drones, which are rapidly gaining in popularity, used in more and

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.

more different areas of application, such as aerial photography, the spraying of agricultural chemicals, and infrastructure inspections. While it is expected that they will be used to a greater extent in the future, crash landings have occurred, and other examples of safety-related issues have emerged. For this reason, the Aeronautical Act as amended in September 2015 was enacted and came into force in December of the same year. Minimal operating rules for unmanned aircraft, such as in terms of the airspace in which they are allowed to fly and the methods by which they can be operated, were introduced with great urgency.

Beginning in December of the same year, meetings of the Public Private Round table for the Dissemination of UA have been held to sufficiently obtain the opinions of concerned parties while taking into consideration technological progress and the state of the diversification of applications. Discussions on properly designing a system to ensure greater safety for unmanned aircraft while considering the promotion of the utilization of unmanned aircraft are proceeding.

### (2) Developing Air Traffic Systems for Aviation Safety

Since the majority of serious incidents concerning air traffic services originate from human error, measures to prevent



## Column For a safe flight of unmanned aircrafts (drones, radio-controlled planes, etc.)

In December, 2015, an amendment to the Aeronautical Act was issued to enforce flying rules on unmanned aircrafts. The outline of rules is as follows. You can see the details on the website of the Ministry of Land Infrastructure, Transport and Tourism (MLIT) (http://www.mlit.go.jp/koku/koku_tk10_000003.html).

**[Outline]**

**(i) Target aircrafts**

Any airplane, rotorcraft, glider or airship which cannot accommodate any person on board and can be remotely or automatically piloted (excluding those lighter than 200 g. The weight includes that of battery).

(Examples of unmanned aircraft)

(Drone (multi-copter))

(Radio-controlled airplane)

(Crop-dusting helicopter)

**(ii) Prohibited airspace for flight**

Any person who intends to operate an unmanned aircraft (UA) in the following airspaces is required to obtain permission from the Minister of Land, Infrastructure, Transport and Tourism because of the high likelihood of collisions with a manned aircraft, and harm to people or others on the ground.

- Airspace around airports (airspaces above approach surface, etc.)
- Airspace above 150 m above ground level or water surface
- Above Densely Inhabited Districts, which are defined based on the results of national censuses.

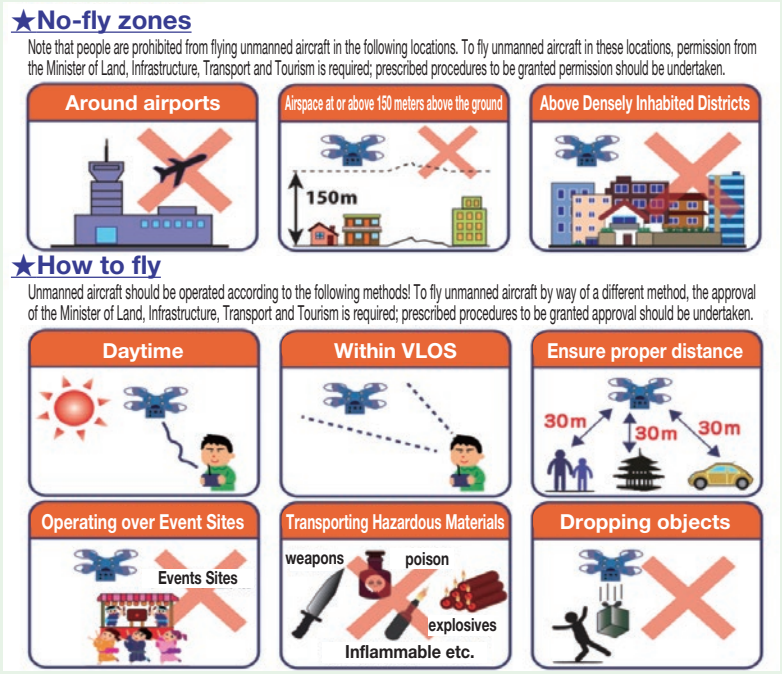
**(iii) Operational limitations**

Any person who intends to operate an UA is required to follow the operational conditions listed below, unless approved by the Minister of Land, Infrastructure, Transport and Tourism.

- Operation of UAs in the daytime (from sunrise to sunset)
- Operation of UAs within Visual Line of Sight (VLOS) while constantly watching the UAs and the surroundings
- Maintenance of 30 m operating distance between UAs and persons (the third persons) or properties (buildings, automobiles, etc., belonging to third praty)
- Do not operate UAs over event sites such as festivals and fairs, where many people gather.
- Do not transport hazardous materials such as explosives by UAs
- Do not drop any objects from UAs.

**(iv) Permission & Approval**

If you intend to fly an UA in the prohibited airspace for flight or in the way not depending on the operational limitations, you are required to submit an application for the permission or approval to MLIT at least 10 days (excluding Saturdays, Sundays, and holidays) before you fly an UA. As for the application form, procedure, and prior consultation, please visit the website shown above.




Source) MLIT

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 such missions as disaster response, development of low altitude routes considering its operational characteristics is being evaluated as well.

## 5 Determining the Causes of Aircraft, Railway, and Marine Accidents/Serious Incidents and Preventing Recurrence

During FY 2015, accidents subject to investigations by the Transport Safety Board consisted of thirty-nine aviation incidents, fourteen rail incidents, and 893 incidents involving ships and vessels that occurred and were investigated.

Investigation reports for thirty aviation accidents whose investigations were finished in FY 2015 were publicly released. Released in May 2015, a key report consisted of an investigation report on a serious incident in which a plane that was taking off mistakenly entered a runway that was at the time being used by a plane that was approaching for a landing at Naha Airport in July 2012.

Likewise, investigation reports for twenty-one rail accidents were released. Released in December 2015, key reports consisted of investigation reports on freight car derailments that occurred on JR Hokkaido's Esashi Line in September 2012 and June 2014. In conjunction with the release of these reports, opinions were presented to the Minister of Land, Infrastructure, Transport and Tourism to have concerned parties come together and carry out a review with a view to improving the safety of freight train operations.

Figure II-7-4-9 Ship Accidents Hazard Map (mobile version)

Top page http://jtsb.mlit.go.jp/hazardmap/mobile/index.html


Example of accident information displayed

Source) MLIT

Likewise, investigation reports for 974 accidents involving ships and boats were released. Released in December 2015, a key report consisted of an investigation report on a major accident in which an oil tanker called Shoko-maru exploded in flames offshore just south of Himeji Port in May 2014, resulting in deaths and injuries caused to five crewmembers.

The Transport Safety Board upgraded the functions of hazard maps for ship accidents that were designed to allow anyone to search locations where multiple ship accidents have occurred and the results of accident investigations by superimposing them on online electronic maps and commenced the operations of a mobile version of hazard maps for ship accidents that were designed to allow information on the vicinity of a user's current location to be quickly searched with a smartphone or tablet in June 2015.

## 6 Support for Victims and Families of Public Transport Accidents

In order to support the victims and others of public transport accidents, the Public Transport Accident Victims Support Office was established in April 2012. The Support Office exercises such initiatives as transferring requests from victims to public transport operators and introducing appropriate authorities in accordance with the consultation content of victims.

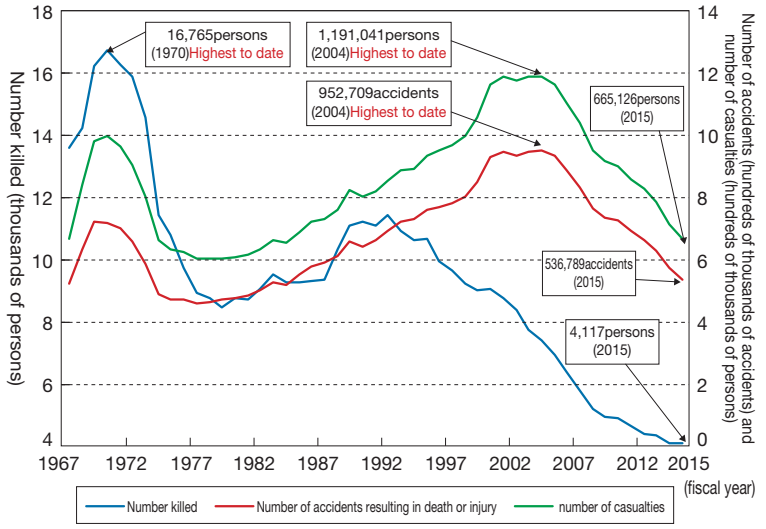
In FY 2015, when a public transport accident occurred, the Support Office made the consultation service well known to victims, as well as responded to consultation from victims. When no public transport accidents needed to be dealt with, the Support Office was involved in numerous other activities, such as by providing education and training to staff members who provide support, building networks with relevant outside organizations, holding support forums for the victims of public transport accidents, and urging public transport operators to formulate plans for the provision of support to victims.

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

In 1970, the number of traffic accident fatalities peaked at 16,000. This figure declined to a quarter of this level, or 4,117 fatalities, (an increase of 4 over the preceding year) in 2015 but then rose for the first time in fifteen years. Elderly persons account for a majority of traffic accident fatalities. Approximately half, or 2,160 fatalities, were killed while walking or riding a bicycle. With half of these incidents taking place within 500 meters of each victim's home, the situation remains grim. 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-7-4-10** Changes in the number of traffic accidents and number of casualties




(Notes) 1 Until 1959, accidents resulting in minor damage (injury suffered for less than eight days, property damage of up to 20,000 yen) were not included.
2 Accident numbers for 1966 and thereafter do not include accidents resulting in only property damage.
3 Figures for 1971 and earlier do not include Okinawa.
Source) Produced by the MLIT using materials provided by the National Police Agency.

### (1) Promoting Efficient and Effective Traffic Accident Measures

By promoting the functional differentiation of roads, we will divert automobile traffic to highly safe expressways. Through measures applicable to accident-prone "black spots" and "zero-traffic accident plans" (tactics for the priority elimination of accidents at black spots) carried out in collaboration with prefectural public safety commissions, we are effectively and efficiently promoting accident measures in order to further improve the safety of arterial roads, which account for approximately sixty percent of traffic accident fatalities.

With respect to residential streets, which account for a significant percentage of fatal and injury accidents involving pedestrians and cyclists, standard specifications for speed bumps, curb extensions, and other measures shall be formulated to secure safe walking spaces by restricting the flow of vehicular traffic and forcing a reduction in vehicular speeds. Comprehensive measures to inhibit traffic accidents are being advanced in collaboration with prefectural public safety commissions, such as by decreasing the width of vehicular roads and widening roadside strips in combination with zonal speed limits, engaging in sidewalk development projects, and carrying out measures to install speed bumps.

### (2) Promoting Safety Measures for School Commute Routes

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 and included coordination among schools, boards of education, police, and other stakeholders. Intensive support was directed toward the measures based on the results above.

In addition, Japan has instituted a "school-commuting roads safety program" in each municipality to ensure the sustained safety of school-commuting roads, and has implemented regular joint inspections and improved and enhanced other measures as well.

### (3) Safety Driving Support on Expressways Using IT

Japan is the first country in the world that commenced the ETC2.0 service, which utilizes communication spots on expressways installed across the country and onboard units. Safe driving support is promoted by providing alerts on locations where accidents occur frequently and on objects that have fallen onto the road as well as information on snow accumulations, overtopping waves, and other such circumstances to the vehicle's car-navigation system. The use of information technology and effective measures based on partnerships with automobile manufacturers and other private-

sector entities to solve the problem of cars driving in the wrong-way driving on expressways, a situation that at any given time is highly likely to cause a major accident, are being studied.

### (4) Systematic Road Facilities Management to Provide Safe and Secure Road Services

Bridges under municipal management account for approximately seventy percent (480,000 bridges) of the approximately 720,000 bridges nationwide. In the United States, bridges managed at the municipal level account for no more than ten percent of the total number in existence in the country. In managing the vast majority of bridges to be found in this country, Japanese municipalities need to properly maintain, repair, and upgrade bridges under their care.

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 for government ordinances. The facilities subject to renovation and repairs by the 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 March 31, 2014 that clarified the obligations of road administrators, such as visual inspections in close proximity of bridges and tunnels once every five years.

Having received recommendations on the full-scale implementation of measures to deal with the obsolescence of roads, as summarized by the Infrastructure Development Council's Road Subcommittee on April 14 of the same year, we will henceforth endeavor to define maintenance cycles (clarify the obligations of road administrators) and build a framework for carrying out required actions as part of these maintenance cycles.

We have been more proactively engaged in the provision of support for measures undertaken by local governments to deal with aging road structures. This include the steady promotion of regular inspections through the use of road maintenance councils that had been set up in all prefectures by July of the same year, the placement of batch orders of inspection operations at a local level, the provision of training for the staff members of local governments, the provision of technical support by the national government where the national government repairs on behalf of the local government based on the evaluation results by the national government officials, and the establishment of subsidy systems for large-scale repair and upgrading jobs.

In order to deal with the obsolescence of expressways, large-scale upgrading and repair projects newly outlined in operational implementation plans according to amendments to the Road Act enacted in June of the same year are systematically being advanced.

### (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 formulated 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 have been definitely implemented in the two years between FY2013 and 2014, and the status of implementation has been followed up and its effects have been reviewed. The MLIT continues to ensure the effectiveness of each measure of this plan such as implementation of street audit and understanding of bus operators that must be continuously monitored, and promotes measures to improve the safety and regain trust of bus operations.

### (6) Promoting Safety Measures According to a Safety Plan for Commercial Vehicles

In November 2014, an interim review of a 2009 comprehensive safety plan for commercial vehicles that was formulated with the aim of halving the number of deceased persons and the number of accidents resulting in injury or death relating to the use of commercial vehicles in the decade between 2009 and 2018 was conducted. Various initiatives to further reduce accidents have been advanced to go along with new measures that have been implemented; these measures include the implementation of accident-prevention measures based on accident trends by industrial sector and key factors, the dissemination of measures to prevent accidents caused by physical changes affecting drivers, and the implementation of accident-prevention measures based on the use of survey data, accident data, and other types of pertinent information.

#### (i) Establishing a Framework for Safety through the Management of Transportation Safety

In accordance with a transportation safety management program introduced in October 2006, business operators have

been establishing and improving safety management systems internally on a company-wide basis. In 2015, 146 operators were subject to evaluations of transportation safety management whereby the state verifies the status of the implementation of these systems.

### (ii) Ensuring Compliance on the Part of Motor Carrier Businesses

In order to enforce the Labor Standards Act and other relevant laws and ordinances and thoroughly manage operations, business operators who have willfully driven while under the influence of alcohol, business operators who have caused a major accident, and business operators who have recently entered into a new market shall be subject to thorough audits as well as to audits and oversight carried out jointly by relevant organizations. Unsuitable business operators will be strictly punished according to tightened standards.

Willful business operators who contravene laws and ordinances shall be subject to efficient and effective audits, including audits on a selective, priority basis. In response to a ski bus accident that occurred in Karuizawa in January 2016, chartered bus business operators nationwide were subject to curbside audits and focused audits on an emergency basis.

In order to reinforce audit functions for the prevention of accidents through efforts to merge audit information with accident information, reinforce analytical functions, and identify business operators deemed to be at high risk of causing an accident, a comprehensive safety information system for commercial vehicles is being developed.

### (iii) Eliminating Drunk Driving

With respect to the thorough use of breathalyzer tests with alcohol detection devices during roll calls and to proper knowledge of and usage bans on dangerous drugs in the context of efforts to eliminate driving while under the influence of dangerous drugs, guidance is being provided to business operators and operating managers whenever the opportunity arises through the use of workshops, nationwide transportation safety campaigns, general transportation safety checks conducted during the year-end, New Year's period, and other such initiatives in order to thoroughly ensure that drivers are guided and supervised on a daily basis.

### (iv) Promoting Safety Measures Based on the Use of IT and New Technologies

We are providing support for the deployment of equipment that will contribute to the advancement of operation management such as digital operation recorder and for advanced initiatives such as preventing overwork driving, from the point of view to support the efforts made to prevent the traffic accidents caused by the automotive transportation operators. Next-generation operating management and support systems linking vehicles with onboard devices and health-care instruments are being studied.

### (v) Accident-Prevention Measures Based on Accident Patterns by Industrial Sector and Key Factors

In order to promote transportation safety, we are implementing accident-prevention initiatives based on characteristic accident patterns for each industrial sector—trucks, buses, and taxis—in concert with on-site concerned persons and are endeavoring to improve the provision of guidance to and the supervision of entry-level drivers through the establishment of a quasi-medium-size license as a new licensing category for the drivers of trucks.

### (vi) Measures Based on the Recommendations of the Committee Investigating Accidents Involving Commercial Vehicles

Established in collaboration with the National Police Agency in 2014, the Committee Investigating Accidents Involving Commercial Vehicles has conducted more advanced, complex investigative analyses of accident factors, such as by endeavoring to further clarify the organizational and systemic issues behind major accidents involving commercial vehicles that have a large impact on society, in order to receive objective, higher-quality recommendations on recurrence-prevention measures. Reports for eight cases concerning incidents subject to special important investigations were then publicly issued.

### (vii) Promoting Measures to Prevent Accidents Caused by Rapid Physical Changes Affecting Drivers

In addition to endeavoring to thoroughly disseminate the Manual on Health Management for Drivers of Commercial

Vehicles, which was revised in April 2014, a Council for Discussing Measures to Deal with Health-Attributable Accidents Involving Commercial Vehicles was established in September 2015 to promote screenings as a more effective tool for enabling the early detection of sleep-disordered breathing, brain diseases, heart disease, and other key diseases as recommended in the aforementioned manual. Measures to promote the dissemination of such screenings and other matters are being studied by this council.

#### (viii) 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 on June 2013. We are working to disseminate these guidelines and ensure the effectiveness of them in collaboration with the stakeholders through stakeholders meetings and training sessions by related industries in rural areas.

### (7) Measures in Response to a Ski Bus Accident in Karuizawa

On January 15, 2016, a chartered bus (carrying forty-one passengers) swerved into the oncoming lane and rolled down the right side of the road on the Usui Bypass on National Route 18 in Karuizawa, Nagano near the Iriyama mountain pass. Fifteen individuals (thirteen passengers and two crewmembers) were killed and twenty-six passengers sustained light to heavy injuries in this serious accident. In order to study thorough recurrence-prevention measures designed to prevent such a tragic accident from ever occurring again, meetings of a Committee of Experts to Investigate Measures in Response to the Ski Bus Accident in Karuizawa have been held to discuss, from various perspectives—such as in terms of reinforcing before-and-after safety checks imposed on chartered bus business operators, optimizing the business environment vis-à-vis travel agents, and visualizing elements of safety for users—fundamental safety measures corresponding to structural issues, such as those relating to the significant increase in the number of chartered bus business operators and the audit personnel system that emerged after regulations were eased, a shortage of drivers tied to a shrinking and aging population, and business relations between travel agents and chartered bus business operators.

In accordance with the extent to which a study of an interim summary of recurrence-prevention measures had been conducted, three matters came into focus on March 29, 2016: matters that should be implemented promptly in terms of the imposition of strict punishment, such as in terms of the revocation of business licenses granted to business operators who fail multiple times to correct and ameliorate violations of laws and ordinances; matters for which realization should be pursued in terms of the establishment of a framework for the provision of safety information on chartered bus business operators and the promotion of the dissemination of systems for handling driver abnormalities; and matters that should continue to be studied in terms of conducting reviews of the ways in which operating managers should perform their duties.

For matters that should be implemented promptly, matters that can be implemented shall be promptly implemented. Committee members will continue to discuss matters for which realization should be pursued and matters that should continue to be studied, summarize comprehensive measures for the prevention of recurrence by this summer with respect to these matters, and move to reliably implement these measures going forward.

### (8) Comprehensive Safety Measures for Automobiles

#### (i) Considering Vehicle Safety Measures for the Future

The Technical Safety Working Group under the Automobile Subcommittee of Road Transport Session, beneath the Transport Policy Council was held, in response to the formulation of the tenth Fundamental Traffic Safety Program (for FYs 2016 to 2020). The working group discussed about future safety measures, such as the advanced emergency braking system, while considering the current status of traffic accidents and development of automotive technologies.

#### (ii) Expanding, enhancing, and strengthening safety standards

In order to improve the safety of automobiles, ten international regulations were adopted in Japan, Due to this adoption, testing conditions based on simulations of lateral collisions with electric utility poles and safety standards for battery-type electric motorcycles were newly developed. Japan is the first country in the world to formulate safety standards applicable to fuel-cell-based motorcycles.

### (iii) Promoting the Development, Commercialization, and Popularization of Advanced Safety Vehicles (ASV)

With the cooperation of manufactures and academics, the popularization of ASV technology, such as advanced emergency braking systems were promoted. Also, as the output of the fifth-term ASV promotion plan, guidelines on systems for handling driver abnormalities and communications-based driving support systems were formulated.

Figure II-7-4-11 Braking to mitigate collision damage

Source) MLIT

### (iv) Providing Safety Information Through Automobile Assessment

In order to promote the development of safer automobiles, and enable consumers to choose the safe automobiles and child restraint system, the results of the assessment of automobile safety were published. Assessment of rear-view monitor commenced in FY 2015.

### (v) Efforts Towards Realization of Automatic Driving

Established under the purview of the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29), the Automatically Commanded Steering Function Informal Working Group, co-chaired by Japan, has spearheaded the formulation of international standards on automatic driving, such as by proposing standards for automatic steering that could allow for automatic driving on expressways.

### (vi) Swift and Steady Implementation of Automobile Recalls and Informing Users and Others

In order to carry out vehicle recalls promptly and reliably, information is collected from vehicle manufacturers and users and efforts are made to reinforce systems for the collection of information from parts suppliers. In addition, checks are conducted and guidance is provided when audits are performed with respect to recall operations carried out by vehicle manufacturers. Technical verifications are conducted by the National Agency for Automobile and Land Transport Technology (known as the National Traffic Safety and Environment Laboratory until March 31, 2016) on vehicles that are questionable in terms of conformity of the safety or environmental regulations. In order to reinforce the collection of information on defects, dissemination activities in connection with the hotline concerning information on automobile defects (www.mlit.go.jp/RJ/) are being proactively undertaken.

In addition, the information collected by the 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.

Also, in FY 2015 the number of recall notifications was 368 and the number of recalled vehicles was 18,990,000.

### (vii) Sophistication of Vehicle Inspections

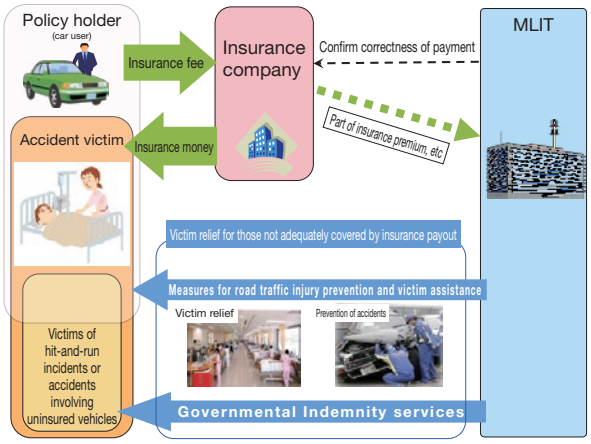
In order to prevent illegal secondary modifications [Note] and the early detection of vehicular malfunctions, information technology is being utilized to make vehicle inspections more sophisticated.

**Note** Conduct whereby, after a vehicle undergoes a new inspection with components removed, the given components are re-attached to the vehicle and used accordingly.

### (9) Protecting Victims with the Automobile Liability Security System

The automobile liability security system, implements various victim relief measures such as insurance payments of Compulsory Automobile Liability Insurance, governmental indemnity services (relief for victims of hit-and-run and uninsured car accidents), and payments for nursing care fees and administration of nursing care centers for those with severe residual disabilities based on the principle of the mutual support of the car society and is fulfilling a big role in protecting victims of traffic accidents.

Figure II-7-4-12 Automobile Liability Security System




Source) MLIT

### (10) Safety Measures for Mechanized car parking

In light of the occurrence of accidents involving deaths in mechanized car parking, we are proceeding with studies of JIS standardization of safety standards applicable to mechanical parking equipment together with industry groups in order to endeavor to further improve the safety of mechanical parking equipment.



## Section 5 Crisis Management and Security Measures

## 1 Promoting Crime and Terrorism Counter-measures

### (1) Coordinating with Other Countries for Crisis Management and Security Measures

#### (i) 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 currently has a participation of over 16 nations and is expected to further evolve as a framework for bilateral dialogue with the United States of America and European Union on land transport security and it will be utilized to improve domestic security and international contributions.

#### (ii) Anti-Piracy Measures

According to the International Maritime Bureau (IMB), there were 246 instances of piracy and armed robbery in 2015. Broken down by region, the sea area around Southeast Asia accounted for 147 instances, Africa (Gulf of Guinea) accounted for thirty-one instances, and the sea area around Somalia and the Gulf of Aden accounted for zero instances.

While the number of heinous cases of piracy increased rapidly in the sea area around Somalia and the Gulf of Aden beginning in 2008, such cases have declined to low levels in recent years thanks to anti-piracy efforts by the navies of different countries, the implementation of self-defense measures based on best-management practices (BMP) [Note] on the part of merchant ships, and the initiatives of the international community, such as in terms of the presence of armed security on board merchant ships. Nevertheless, cases in which vessels are pursued by suspicious boats continue to emerge and circumstances in terms of the navigation of merchant ships remain unpredictable.

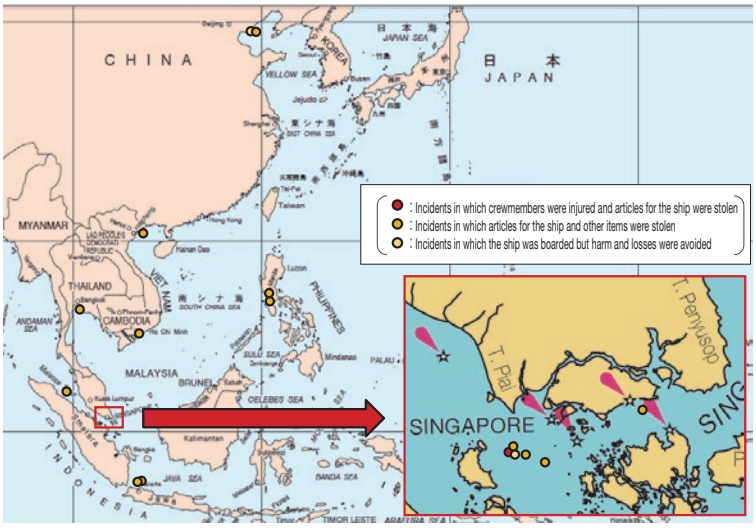
Under this situation, the Japan Maritime Self-Defense Force destroyers are conducting escorts of merchant ships in the Gulf of Aden as well as surveillance patrols by two P-3C patrol aircraft based on the Law on Punishment of and Measures Against Acts of Piracy. The MLIT provides a contact point for escort requests from shipping companies and others and

Note Stipulations of self-defense measures (such as measures to avoid piracy and the development of escape compartments onboard a ship) to prevent or minimize the harm caused by Somali piracy as produced by the International Chamber of Shipping and other international shipping organizations.

selects vessels to be escorted. The MLIT also appropriately applies the Act on Special Measures Concerning the Guarding of Japanese Ships in Pirate-infested Waters (enforced on November 30, 2013) which allows security guards employed by commercial security companies to guard Japanese-flagged vessels with which certain requirements are satisfied and ensures the complete navigational safety of Japanese-flagged vessels.

Japan Coast Guard, for anti-piracy measures in the water off the coast of Somalia and Gulf of Aden, dispatches its eight officers, onboard Japan Maritime Self Defense Force destroyers to conduct judicial police activities in case of piracy incident.

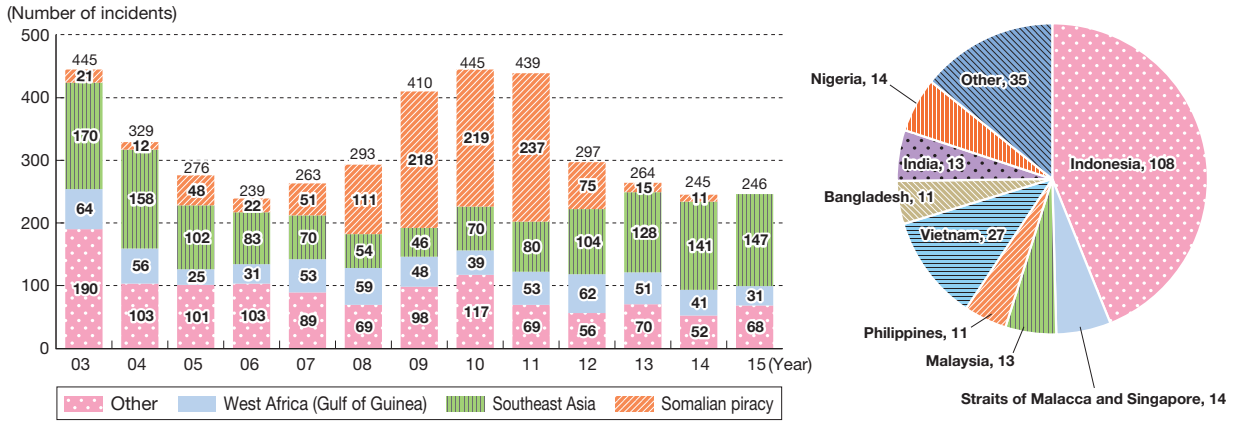
**Figure II-7-5-1** State of the occurrence of piracy and armed robbery against Japanese-related ships as reported to the MLIT (2015)




Source) MLIT

In addition, the Japan Coast Guard provides capacity building assistance towards maritime security agency officials of coastal states, such as off the coast of Somalia and in the Gulf of Aden and Southeast Asian waters, and is working on the promotion of collaboration and cooperation with relevant countries and agencies. Specifically, airplanes have been dispatched to and piracy-related safe-passage drills have been performed in collaboration with coast guard agencies belonging to the relevant countries for coastal states in the sea area around Somalia and the Gulf of Aden while patrol vessels and airplanes have been dispatched to and anti-piracy drills, training, and lectures have been held in collaboration with coast guard agencies belonging to the relevant countries for coastal states in the sea area around Southeast Asia. Members of coast guard agencies belonging to various countries have been invited to Japan and experts have been dispatched on a short-term basis to other countries to carry out training programs. Contributions are being proactively made to international partnerships, such as by dispatching personnel to the Information Sharing Center (ISC), which was established according to the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP).

**Figure II-7-5-2** "Changes in the number of incidents involving piracy and armed robbery worldwide (according to the IMB Report)" and "Number of incidents involving piracy and armed robbery by sea area in 2014 (according to the IMB Report)"




(Notes) 1 For the years between 2003 and 2009 and 2014, the number of incidents of piracy in the waters around Somalia consists of incidents occurring in Somalia, the Gulf of Aden, and the Red Sea; for the years between 2010 and 2013, the number of incidents of piracy in the waters around Somalia consists of incidents occurring in Somalia, the Gulf of Aden, and the Red Sea, as well as incidents occurring in the Arabian Sea, Indian Ocean, and Oman.
2 The number of incidents for West Africa consists of incidents occurring in Angola, Benin, Cameroon, Congo, Gabon, Ghana, Guinea, Guinea-Bissau, Cote d'Ivoire, Liberia, Nigeria, Republic of Congo, Senegal, Sierra Leone, and Togo.
Source) MLIT

### (iii) 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 a part of the initiative to further raise the level of security in international ports.

## (2) Comprehensive and Strengthened Counter-Terrorism Measures for Public Transport

As ISIL was gaining ground in the Middle East, Japanese nationals were being killed in Syria and Tunisia (January, February, and March 2015), a Russian plan was downed in Egypt (October 2015), and a series of terrorist attacks targeting Paris and Brussels occurred (November 2015 and March 2016). These incidents illustrate the ongoing seriousness of the global threat of terrorism. In light of these circumstances, counter-terrorism measures are being developed in each respective field and thorough supervision and inspections of counter-terrorism measures are implemented during busy season.

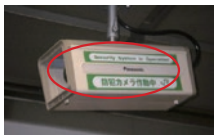
**Figure II-7-5-3** Implementing "Displaying Security and User Participation" as the Axis of Railway Counter-Terrorism Measures


(Picture 1) "Crisis management poster" displayed inside the station

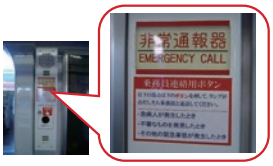

(Picture 2) "Anti-terrorism cooperator emblem" on sales staff, etc.

(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) Warning messages (such as "This area monitored by security camera" ) are conspicuously displayed.




(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

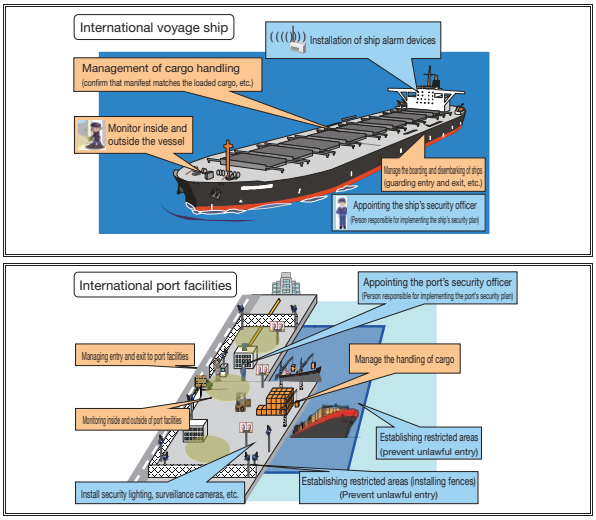
### (i) Promoting Counter-Terrorism Measures for Railways

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.

### (ii) Promoting Counter-terrorism Measures for Ships and Ports

MLIT has been engaged on ensuring security, through approval of the Ship Security Plan of the Japanese ships engaged on international voyage and ship inspection to them, and also approval of the Port Security Plan of the international port facilities in Japan and inspection to them, furthermore control of all the ships entering into the ports, such control includes inspection to them and Port State Control (PSC), in accordance with "Act on Assurance of Security of International Ships and Port Facilities." In addition, in the light of the results of inspections for the Japanese international port facilities and the security levels of foreign countries, MLIT has increasingly enhanced its port security measures, for example, the three-item check (checks on the ID, organization and purpose of entrance) at all the Japanese international port facilities after July 2014.

**Figure II-7-5-4** Security Measures for International Voyage Ships and International Port Facilities




Source) MLIT

**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.

#### (iii) Promoting Counter-Terrorism Measures for Aviation

In order to do every possible thing to prevent a terrorist attack involving aircraft in our country, the aviation security framework is being strengthened in accordance with the international standards defined by the Convention on International Civil Aviation. In such situation, corresponding to the cases of terrorism and the trespassing inside and outside our country, in addition to strengthening the fences for invasion preventive measures against vehicles and people, prompt measures are being taken such as installing sensors on every airport, which are able to cope with invasion. As part of efforts to enhance security checks at airports, advanced body scanners will be installed at major airports in our country by the 2020 Tokyo Olympic and Paralympic Games. Operational trial was conducted and efforts will be undertaken to otherwise reinforce aviation security measures. 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.

#### (iv) Promoting Counter-Terrorism Measures for Automobiles

Relevant businesses are instructed to carry out inspections inside vehicles, strengthen patrol of the inside and perimeters of business offices and garages, and dispatching security officers to major bus stops during seasons with increased travelers.

#### (v) 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 lockout 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) Balancing Security and Efficiency of Logistics

For international logistics, initiatives to balance security and efficiency are spreading to each country, even in our country, the dissemination of AEO system [Note 1] for logistics companies is being promoted. At present, the cargo for which the export declaration is done by AEO exporter, and AEO bonded transporter transports the cargo up to the bonded area, export declaration for the cargo is entrusted to AEO customs broker, also receiving the export license is permitted before bonded area loading.

For the security system of airfreight with the purpose of protecting airfreight from the shipper to loading on aircraft, the KS/RA system [Note 2] based on international standards established by the ICAO is adopted. Then, based on the request of the United States for further security strengthening, the system was revised while maintaining the smooth performance of the logistics, applied from October 2012 for the United States for international passenger flights equipped with cargo, the same system was also expanded for application of all international passenger flights equipped with cargo from April 2014.

Also, in the container terminals of major ports, an access control system is being implemented to accurately confirm the identity and association of truck drivers and full-scale system operation started from January 2015.



**Note 1** A system for the customs to certify international trade related business operators with well developed system of security management of cargos and compliance with laws and to grant the benefit of simplifying customs clearance.

**Note 2** 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.

### (4) Information Security Measures

As the dependence on IT for socioeconomic 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. As we prepare to host the Tokyo Olympic and Paralympic Games in 2020, information security measures will need to be further fortified.

For this reason, the MLIT is engaged in information security measures, such as by reinforcing information system functions and enhancing and fortifying arrangements for coping with cyber-attacks, in accordance with the policy formulated by the government's Cybersecurity Strategy Headquarters. In implementing information security measures for areas of critical infrastructure (aviation, railway, and logistics), efforts are being made in collaboration with the National center of Incident readiness and Strategy for Cybersecurity (NISC) to improve the ability of critical infrastructure in each area to deal with cyber-attacks through drills involving hypothetical cyber-attacks.

## 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, a disaster response headquarters is established within the MLIT to develop a system to collect and aggregate precise information quickly and be able to implement disaster emergency measures with relevant government agencies.

For accident disasters at sea, coordination with relevant organizations is being furthered such as ensuring a dispatch system for patrol vessels and aircraft and readying disaster mitigation equipment in addition to implementing joint training. Also, 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 addition to making sure to police territorial waters and control foreign fishing vessels in the sea area around the Senkaku Islands, the Coast Guard is steadily developing new jet airplanes and regulatory capacity advanced patrol vessels in order to adequately respond without security holes to suspicious incidents and unlawful conduct in sea areas around Japan, including remote islands. We will also systematically proceed with the replacement of superannuated patrol vessels with helicopters, other patrol vessels and aircraft with alternative high-peformance patrol vessels and aircraft and the development of relevant facilities.

### (2) Promoting Counter-Terrorism Measures

As measures to prevent terrorism, nuclear power plants, petroleum complexes, and other important facilities in coastal areas are subject to surveillance and detection functions carried out by patrol vessels and aircraft. Passenger terminals, ferries, and other soft targets where large numbers of people can be found are also subject to surveillance and detection functions on a priority basis.

Counter-terrorism measures are also being carried out by public-private partnerships formed through close ties with relevant organizations and local governments. Such measures include the provision of thorough guidance to business operators on the matter of self-security, increased awareness of the risks of terrorism committed against passengers, calls for the early detection of suspicious incidents, and the implementation of joint drills on counter-terrorism measures.

In addition, we are striving to reinforce counter-terrorism measures in anticipation of the hosting of the Ise-Shima Summit in 2016 and the Tokyo Olympic and Paralympic Games in 2020.

### (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 our country's territorial waters and to shed light on their objectives and activities, suspicious boats needs to be stopped for boarding inspection and if crime is discovered, 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 a police organization deals with them as the primary agency in

cooperation with relevant government agencies.

The Japan Coast Guard conducts various training as well as closely works with relevant agencies, etc. 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

Examples of recent trends that we are seeing in terms of maritime crimes include cases in which domestic poaching is carried out by poachers and buyers working in tandem and cases in which funding is provided by crime syndicates. Environmental offences, such as cases in which waste products are illegally dumped into the ocean to avoid having to pay for treatment costs, continue to be perpetrated. These offenses are becoming more aggravated and increasingly sophisticated. Cases in which foreign fishing vessels are found to be illegally operating continue to arise. Some vessels operate unlawfully under cover of darkness to evade control. Such cases are also becoming more aggravated and increasingly sophisticated. International criminal organizations are also getting involved in the smuggling and the stowaway. Regarding various maritime crimes, there is still a need for vigilance and Japan Coast Guard is strengthening surveillance and law enforcement, gathering and analyzing crime information, and strengthening boarding inspections by effectively utilizing patrol vessels and aircraft as well as sharing information with relevant domestic and foreign organizations as part of the efforts to pursue effective measures and take strict yet appropriate measures against maritime crimes.

## 4 National Security and Protection of 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, 2017 in April 2015. In response to nuclear testing conducted in January 2016 and the launching of a ballistic missile referred to as a 'satellite' in February of the same year, a Cabinet decision was made based on the same Act on the nineteenth day of the same month to bar any third-country ships verified through procedures set forth under Japanese law as having made a port of call in North Korea from entering a Japanese port. 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 the measures banning exports to North Korea such as the United Nations Security Council Resolution 1874, in accordance with the Special Measures Law Regarding Cargo Inspections, etc., of Japan in Accordance with the United Nations Security Council Resolution 1874, etc., close coordination with relevant administrative agencies is promoted to ensure the effectiveness of measures stipulated by the law.

Based on the repeated occurrences of North Korean transgressions, contingency measures have been thoroughly taken to fortify response systems, including those harnessed for the collection and transmission of information. A system for monitoring and keeping track of North Korea remains in effect. Even in the wake of nuclear testing conducted on January 6, 2016 and the launching of a ballistic missile referred to as a 'satellite' on February 7 of the same year, ministerial directives called for the collection of information and the provision of necessary information to ensure the safety and security of the people.

### (2) Responding to Armed Attacks 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 and Basic Guidelines for Protection of the People that stipulates measures regarding the evacuation, rescue and minimization of losses due to armed attacks, etc., the MLIT, the Geospatial Information Authority of Japan, the Japan Meteorological Agency, and Japan Coast Guard stipulate Plan for the Protection of the People. The MLIT has stipulated that support for engaging in communications and coordinating with designated public institutions as public carriers in connection with the transporting of refugees in response to local government requests shall be provided. The Japan Coast Guard has stipulated that the implementation of measures for alarms and evacuations shall be communicated and that required measures, such as those to be taken to help guide refugees, shall be implemented.

## 5 Infectious Disease Measures

We are coping with the infectious diseases, by close cooperation with the relevant ministries and agencies, including the Ministry of Health, Labor and Welfare and the Cabinet Secretariat for the measures.

For countermeasures against pandemic influenza and new infectious diseases, in May 2012 “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 on 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 measures in conducting business, 2) Registered business operations eligible for 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 measures against breakouts of new type influenzas, etc., and designated public institutions that serve as transport operations must establish individual business plans in the event of new type influenzas, etc., emergency situations 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 of citizen’s lives and the national economy for the various outbreak stages of pandemic influenza and new infectious diseases.

In accordance with this, MLIT amended the MLIT Action Plan or Pandemic Influenza and New Infectious Diseases in June 2013 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, and 2) responses when a declaration of an emergency situation regarding Pandemic Influenza were defined. 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 segregation 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.