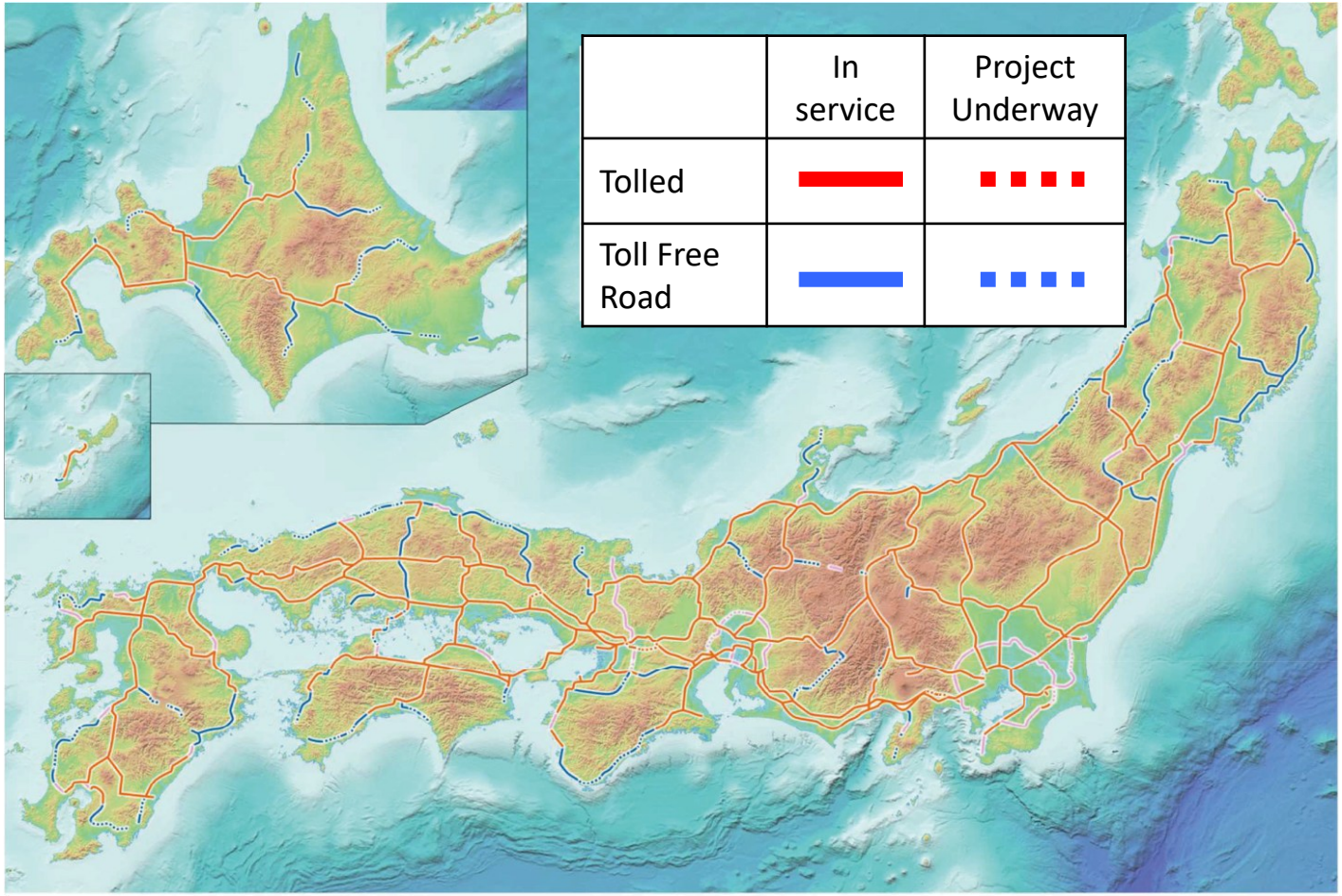
Ministry of Land, Infrastructure, Transport and Tourism

# Roads in Japan 2026

# Road Administration in Japan

# Overview of Japan's Land and Road




Land area

**378,000** km²

Total Road :

**1,230,000** km

Arterial high-standard Expressway :

**12,400** km

Mountain area

**70%**

Bridges : **730,000**

Tunnels : **12,000**

All figures are approximate.

# Types of Road

## Various types of roads in Japan (1)

In the Road Act, a "road" is defined as a thoroughfare that is open to public use and is classified into the following types

1)National Expressways 2)National Highways 3)Prefectural Roads 4)Municipal Roads

▪National Expressway

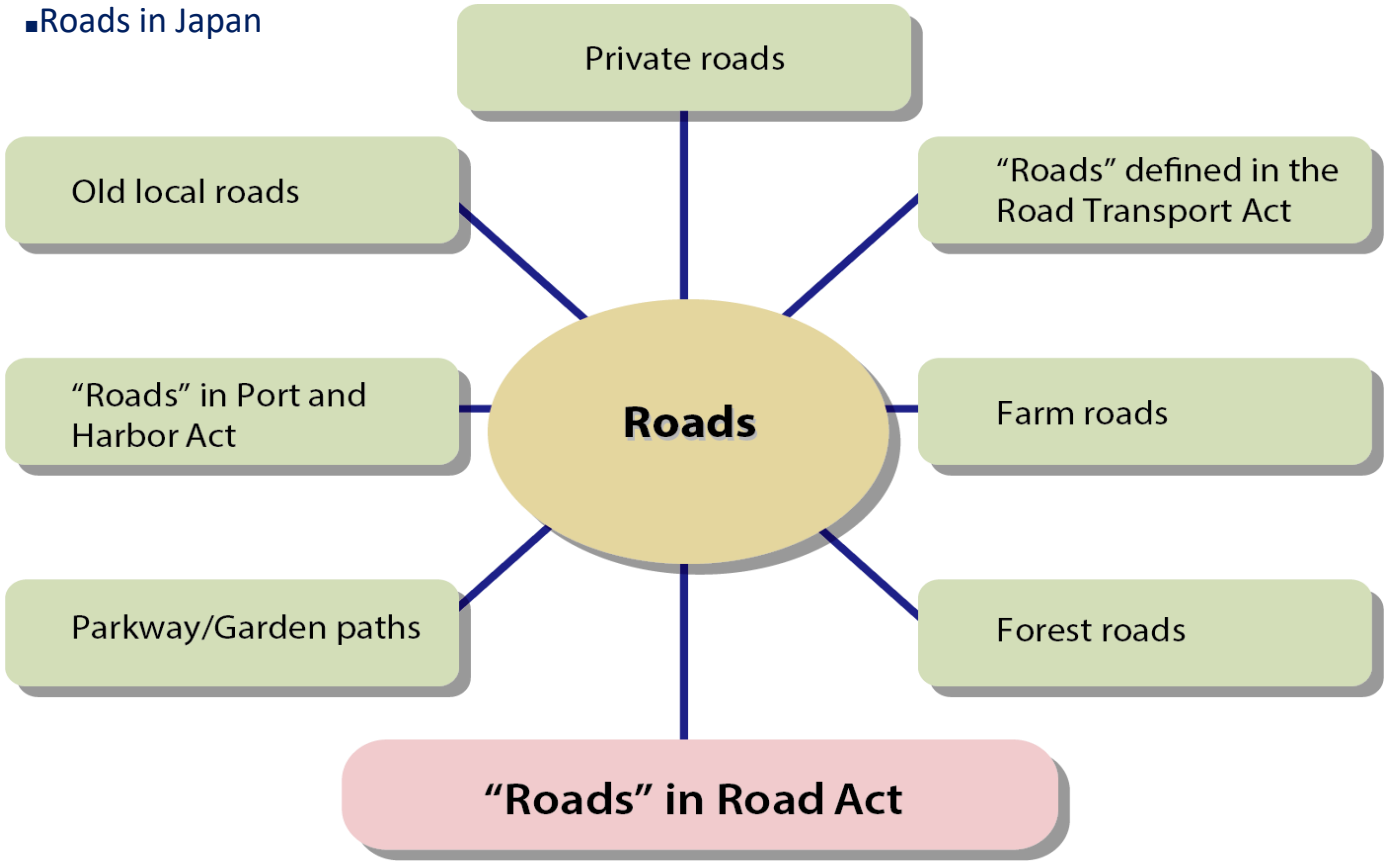
Ichinomiya Interchange On Meishin Expressway

▪National Highway

National highway Route 20

# Various types of roads in Japan (2)

■Roads in Japan




In addition to the roads defined by the Road Act, there are various roads such as private roads, farm roads and forest roads.

# Cost sharing of roads

Roads in Japan are classified into National Highways, National Expressways, Prefectural Roads and Municipal Roads depending on their road administrators. The burden sharing for development/improvement and maintenance/repair activities is different based on this classification.

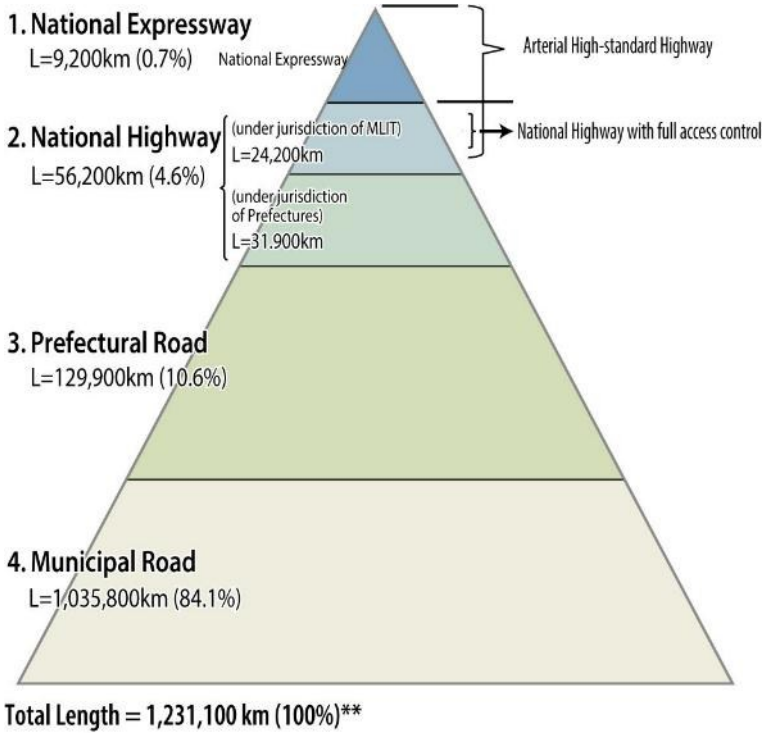
■Cost sharing in road development projects

| Road Type | | Road Administrator | Cost is carried by | Cost Sharing | |
|---|---|---|---|---|---|
| | | | | Development/improvement | Maintenance/repair |
| National Expressway | Toll | Minister*1 [Article 6 of the National Expressway Act] | Expressway Companies (NEXCOs) | Development, improvement and repair activities are carried out using a loan. The debt and management expense are repaid with toll revenue [Article 3 & 4 of the Act on Special Measures concerning Road Construction and Improvement] | |
| | Under jurisdiction of MLIT | | National Gov. Prefectures*2 | National Gov : 3/4<br>Prefectural Gov*2 : 1/4<br>[Article 20 of the National Expressway Act] | National Gov : 10/10<br>[Article 20 of the National Expressway Act] |
| National Highway | Under jurisdiction of MLIT | <Development/improvement><br>Minister*1<br>[Article 12 of the Road Act]<br><Maintenance, Repair and other management><br>Designated section :<br>Minister*1<br>Other :<br>Prefecture*2<br>[Section 13 of the Road Act] | National Gov. Prefectures*2 | National Gov : 2/3<br>Prefectural Gov*2 : 1/3<br>[Article 50 of the Road Act] | National Gov : 10/10<br>[Article 49 of the Road Act] |
| | Under jurisdiction of Pref.*2 | | National Gov. Prefectures*2 | National Gov : 1/2<br>Prefectural Gov*2 : 1/2<br>[Article 50 of the Road Act] | Maintenance*3<br>: Prefectural Gov*2<br>[Article 49 of the Road Act]<br>Repair : Can be subsidized up to 1/2 by National Gov<br>[Article 56 of the Road Act] |
| Prefectural Road | | Prefecture*2<br>[Article 12 and 13 of the Road Act] | Prefectures*2 | Can be subsidized up to 1/2 by National Gov<br>[Article 56 of the Road Act] | Maintenance*3<br>: Prefectural Gov*2<br>[Article 49 of the Road Act]<br>Repair : Can be subsidized 1/2 by National Gov<br>[Article 1 of the Road Repair Act] |
| Municipal Road | | Municipality<br>[Article 16 of the Road Act] | Municipalities | Can be subsidized up to 1/2 by National Gov<br>[Article 56 of the Road Act] | Maintenance*3 : Municipalities<br>[Article 49 of the Road Act]<br>Repair : Can be subsidized 1/2 by National Gov<br>[Article 1 of the Road Repair Act] |

# Lengths and travels by road type

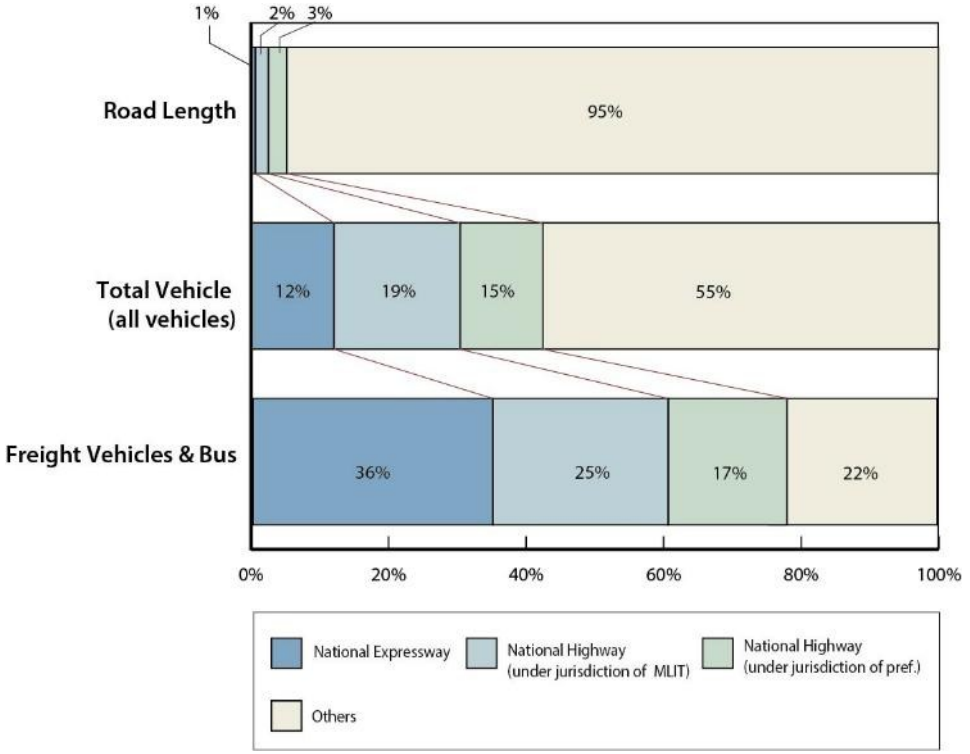
Expressways account for only 0.7% of the total road length, while they account for 12% of the total vehicle kilometers traveled (VKT) and play a significant role in road traffic.

■Road classification and percentage of road length




(As of April 1, 2022)

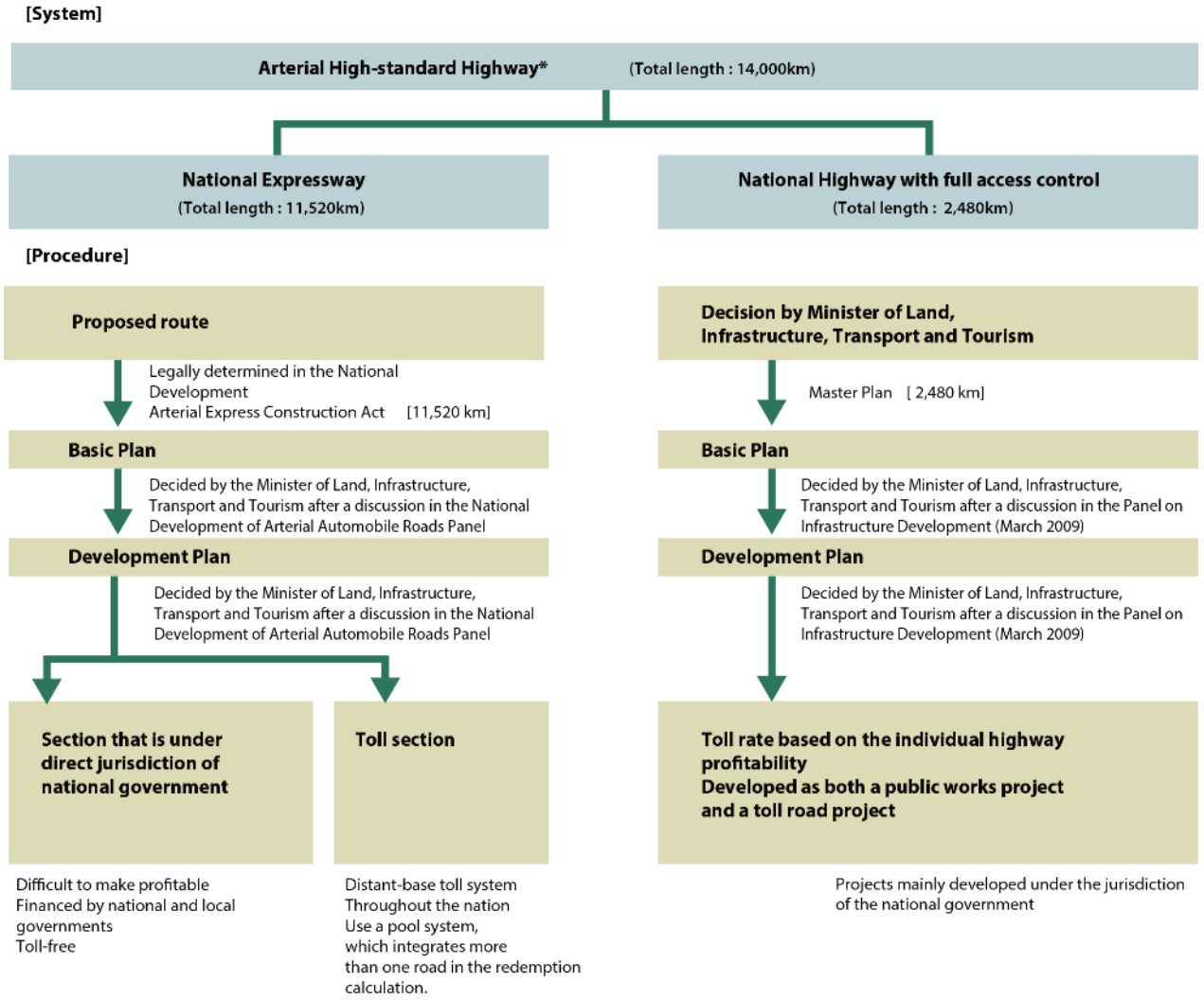
■Share of length and VKT by road type




(As of FY2021)

# Classification of arterial high-standard highway system

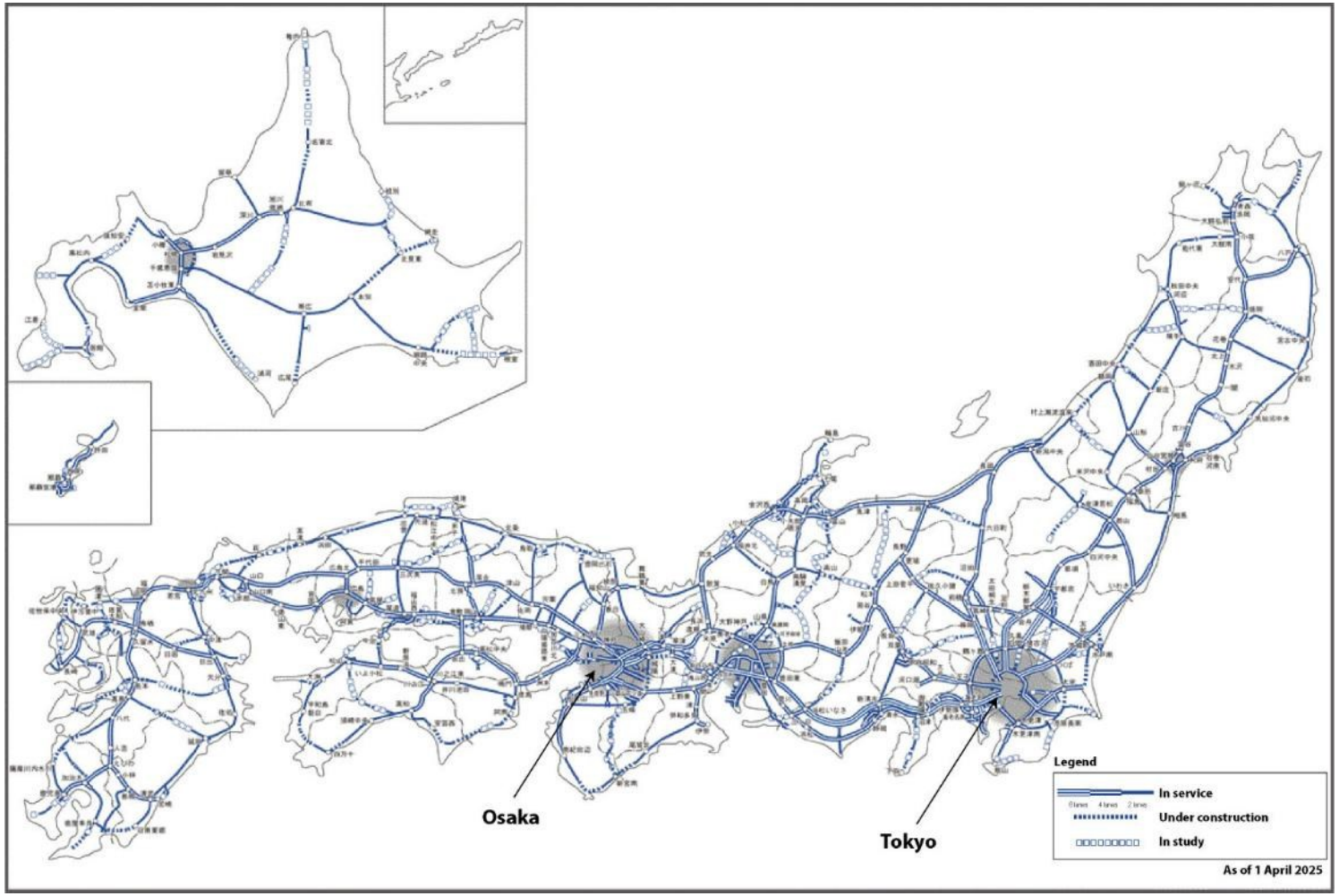
Arterial high-standard highways were created as a part of the rapid surface transportation network across the country. The total planned length is 14,000km



# Arterial high-standard highway network

Arterial high-standard highways, which consist mainly of expressways, have been developed throughout the country.

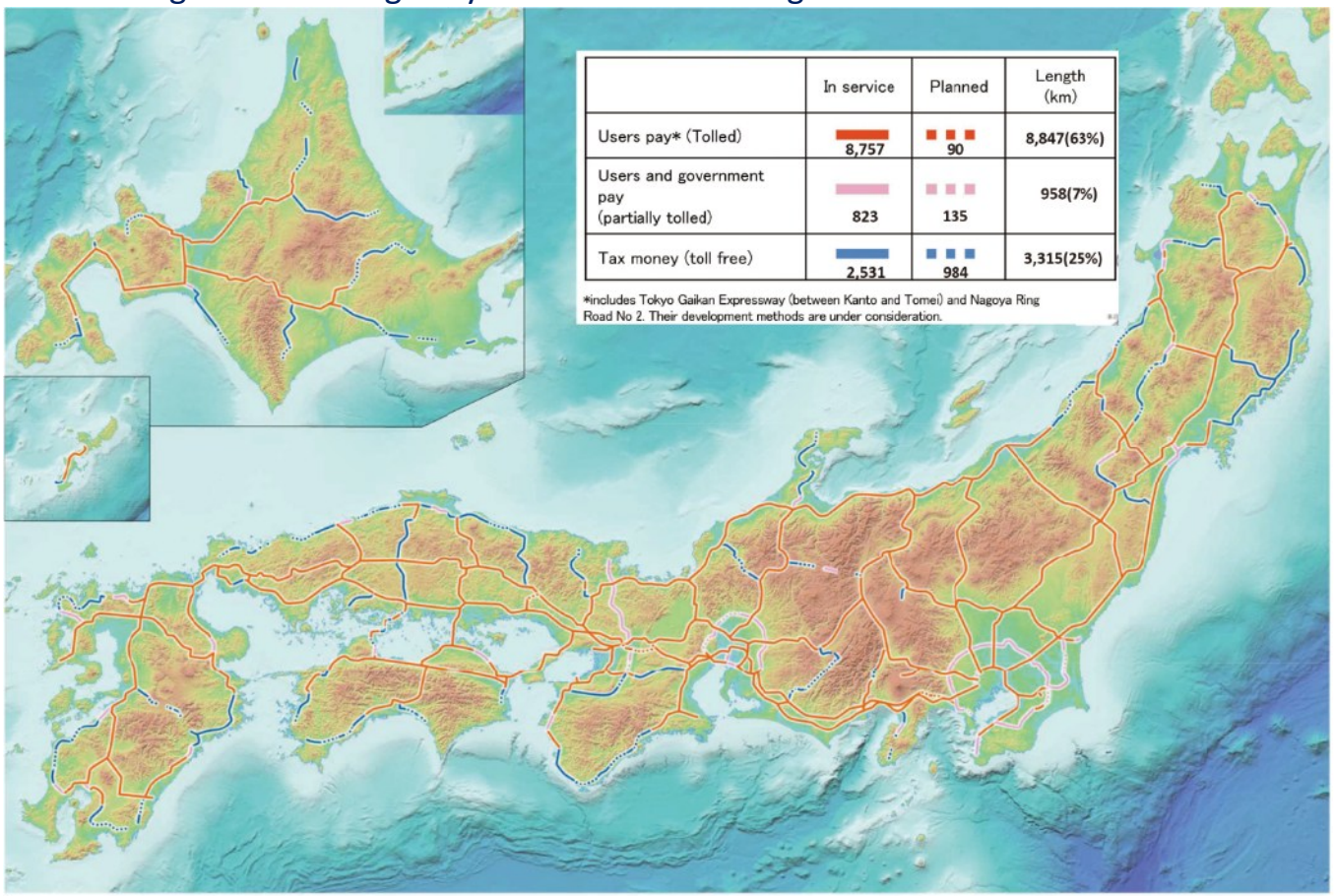
■Arterial high-standard highway network



# Cost sharing of arterial high-standard highways

As of May 2021,12,000 km of arterial high-standard highways are in service. There are two types of highways in Japan: one is tolled highways and the other free highways. Red lines indicate tolled highways, while blue and pink ones indicate partly or fully financed by tax money because of insufficient profitability.

■Arterial high-standard highway network cost-sharing



# Toll road system in Japan

Rapid motorization accompanied by economic growth demanded networks of expressways and the government didn't have sufficient tax revenue to finance expressway development. That's why "Toll road system" was introduced. This system enables to repay the maintenance costs and construction debts of particular roads with the toll revenues that are collected from the road users.

## ■Introduction to the toll road system in Japan

**In response to the rapidly increasing traffic demand after World War II, immediate road development was necessary. However, additional financial resources were required , so a toll road system was developed.**

**A Toll Road System**

In 1952, **the Act on Special Measures concerning Road Construction and Improvement was enacted.**
→The toll road system was introduced on public roads across the country.
(Project proponent: National, prefectural or municipal governments act as a road administrator.)

In order to expand the current toll road system, as part of the measure to immediately develop roads across the country, an organization needs to be established so that private funds will be widely introduced and comprehensive, efficient operations will be carried out. As such, in 1955 the Road Council recommended the creation of the Japan Highway Public Corporation (JHPC, provisional name).

In 1956, **a full-fledged revision of the Act on Special Measures concerning Road Construction and Improvement Act on Japan Highway Public Corporation was enacted.**
In 1959, the Act on the Metropolitan Expressway Public Corporation was enacted.
In 1962, the Act on the Hanshin Expressway Public Corporation was enacted.
In 1970, the Act on the Honsyu-Shikoku Bridge Authority was enacted.

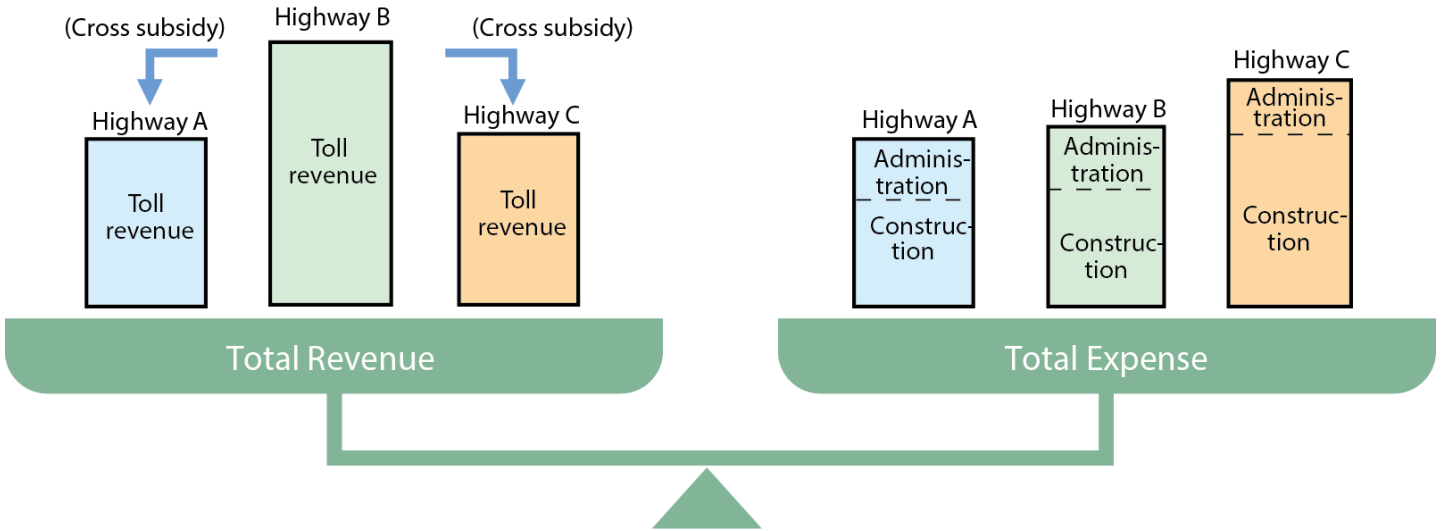
# Pool system

After the partial opening of the Meishin Expressway in 1963, a 3,400km plan, based on individual profitability, was developed and formulated by March 1972. By that time, 8 expressways, about 710km had been developed, including the Tomei Expressway and Chuou Expressway.

## 1972 Road Council Recommendation

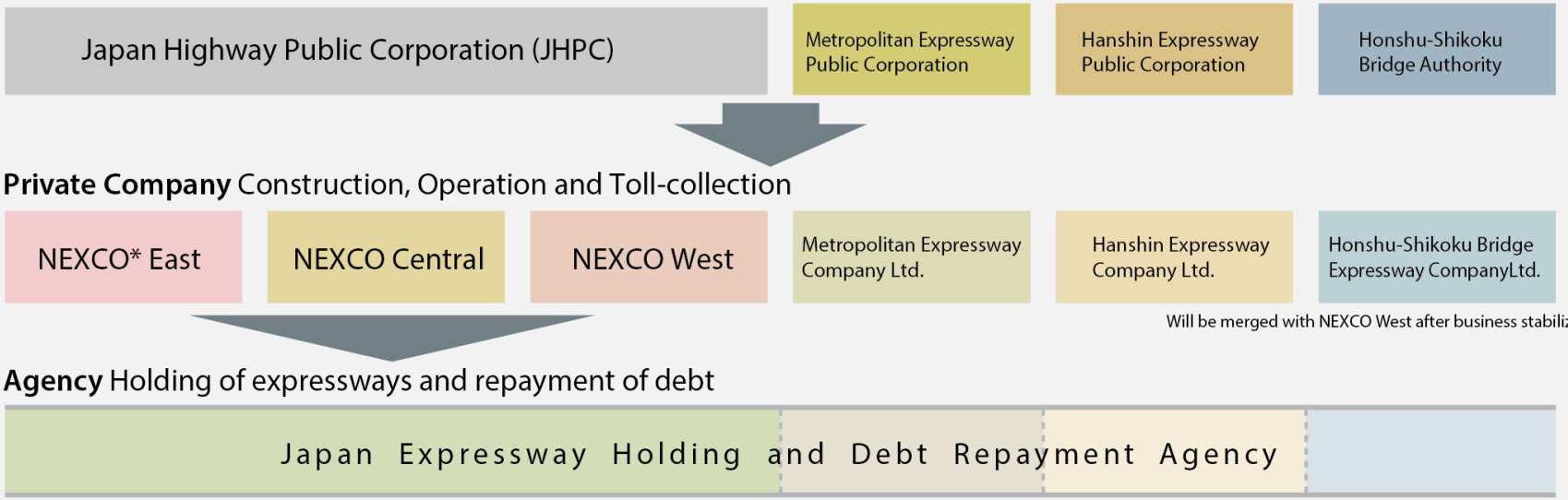
1)Expressways should create an arterial network, wherein they connect to each other throughout the country. Each link is not necessarily considered independent and, therefore, the toll rates should remain consistent and integrated.

2)Under circumstances where development costs are affected largely by changing land costs and construction costs that depend on the length of time needed for construction, cost differentiation due to the start time of projects should be avoided. In addition, debt repayment should be smoothly carried out. Shifting from the individual pro tability system to a pool system seems to be the most effective method to combat the aforementioned problems and ensure reliability.



# Privatization of highway public corporation

■ Organizational chart after

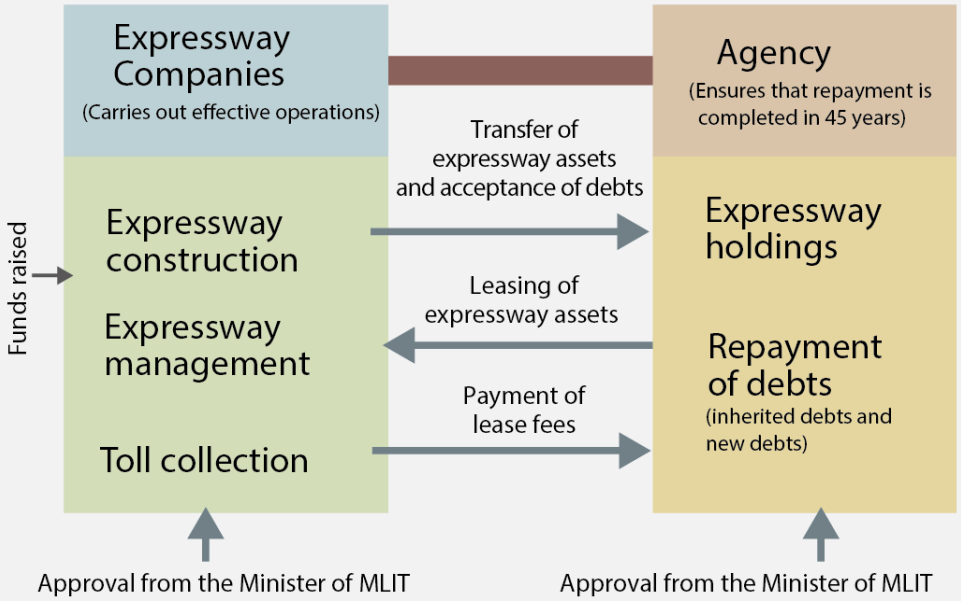


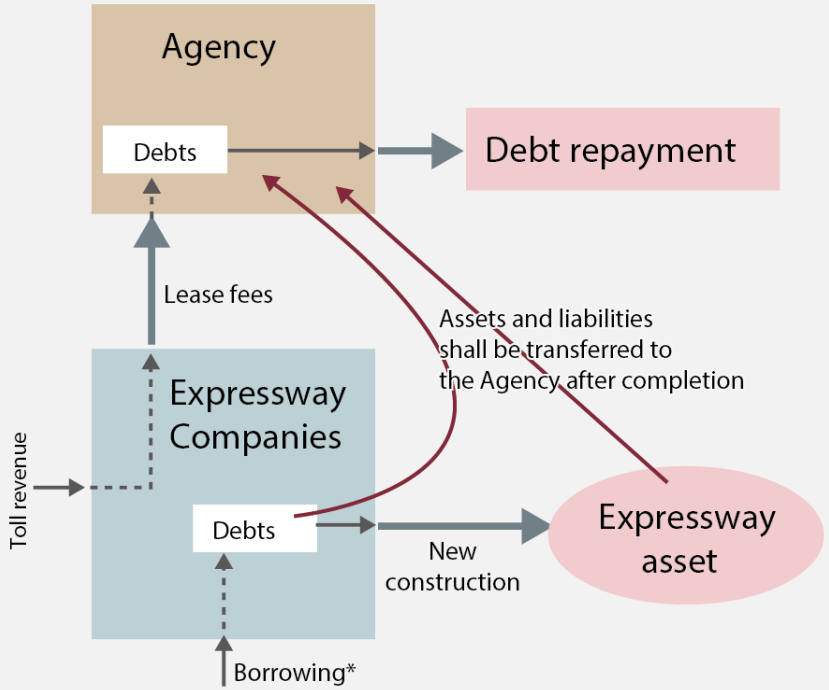

**Privatization was based on the following acts**

-Expressway Company Law
-Japan Expressway Holding and Debt Repayment Agency Law
-Law Regarding the Development of Highway-Related Laws in Connection with the Privatization of the Japan Highway Public Corporation
-Act for Enforcement of Acts Related to Privatization of the Japan Highway Public Corporation, etc.

*NEXCO: Nippon Expressway Company

# Business scheme



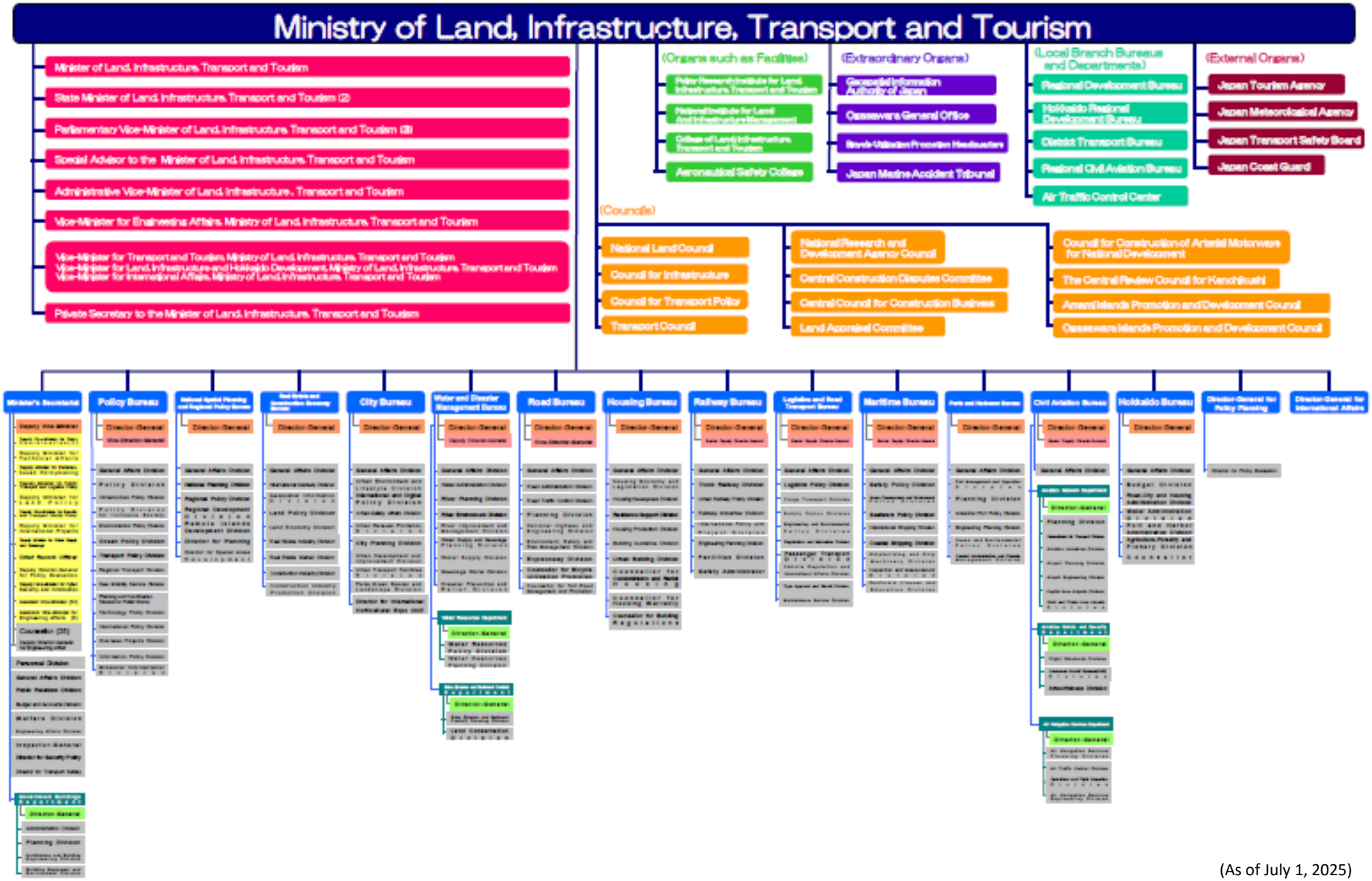




Responsibilities of the Agency

-The holding and leasing of expressway assets
(property tax is exempted based on the premise of free service in the future)
-To ensure early repayment of the debts and thus reduce the public's burden
-To support expressway companies in carrying out their business successfully

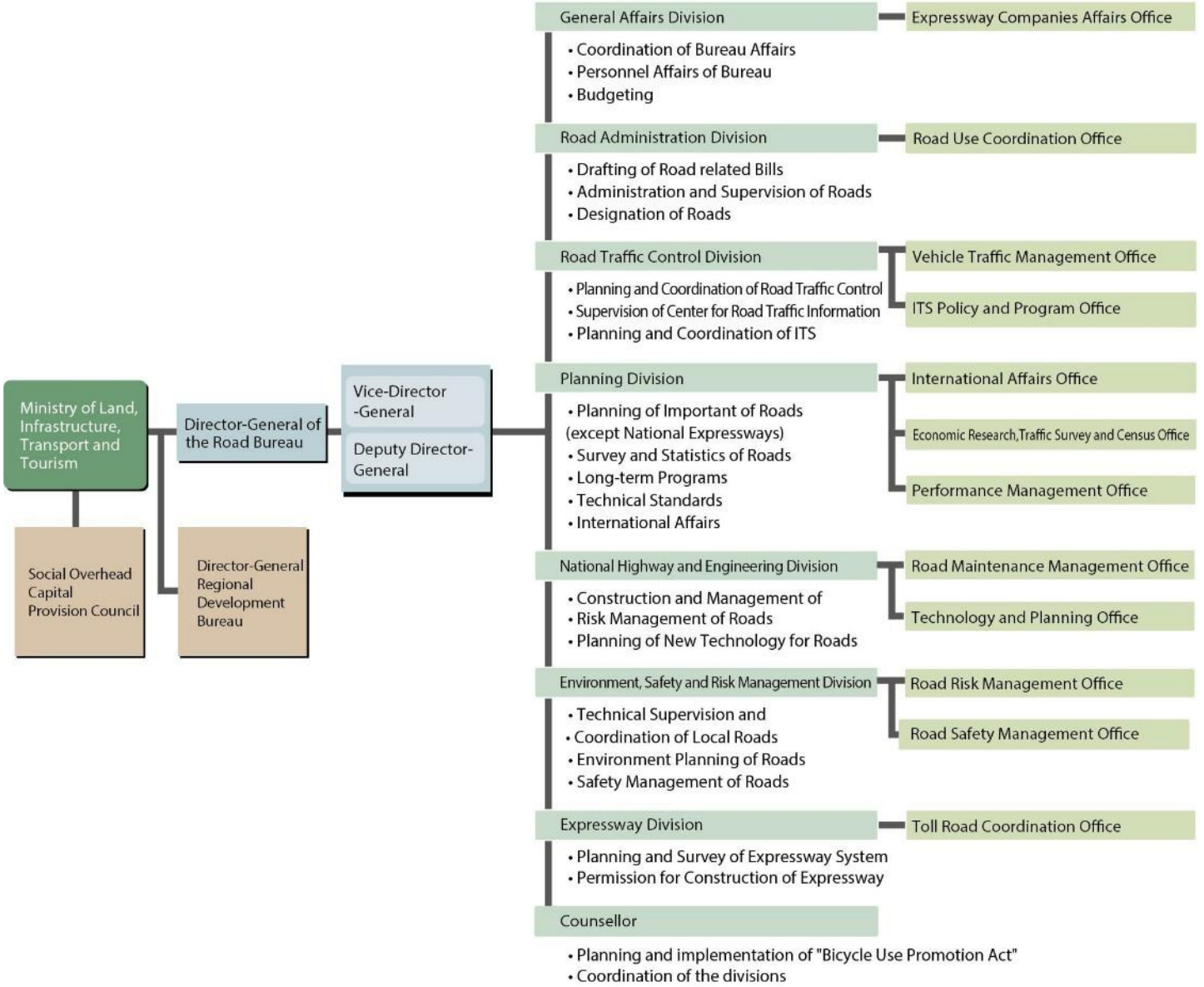
*borrowed from both national and local governments for construction (and this money is loaned to the companies at no interest)

# Administrative Organization



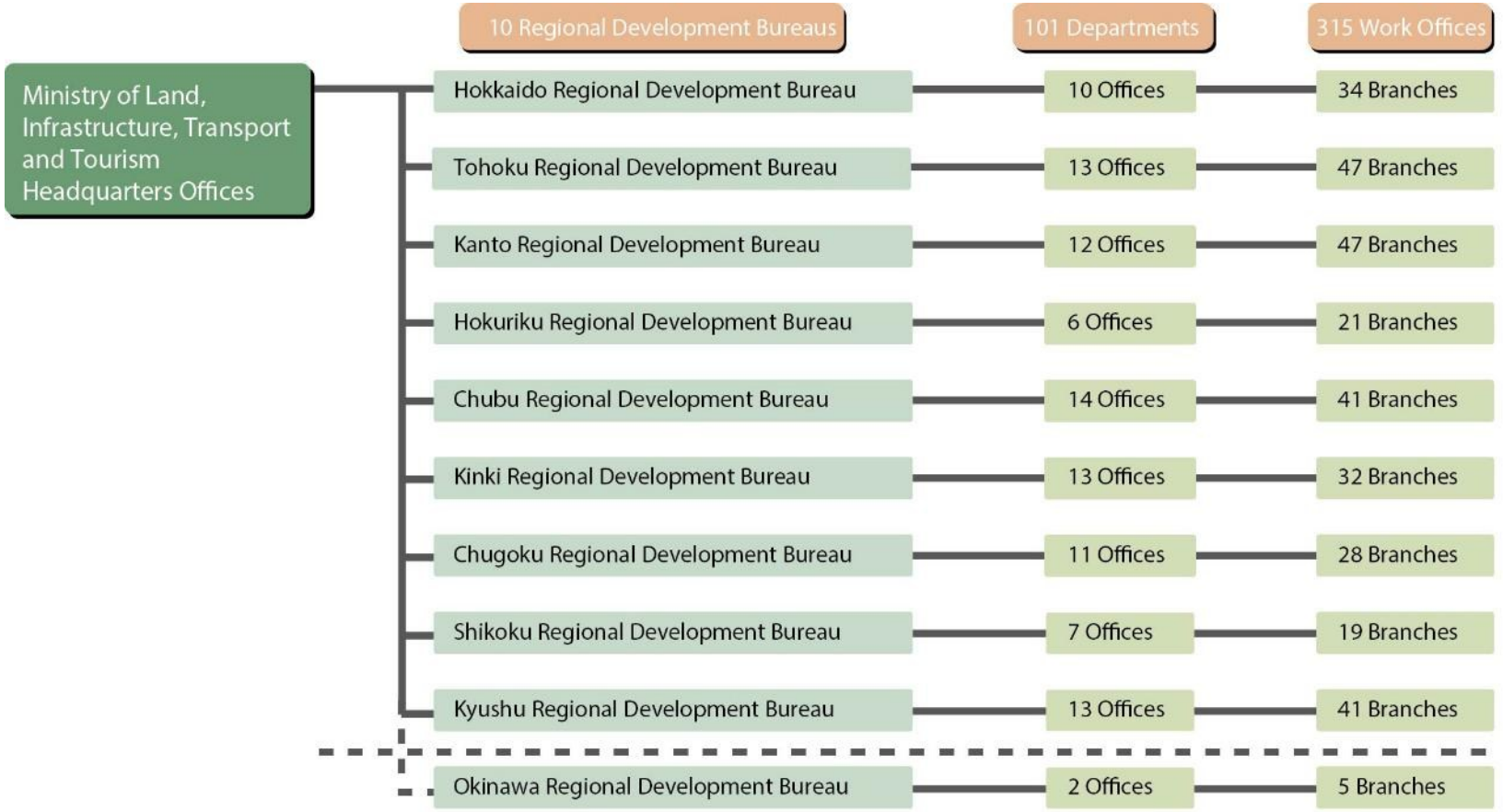

(As of July 1, 2025)

# Organization Chart of Road Bureau



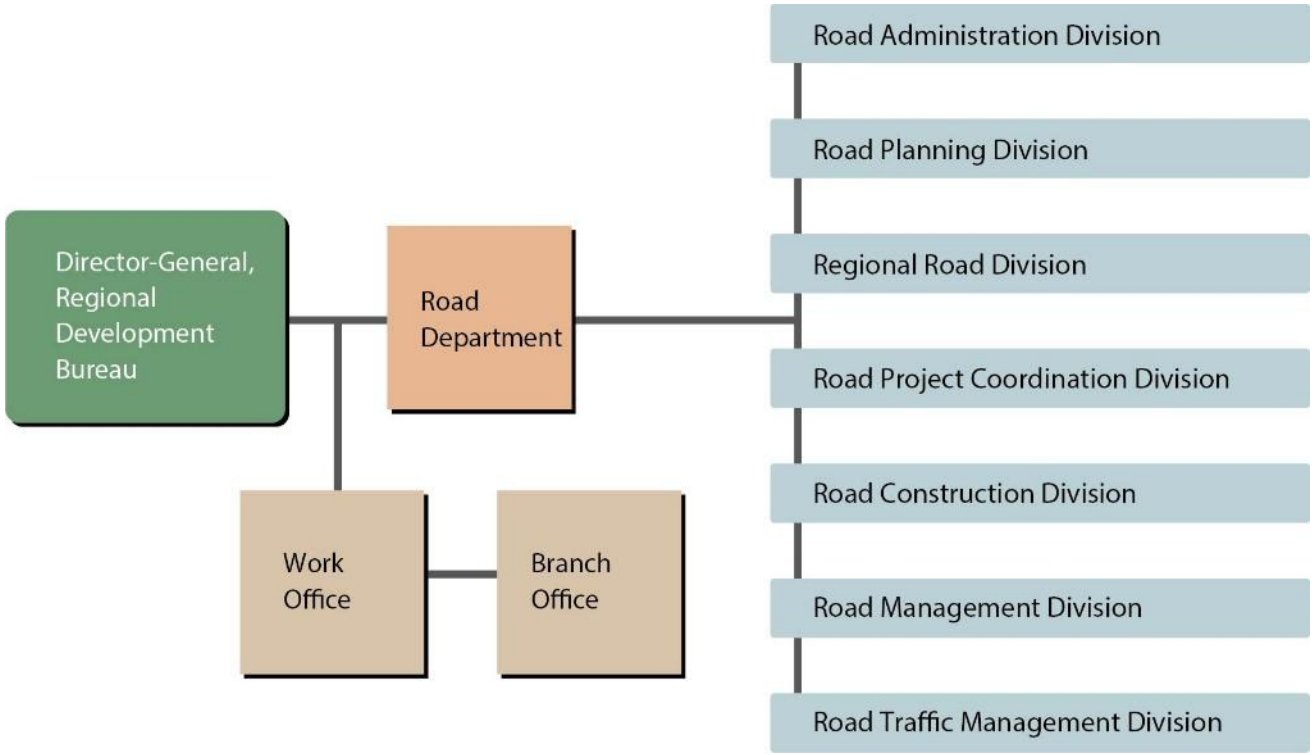

As of April 1, 2018

# Regional Development Bureaus




As of April 1,2021

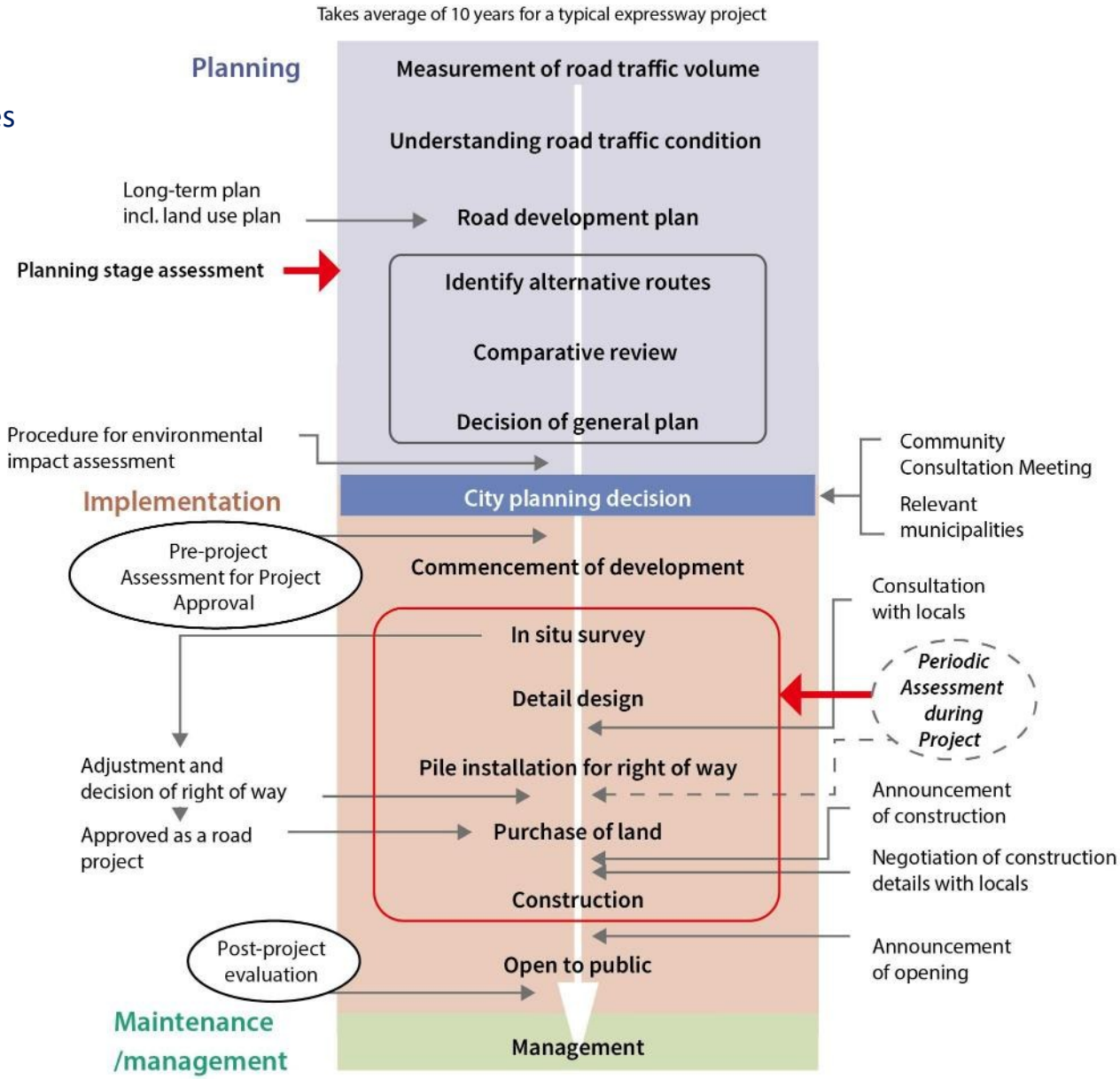
# Organization Chart of a Regional Development Bureau



# Planning and Implementation of Projects

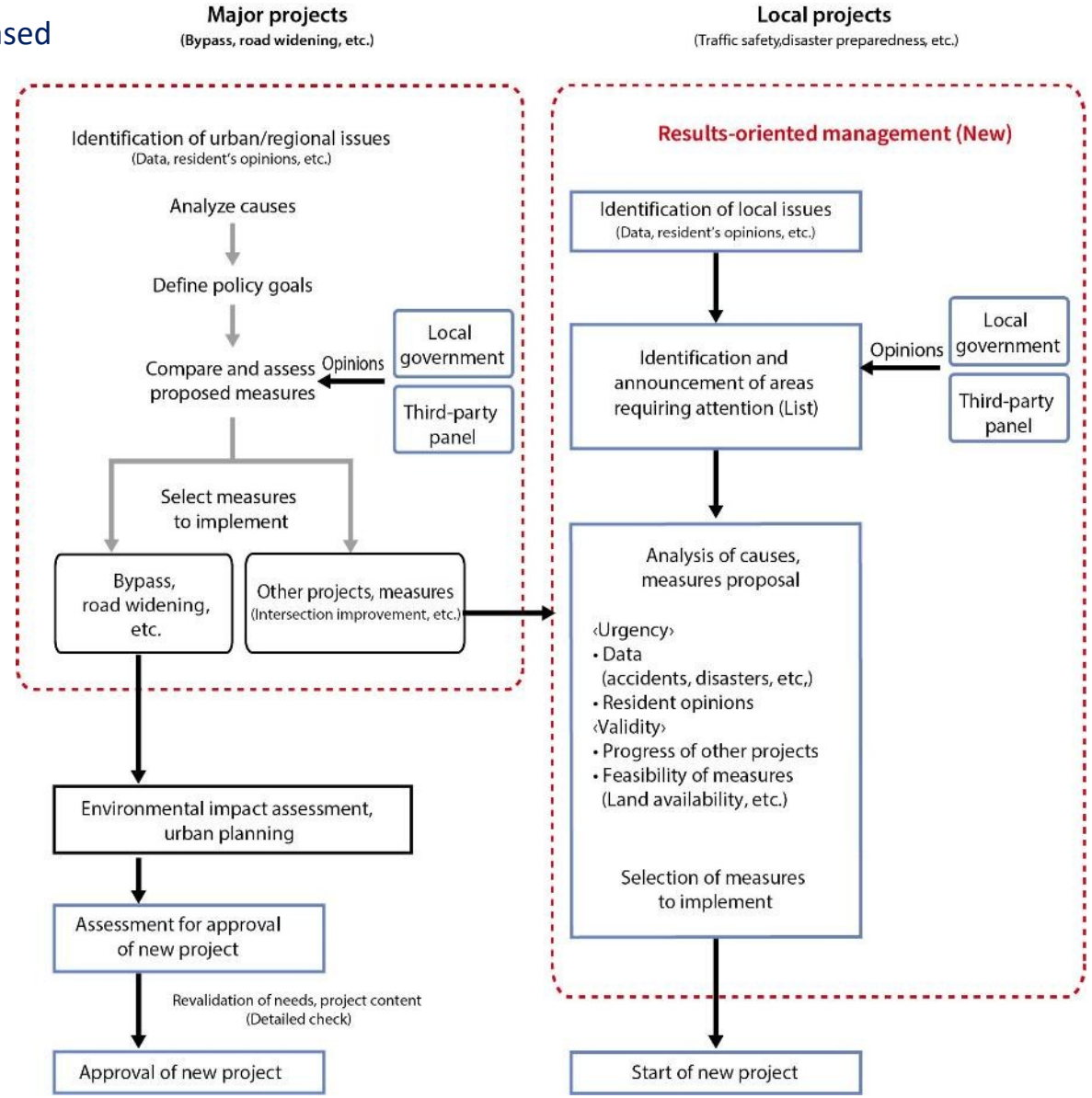
## Implementation of an evaluation system

- Road development project procedures



# Assessment of policy goals for road projects

▪Planning review and outcome-based management flowchart



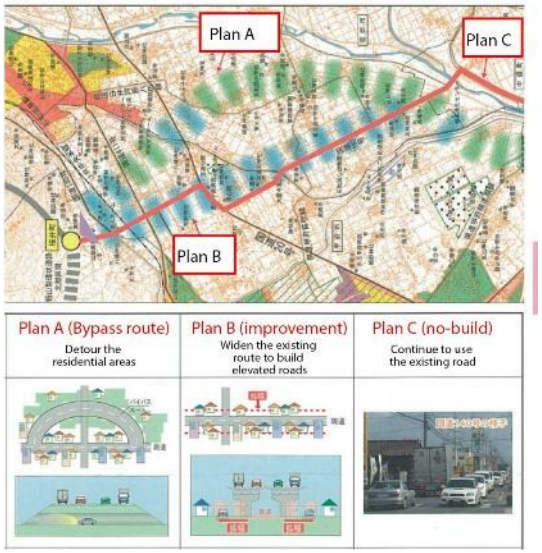
# Road development planning

Roads in Japan are generally developed through the following procedure to make sure to choose the optimal route.

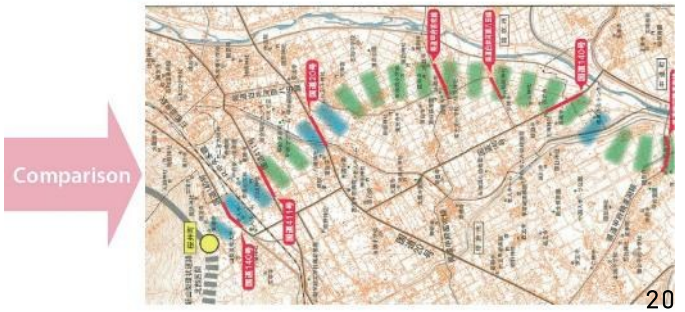
■Road development planning

| | | |
|---|---|---|
| | Measurement of road traffic volume | Covers vehicles, bicycles and pedestrians for the purposes of;<br>(1) Traffic volume (2) Origin and destination<br>(3) Condition of road development |
| | Assessment of road and traffic condition | Assess the current condition such as traffic volume and traffic safety of the existing roads. |
| | Road development plan | Determine the road type and plan the fundamental design (number of lanes and cross-section) |
| (1) | Identify alternative routes | Identify multiple routes for comparison in the light of the plan. |
| (1) | Comparative review | Make a comparison with other routes with respect to nature, structure, care for control-points* and economy before deciding the optimal route. |
| (2) | Decision of general plan | |

(1)




(2)



# Road development process

After a city planning decision was made, roads are developed taking the following steps while making sure to build the consensus of the local residents.

## ▪Implementation of road projects

City planning decision

Commencement of development

Community Consultation Meeting — Explain measurement to the parties involved

(1)

- In situ survey — Install piles for center mark during the land survey
- Detail design — Designed based on the survey data (S=1/1,000)

Consultation with locals — Explanation of details to the parties involved using the design together with indemnity for land loss.

(2)

- Pile installation for right of way — Install piles to mark right of way
- Measurement of lands — Measurement of properties, both lands and buildings (owners are asked to be present to confirm measurements)
- Land acquisition negotiation — Negotiation with the parties involved on the indemnity for land loss
- Payment of indemnity for land loss following conclusion of agreement

Explanation of construction plan — Explanation of the construction methods and construction safety to the parties involved

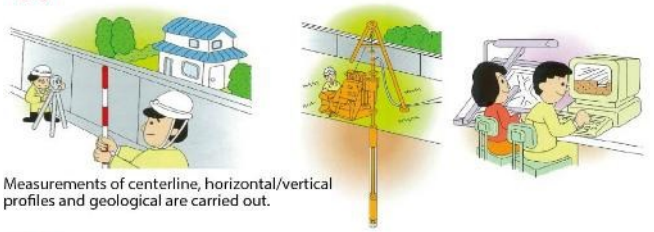
* Further survey of buried cultural properties is to be conducted as necessary

Construction

Completion/open to public

Maintenance/ management

(1)



Measurements of centerline, horizontal/vertical profiles and geological are carried out.

(2)

Land measurement/survey is carried out after explanation to the owners.

Negotiation of compensation is conducted.

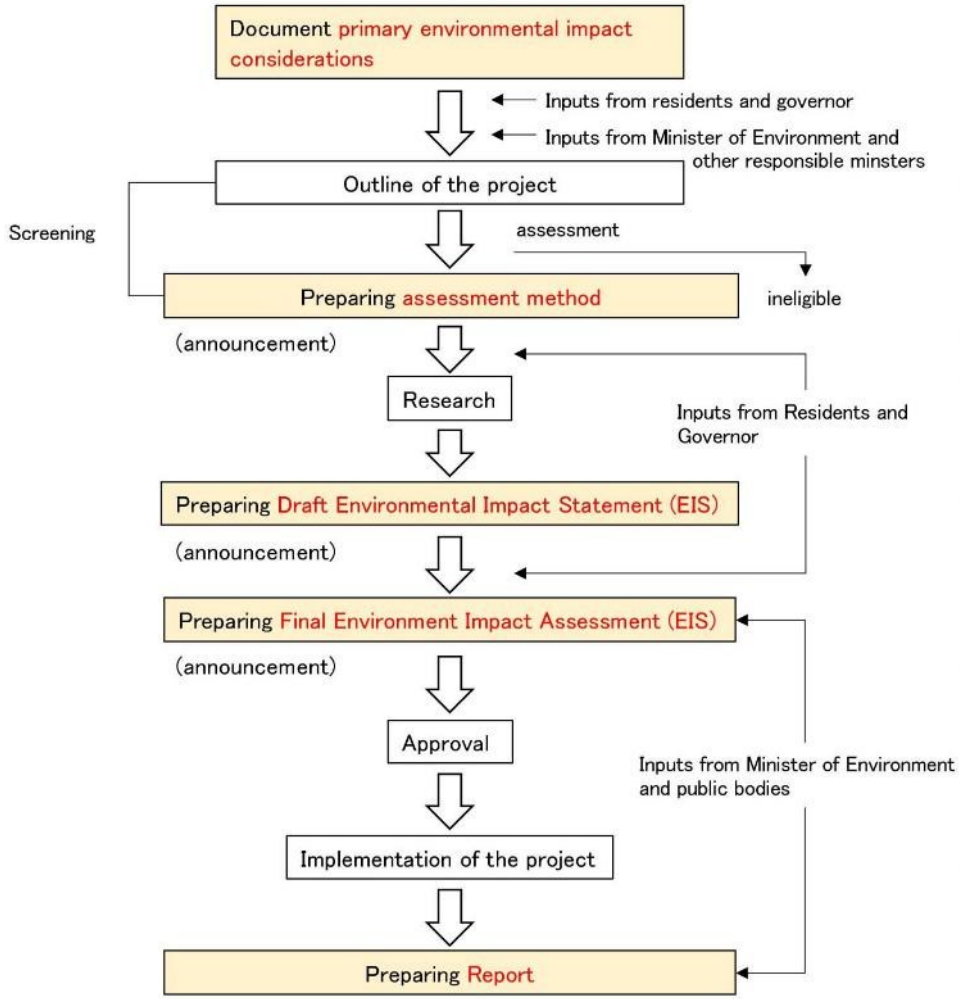
# Environmental impact assessment (EIA)

An assessment system in which a project proponent identifies/predicts/evaluates the potential impacts of the project on the environment prior to the decision being made on the details. In order to create an improved project, this collected information is available to the public and municipalities so that they can add their input.

■Road projects that have to be assessed

| | Class 1 | Class 2 |
|---|---|---|
| National Expressway | All | ——— |
| Tokyo Metropolitan Expressway | 4 lanes or more | ——— |
| National Highway | 4 lanes or more,10km or longer | 7.5km-10km |

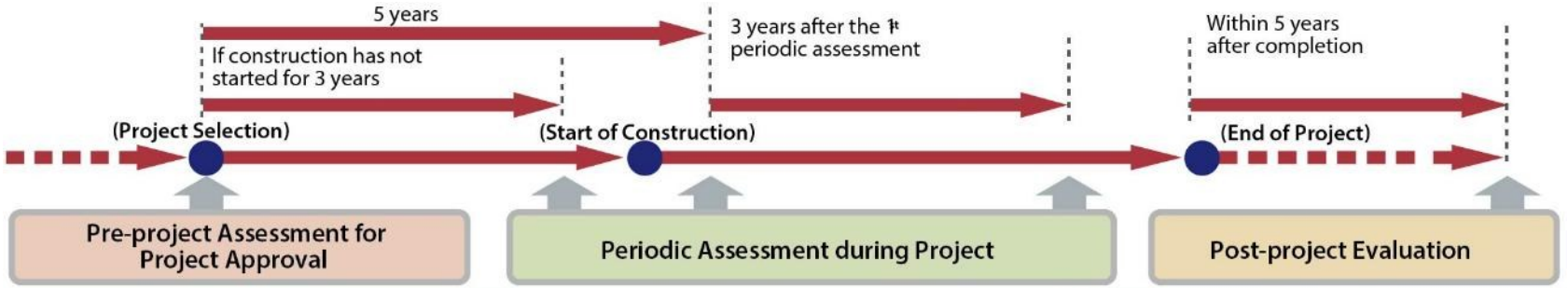
■Road projects that need to be assessed



# Road project assessment

Road project assessment is carried out at various phases of the project; assessment at planning phase, pre-project assessment phase, during project and post-project phase.

■ Road project assessment




**1) Pre-project assessment for project approval**

Project assessment including a cost-benefit analysis is conducted when approving a new project. **This procedure was introduced in FY 1998.**

Total : 1,067projects
(FY2020 : 45projects)

**2) Periodic assessment during project**

When a project has not started for 3 years after approval or when a project is still in progress for 5 years, another assessment will be conducted and any necessary improvements will be made. If the continuation of the project is found to be inappropriate, it will be abandoned. **This procedure was introduced in FY 1998.**

Total : 5,615projects
(FY2020 : 187projects)

**3) Post-project evaluation**

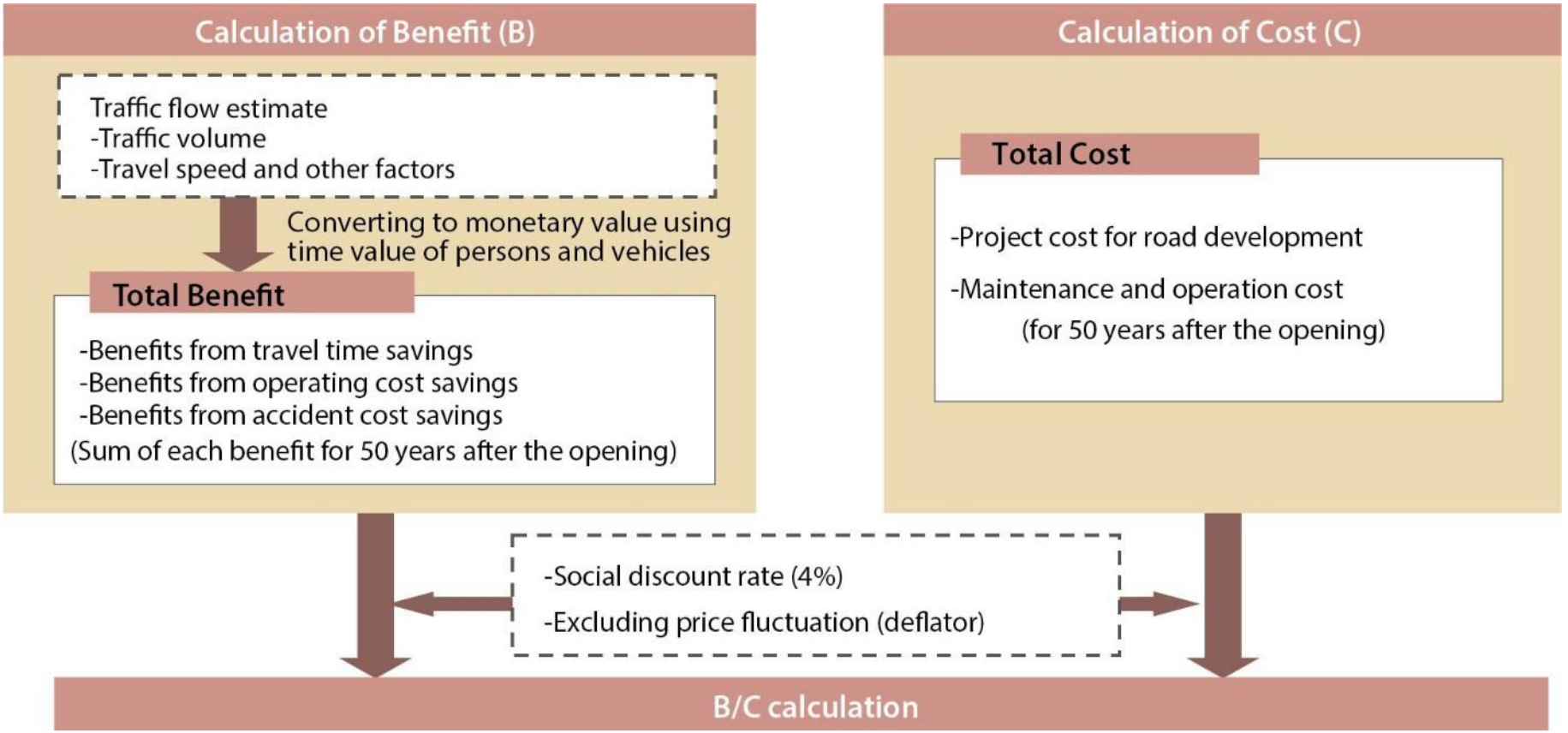
Post-Project evaluation is carried out in order to confirm its effectiveness and environmental impacts. As necessary, improvements and appropriate planning and researching for similar projects are examined. **This procedure was introduced in FY 2003.**

Total : 596projects
(FY2020 : 33projects)

# Cost-benefit analysis of a road project

Cost-benefit (B/C ratio) analysis for road project is made to assess adequacy of the project from the social and economic aspects.

■ Cost-benefit (B/C Ratio) calculation

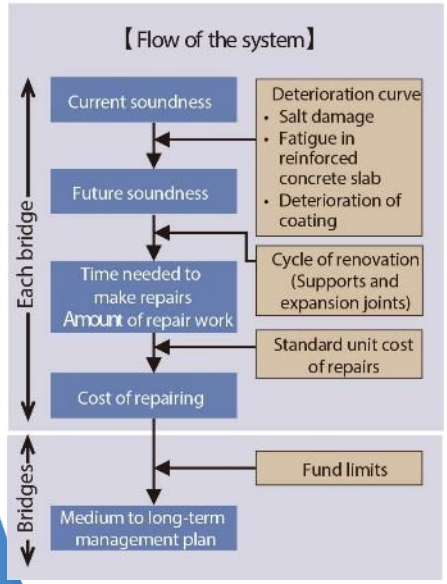


# Asset Management

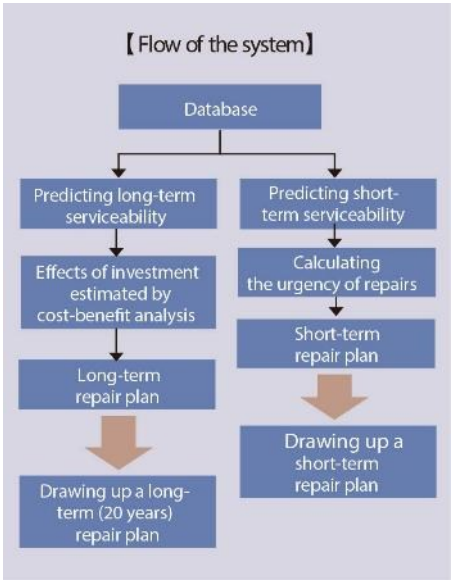
## Development of road asset management

The Bridge Management System (BMS) and the Pavement Management System (PMS) are being developed to predict future deterioration of structures and to ultimately extend their lifetime by extending the time until renovations are needed and reducing the total costs of maintenance and renovation.

### ▪Overview of a Bridge Management System




### ▪Overview of Pavement Management System




### ▪Percentage of bridges olderthan 50 years

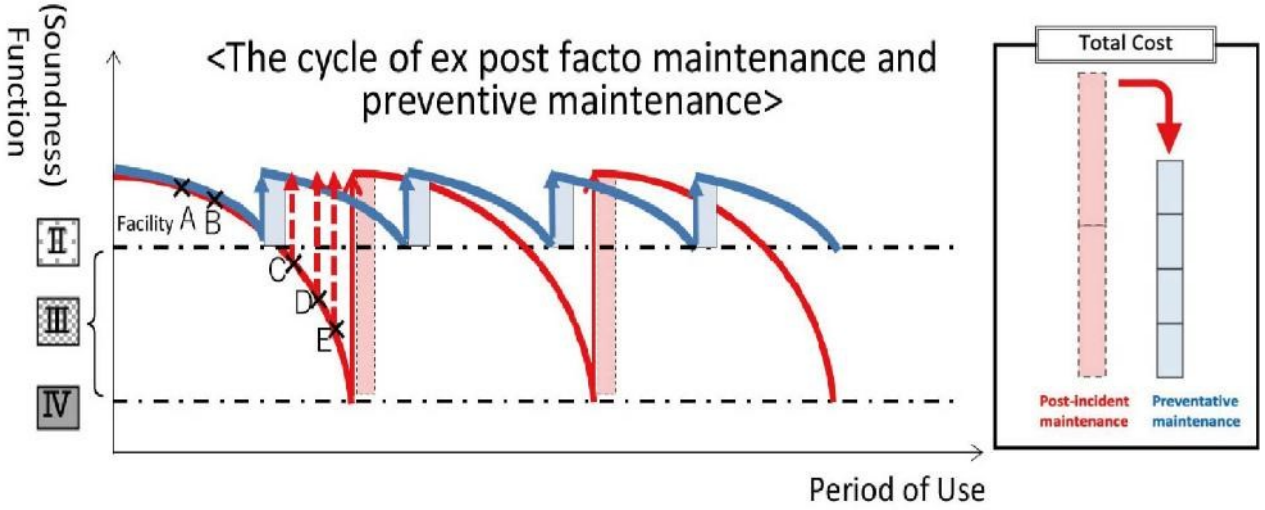
Judgment category IV (urgent measures should be taken)

The percentage of infrastructure facilities that are more than 50 years old is increasing at an accelerating rate.


(As of March 31, 2025)

# Efficient management of road assets

- Medium- to long-term cost reduction through preventive maintenance




Deterioration due to salt damage

Bridge inspection example

Collapsed slab due to fatigue

Deterioration due to an alkali aggregate reaction

# History of maintenance activities for aging road

■History of the road asset management

**2003:** Recommendations for management and renewal of road structures
"Early preventive maintenance can reduce total cost"

**2004:** Notice of National Guideline for Periodic Bridge Inspection (for national road bridges)
Prescribes specific inspection procedures

**2013:** Called "The First Year of Infrastructure Maintenance Era"

**2013:** Amendment of the Road Act Inspection standards were legislated with clear perspectives of preventive maintenance

**2007:** Break of diagonal truss of Kisogawa Ohashi Bridge over National Highway Not 23

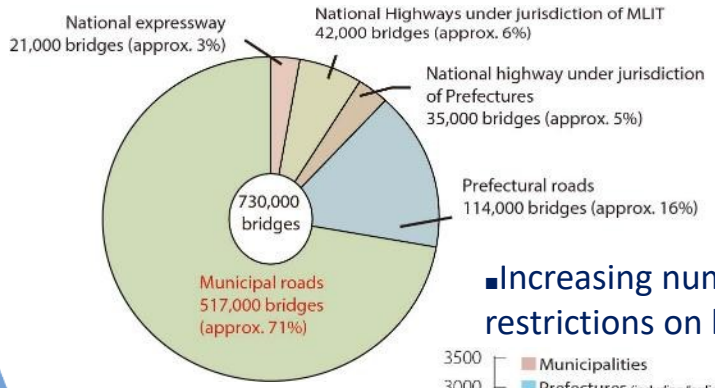
Note: embeddedpart of diagonal truss in concrete

**December 2, 2012:**
Sasago Tunnel Ceiling Collapse

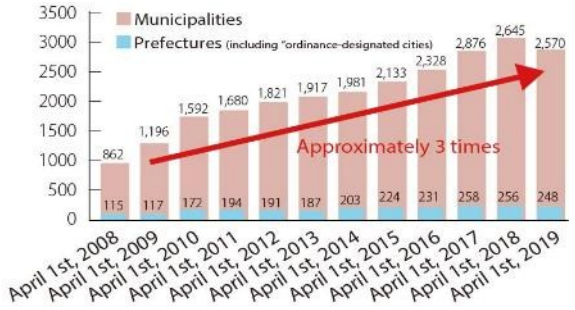
**December 7, 2012:**
Order of urgent inspection of road tunnel facilities
Jet fans, lighting and other

# Current maintenance activities for aging roads activities

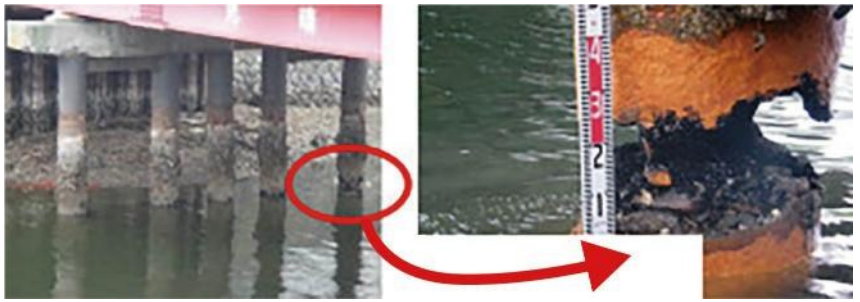
■Number of bridges by road type




■Increasing number of traffic restrictions on local roads



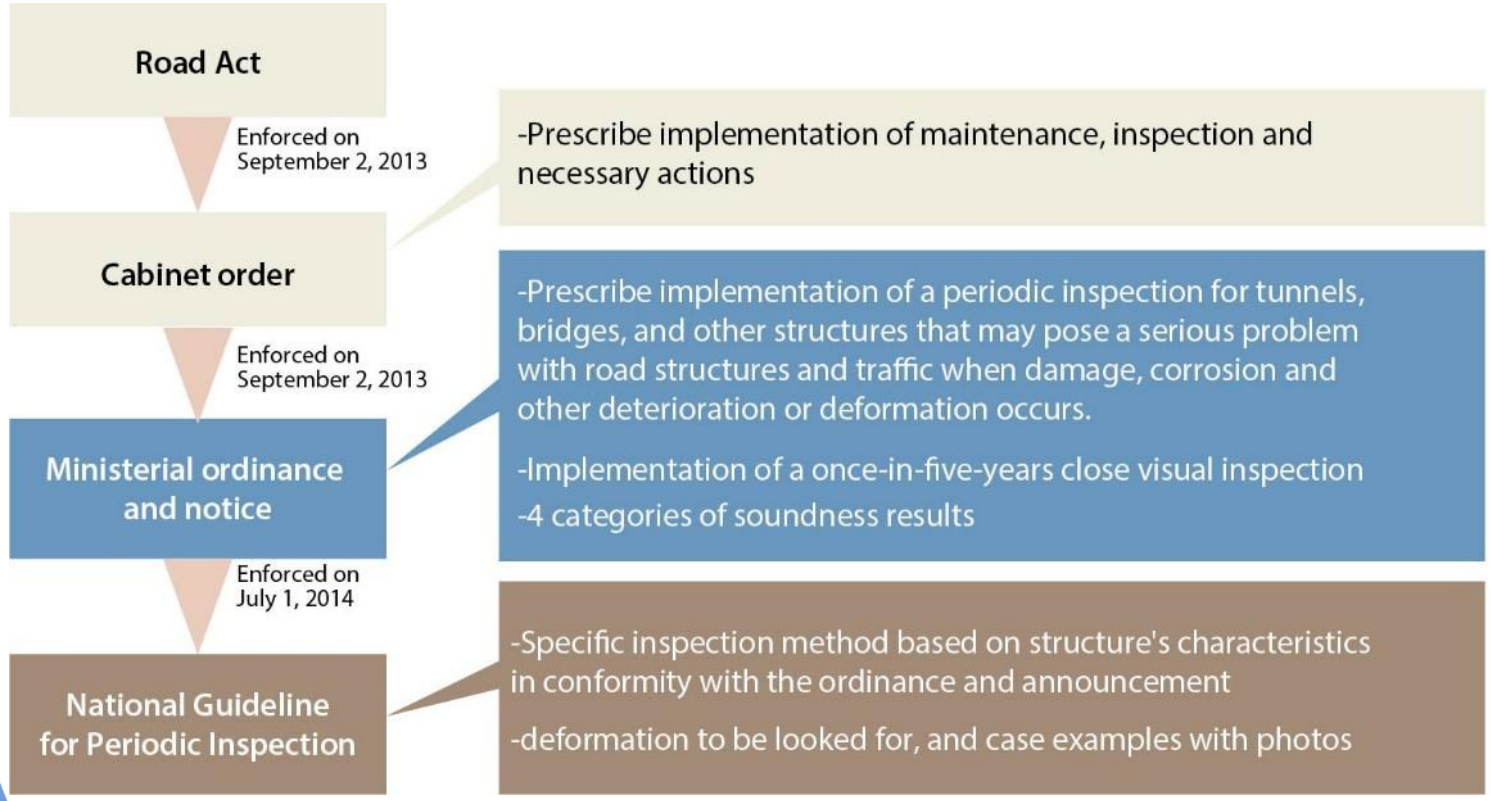

■Serious damages on a bridge



37-year old Miharashi Bridge (on Shinyamashita 8th municipal road) was found damaged.

# Standards for statutory inspection

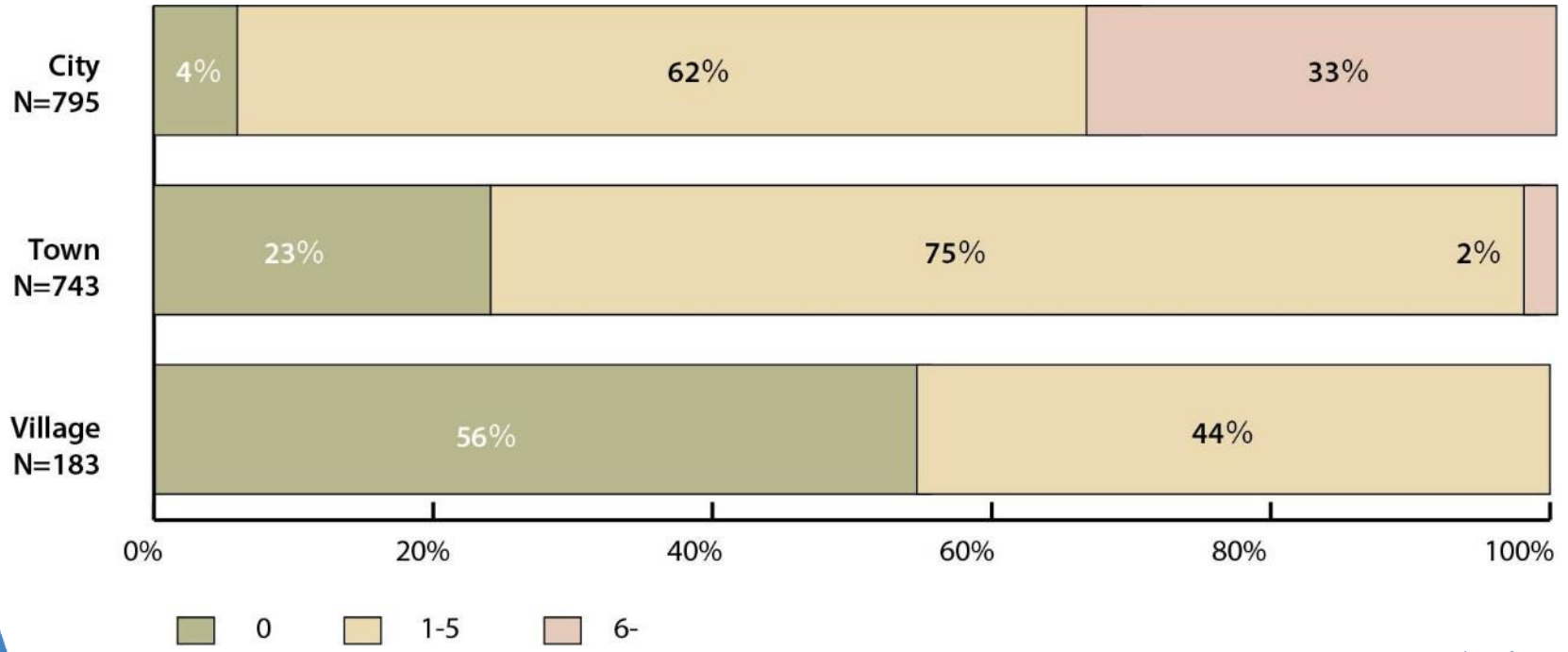
■Legal system of the inspections



# Maintenance by Municipalities (Technician and Inspection Method)

23% of towns and 56% of villages in the country have no civil engineering technicians for bridge maintenance in their workforce.

▪Number of bridge maintenance engineers in the workforce by types of municipal governments




(As of May 2024)

# Road Maintenance Panel

▪Composition of the Panel

**Institutional framework**

-Regional Development Bureau (under MLIT)

-Municipalities (prefectures, cities, towns and villages)

-Expressway Companies (NEXCOs, Tokyo Metropolitan Expressway, Hanshin Expressway, Honshu-Shikoku Bridge Road, designated urban expressways)

-Road Public Corporation

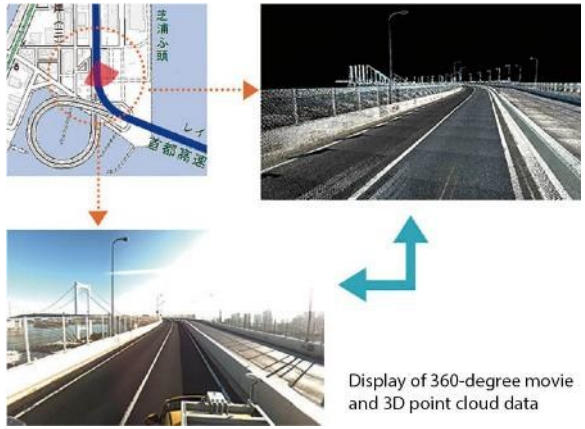
**Roles**

1. Facilitate training and presentation meetings for standards.
2. Facilitate training and presentation meetings for standards.
3. Organization, evaluation and publication of current inspection and repair work.
4. Assistance for area-wide lump sum ordering of inspection work
5. Technical assistance and other

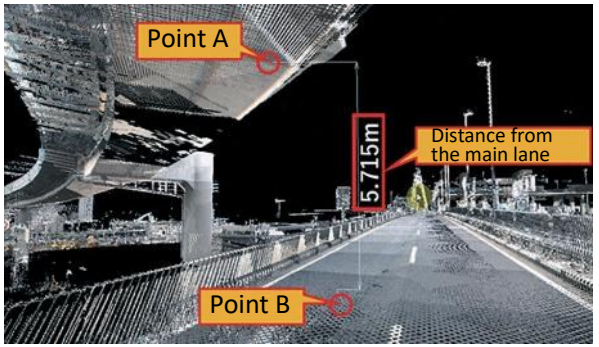
Photo of the Panel (Nara Road Maintenance Panel on February 3, 2016)

# New technologies and “InfraDoctor” (Infrastructure Doctor)

## ■ Basic features for GIS and 3D point cloud data



Display of 360-degree movie and 3D point cloud data




Dimension measurement between 2 points by point cloud data

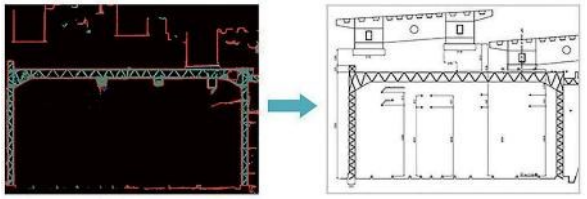
Measurement by MMS

## ■ Management and search features for GIS records

Easy-to-use search system for management/inspection result records that meets needs of administrator

## ■ Further sophisticated management and advanced features

**2D CAD drawing feature**



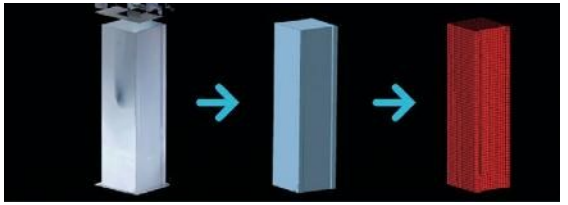
Automatic contour extraction of 3Dpoint cloud data

2D CAD drawing (cross section)

3D point cloud data

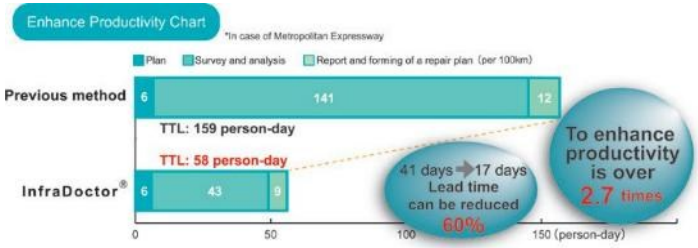
2D CAD drawing (floor plan)

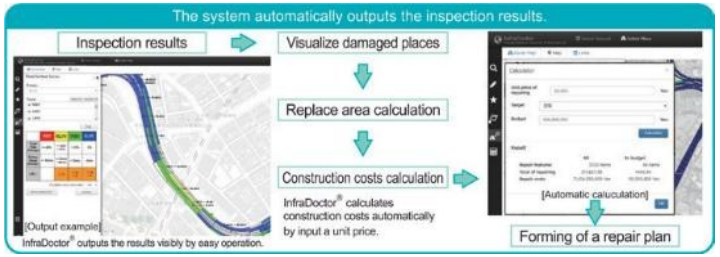
**3D CAD model drawing feature**



Creation of an FEM model from 3D point cloud data

**Analysis of road surface deformation system**

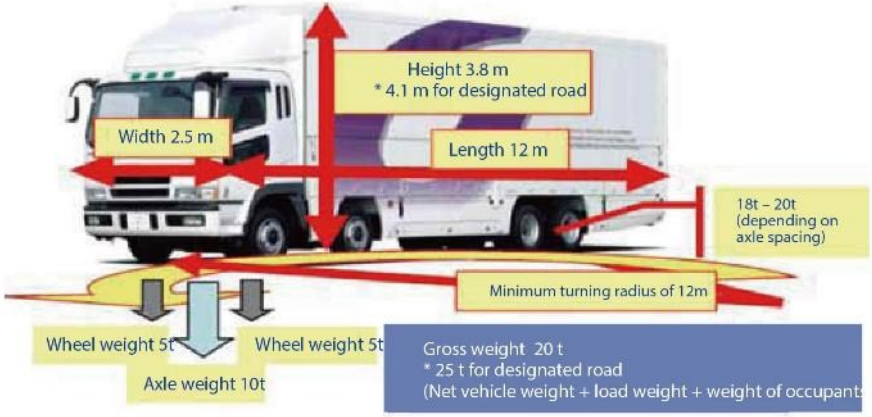


# Road-related systems in Japan

## ▪On general roads

General limit (upper limit) of vehicles according to Article 3.1, Vehicle Size and Weight Restrictions




**Typical overweight or oversize vehicle types**


## ▪On expressways

Dimension and weight limits for specified vehicles on expressways are more lenient than the limits on general roads

**Specified vehicle types**


| combination vehicles | Length |
|---|---|
| Semi-trailer | 16.5m |
| Full-trailer | 18.0m |

| Distance from the foremost axle to the rearmost axle | 8m or more | 9m or more | 10m or more | 11m or more | 12m or more | 13m or more | 14m or more | 15m or more | 15.5m or more |
|---|---|---|---|---|---|---|---|---|---|
| Gross weight | 25t | 26t | 27t | 29t | 30t | 32t | 33t | 35t | 36t |

# Approval system for transporting abnormal loads

Road administrators are authorized to permit the drivers of vehicles that exceed the size or weight limits to use the road, but only after the road administrator examines the vehicle's structure and cargo and determines that there are no alternatives. In these cases, the road administrator will put certain conditions in place to protect the roads and to prevent any potential danger to other road users. Road fatigue, which is caused by oversize or overweight vehicles, can have a significant impact on roads and pavement. In order to utilize our road stock effectively in the future, it is important to ensure the road structures are properly maintained.

▪Enforcing regulations

Instructive enforcement

License plate recognition device

# Stopping unauthorized vehicles

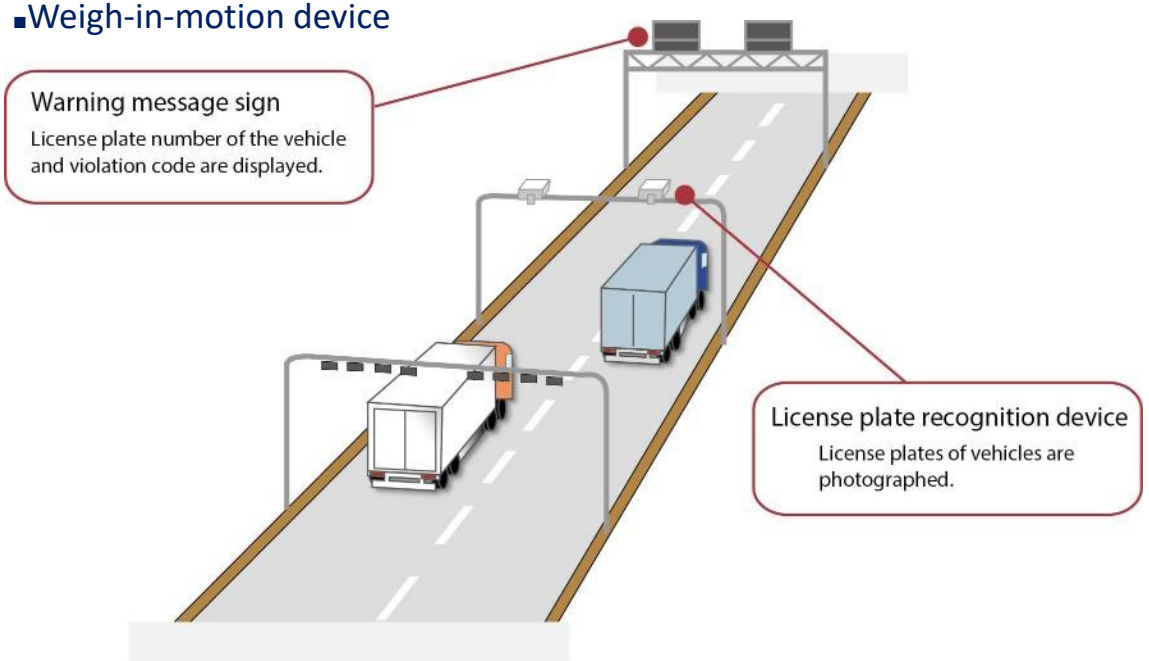
## 1.Instructive enforcement

Drivers are told to pull over at “instruction stations”, where vehicle weights and sizes are measured. If the vehicle exceeds the size or weight limits, the drivers are ordered or warned to reduce the weight and size of the vehicle by splitting the cargo.

## 2. Weigh-in-motion (WIM)

A WIM device automatically measures a vehicle’s gross weight. If the vehicle is over the weight limits, the WIM system then determines if the overweight vehicle has a permit by accessing the database. Based on the results, repeated violators will be given an instructive warning.

▪Weigh-in-motion device



# Disaster Prevention

In order to secure safe and reliable road networks, construction of arterial high-standard highways, urban ring roads and other disaster-resistant roads has begun. Since roads are an important part of disaster relief, measures to respond to and reduce the damages of earthquakes, storms and heavy snows on roads are also being implemented.

## Earthquake

On March 11, 2011 a massive earthquake and the following giant tsunami caused an enormous amount of damage to the roads in Japan
(National Highway 6, Hirono-machi, Fukushima Prefecture)
(Photo: Tohoku Regional Development Bureau)

## Heavy rain


Massive collapse from the top of the slope
Heavy rain in July 2020
(National highway 3, Ashikitamachi Kumamoto Prefecture)

## Heavy snow

In February 2014 there was a record-breaking heavy snow in the Kanto region
(Japan Self-Defense Force clearing the snow on Route 20)
(Photo: Mainichi Shimbun)

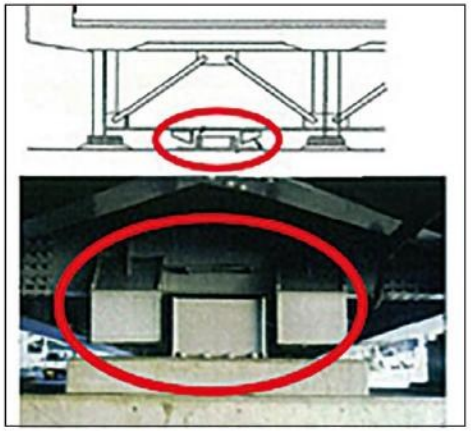
# Measures against Earthquakes (1)

In addition to bridge collapse prevention measures, the MLIT accelerates other anti-seismic measures for expressways and national highways under the jurisdiction of MLIT to prevent a large surface gap, including reinforcement and replacement of supports, based on the probability of large earthquake. In specific, the ministry reinforces support of bridges for immediate recovery from damages and takes other measures where the reinforcement is not possible.

▪Measures for immediate recovery

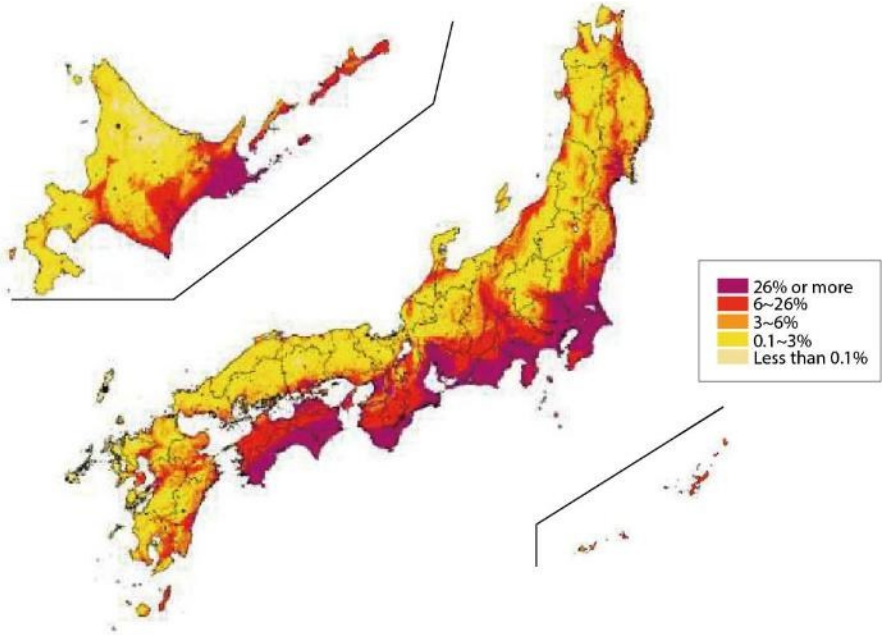
Bridge collapse prevention measures
+
Reinforcement/replacement of supports

Example of a support reinforcement



Structure to diverge horizontal force

▪Probability of an earthquake with a seismic intensity of 6- or higher in 30 years



# Measures against Earthquakes (2)

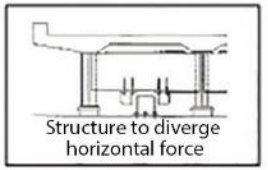
■Example of earthquake preparedness

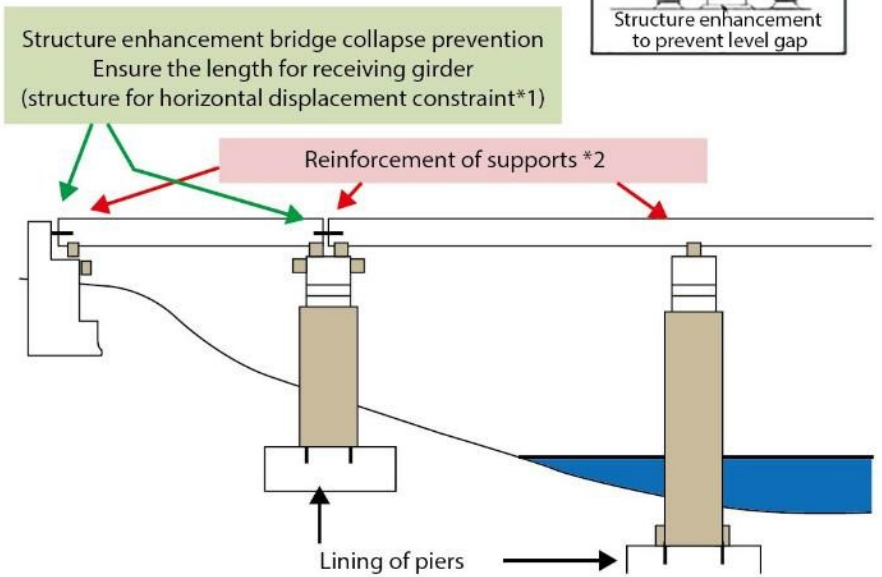
Implement bridge collapse prevention measures that add an ability of immediate recovery of functions.

Bridge collapse prevention measures towards immediate recovery of functions (Level 2 in the Seismic resistance performance)

[Measures]
- Structure enhancement for bridge collapse prevention
- Reinforcement of piers
- Reinforcement of supports

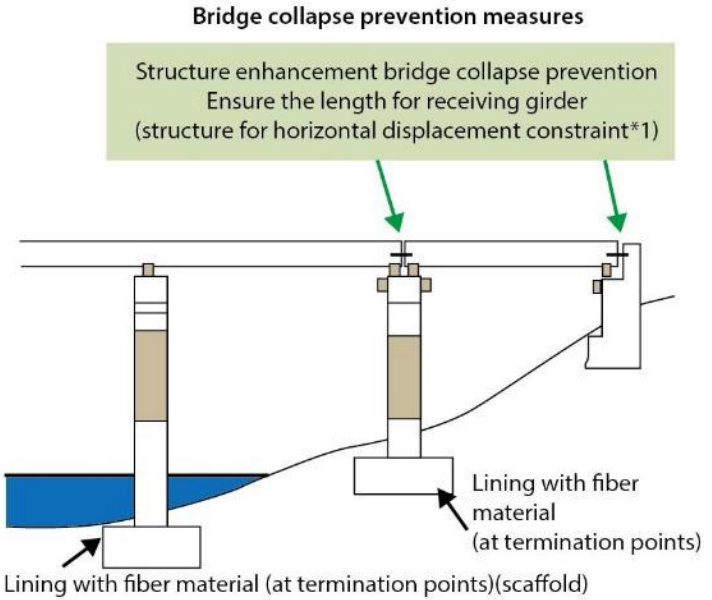
-Replacement of supports
-Structure enhancement to divert horizontal force
-Structure enhancement to prevent level gap




Bridge collapse prevention measures
(Level 3 in the Seismic resistance performance)

[Measures]
- Structure enhancement for bridge collapse prevention
- Reinforcement of termination points of pier

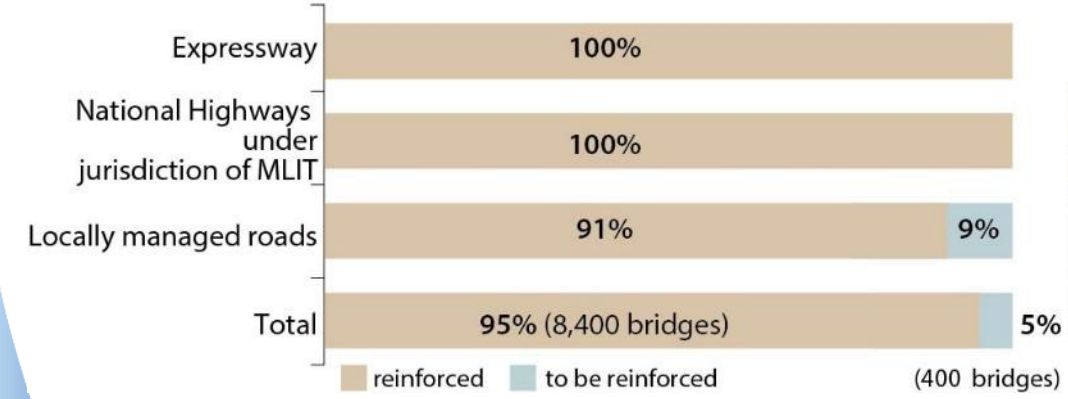


# Measures against Earthquakes (3)

■A seismic retrofitting of overpass

-Overpasses over expressways and national highways under jurisdiction of MLIT are given priority on the collapse prevention measures in the next 5 years (400 bridges are owned by local governments as of November 2016).

**Progress of overpass collapse prevention measures for expressways and national highways under jurisdiction of MLIT**




**Overpass**


**Examples of the measures**

[Structure enhancement for bridge collapse prevention]

[Reinforced pier]

# Measures against Earthquakes (4)

■Seismic strengthening for bridges with rocking piers

Seismic strengthening is conducted by the end of FY 2019 for bridges with rocking piers over expressways, national highways under jurisdiction of MLIT (450 bridges).



**Example of seismic reinforcement**

# Challenges of seismic retrofitting identified after Kumamoto Earthquake (April 14, 2016)

(1) A bridge with rocking piers was collapsed by Kumamoto Earthquake. There remains the possibility that measures in the past were insufficient to avoid collapse, considering peculiarities of Kumamoto Earthquake (consisting of 2 strong quakes) and structure itself.

(2)Several overpasses over expressways and national highways under jurisdiction of MLIT have not been reinforced for collapse prevention (completion rate is 91% as of November 2016 for those owned by local governments).

(3) Although collapse prevention measures have been completed for all the emergency transportation routes (consisting of expressways and national highways under jurisdiction of MLIT), the seismic reinforcement (including reinforcement of bridge shoes) that promptly enables emergency transport vehicles to pass the routes has not been completed (completion rate is 77% as of March 2017).

(1) Collapsed a rocking pier over Kyusyu Expressway (Prefectural road Ogawa-Kashima Line, Furyo Daiichi Bridge)

(2) Locally owned overpasses (have not been reinforced)

(3) Damages on supports and main girders of a bridge (Heiryu Bridge, Oita Expressway)

# Countermeasures for heavy rains (1)

## ▪ Protection of road slopes

Following works are used for slope protection from a heavy rain.
-Rock fall prevention fence work: installation of fence to protect from rock falls. Fence is installed along the road to catch falling rocks.
-Pocket-type rock fall prevention net work: installation of a net to catch falling rocks where they start falling.
-Wire rope that tie a rock: the rope will fix some rocks that may fall in the future.
-Concrete crib work: covers and fixes a slope that may collapse in the future.
-Concrete crib + anchoring: in some cases, concrete structure is supported by additional anchors.

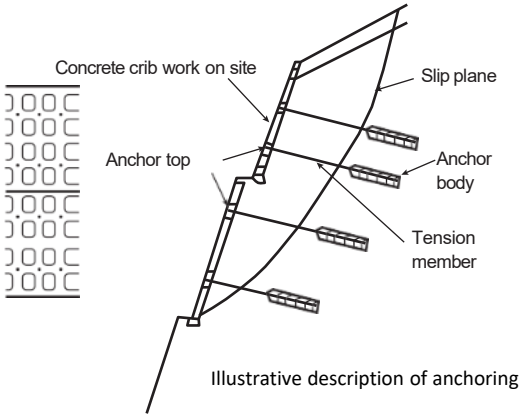
Rock falling protection fence

Pocket-type rock falling protection net

Wire rope work

Concrete crib work

Crib work + anchoring

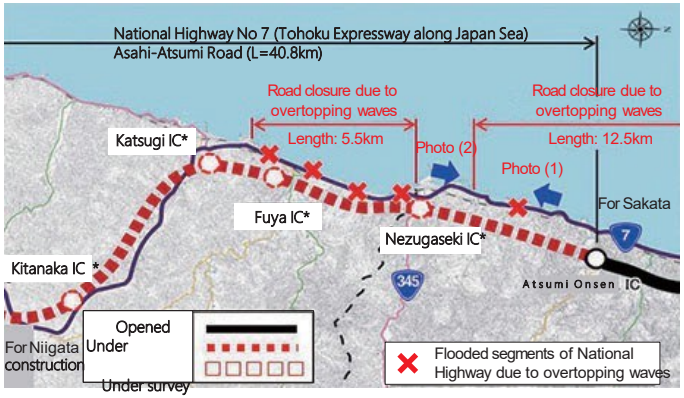


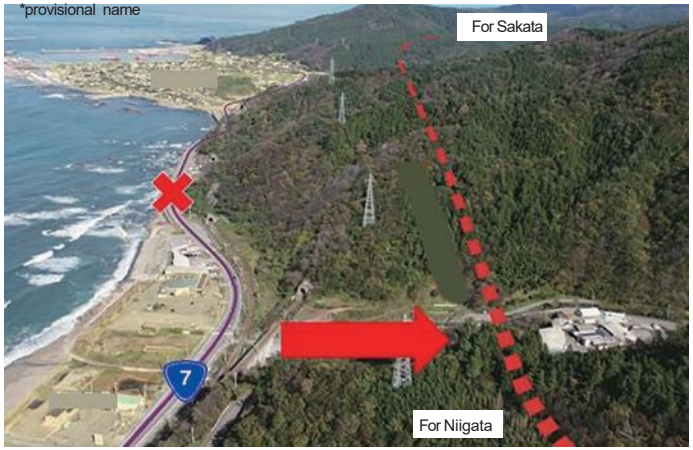

Illustrative description of anchoring

# Countermeasures for heavy rains (2)

## ■ Enhancement of road network for redundancy

In the areas with frequent heavy rain, development of arterial high-standard roads is promoted to provide redundancy, rather than individual spot improvements. Given that overtopping waves frequently force to close National Highway No 7 around the border between Niigata and Yamagata, the Asahi-Atsumi Road is going to be developed as a high-standard road at a distant from the sea shore to ensure redundancy at the event of disaster and reliable transportation between regions.




High-standard Arterial Highway is developed to ensure alternative route in the event of disaster (example of Asahi-Atsumi Road)

(1) Wracks from overtopping waves (On April 4, 2012 in Wasada, Tsuruoka)

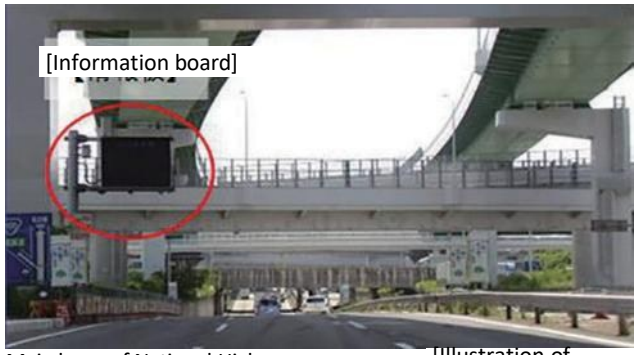
(2) Congestion due to traffic restrictions (On April 4, 2012 in Nezugaseki, Tsuruoka)

# Countermeasures for heavy rains (3)

## ▪ Protection of road from flooding

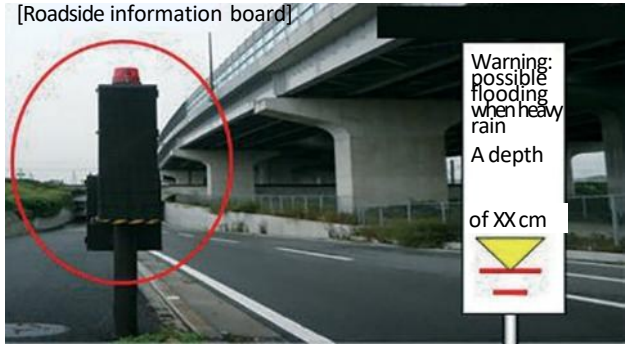
In urban areas, there are about 3,500 underpasses across the country as of April 1, 2015. A heavy rain exceeding the capacity of a drain pump under the underpass will make a pool on the underpass.
In the event of such a heavy rain, we will close the road and provide information for road users.

**Example of road information provision**




Main lanes of National Highway

[Illustration of roadside signage]



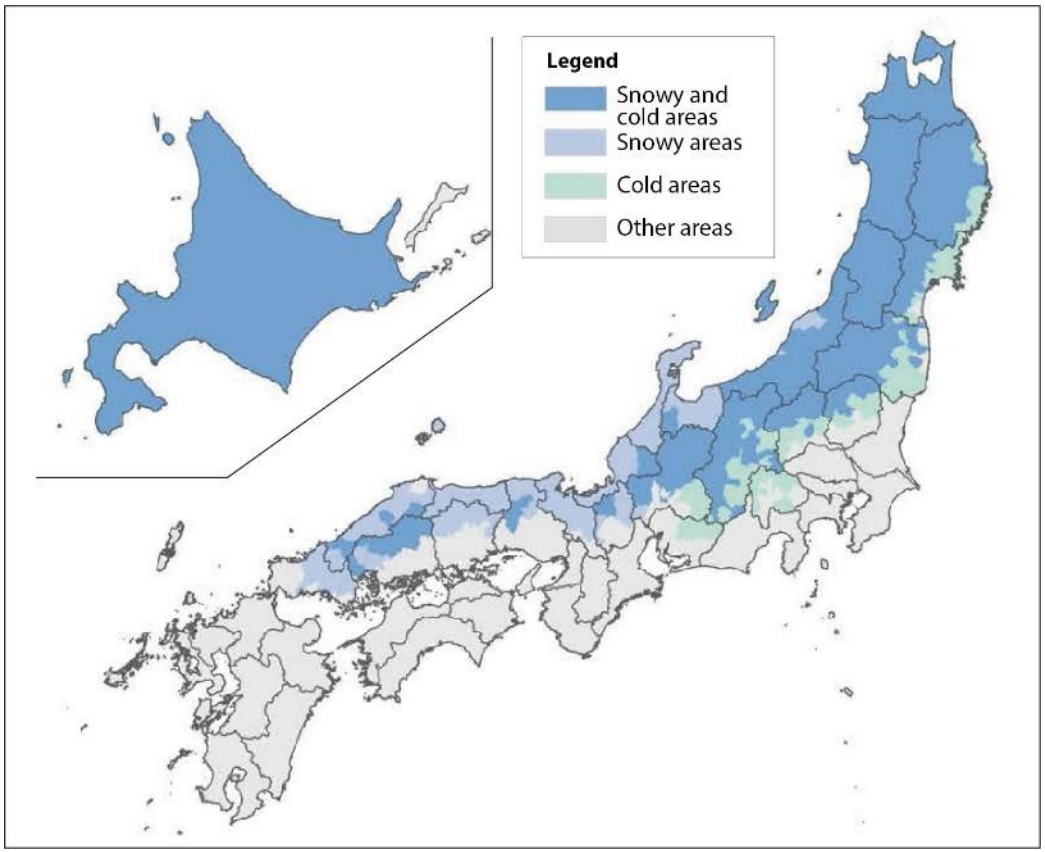

Service road

**Example of drain pump**

# Countermeasures for snowfall (1)

Heavy snowfall hampers every year the improvement of living standards and industrial development of the residents. Sustainable support is required to minimize the impact of the snowfall.

- Purpose of countermeasures for snowfall




Vehicles stuck on road due to heavy snow
(Sanin Region, 2016)

Snow protection work
(Hokuriku Regional Development Bureau)

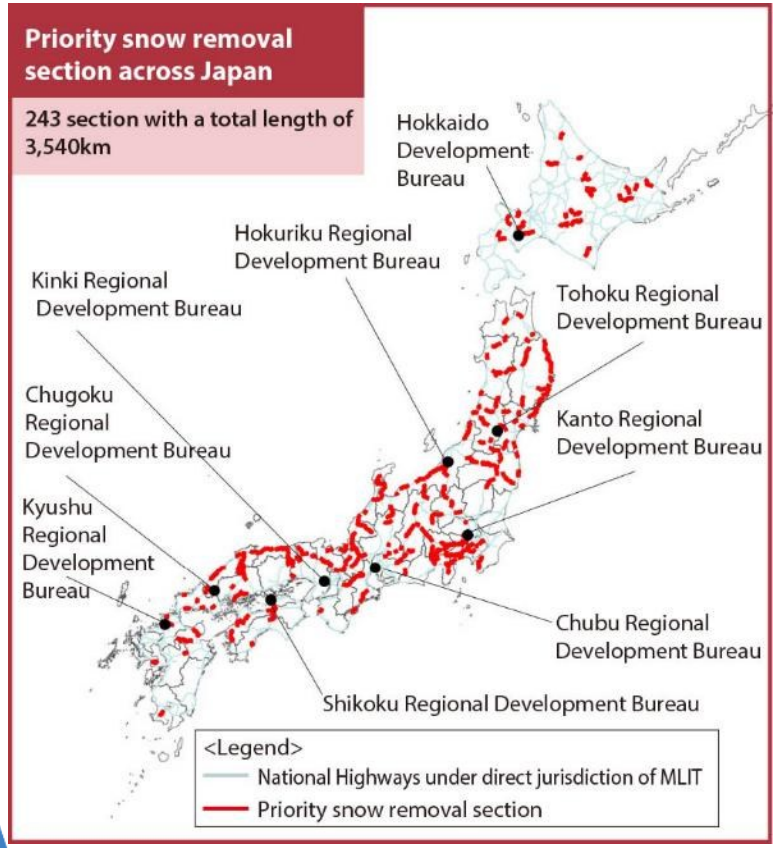
Removal of vehicles at a standstill on road
(Shikoku Regional Development Bureau)

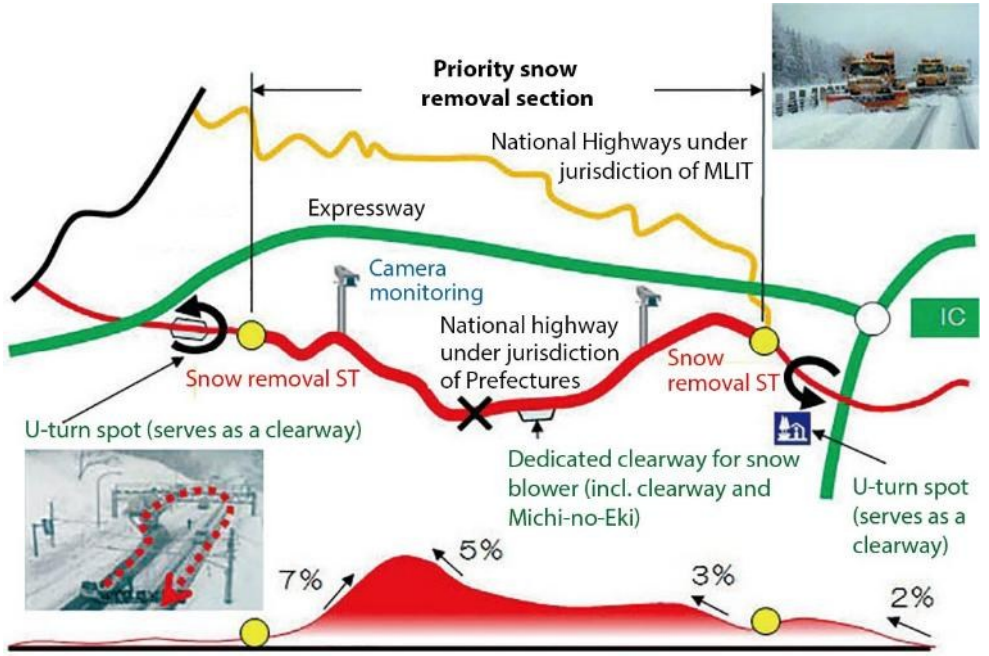
About 60% of the country is in cold and snowy area where a quarter of the population lives.

# Countermeasures for snowfall (2)

■ Advance Restrictions of Road Traffic on heavy snow

This refers to a section identified as a standstill-prone location in the event of heavy snow especially for heavy vehicles on a steep slope. This section receives intensive and efficient snow removal preferentially. 224 road sections were identified as priority snow removal section across Japan.



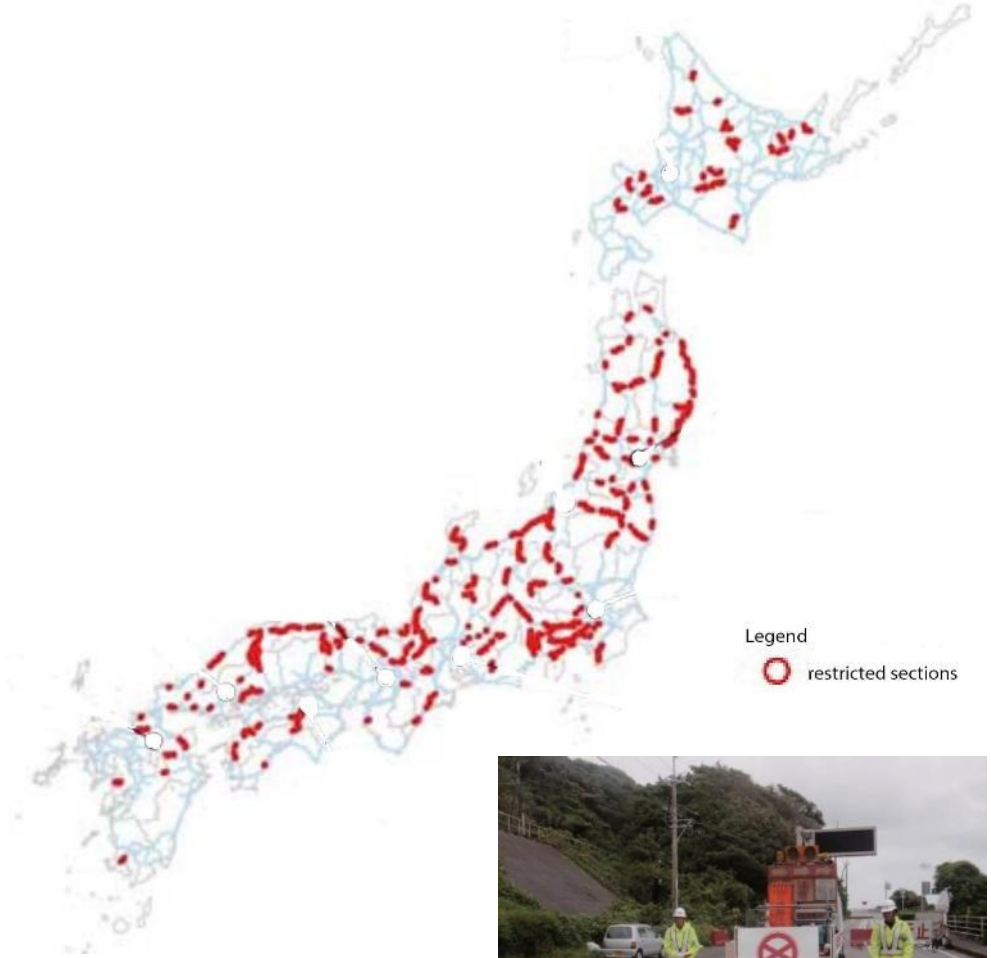

Illustrative description of "Priority snow removal section"

# Initiatives for Advance Restrictions of Road Traffic

■ Restricted sections (national highways under jurisdiction of MLIT)

- In light of the accidental bus fall at Hida River in 1968, we started implementing traffic restrictions in advance based on the "Guidelines for Road Traffic Restrictions in the Event of Extreme Weather" in 1969.
- Restriction standards were set based on “the continuous rainfall” measured by telemeter rain gauges installed at each restricted section.
- national highways under jurisdiction of MLIT : 175 sections, 980 km (total 4%) (As of April 1, 2014)

・Excluding particularly restricted sections against overtopping waves, road flooding, avalanches, etc.
・At the time the system was established (1969), 210 sections
・Set traffic restriction standards based on continuous rainfall.
・Restrictions will be lifted when the rainfall volume stays less than 2 mm/h for 3 hours, the road is patrolled, and safety is confirmed.

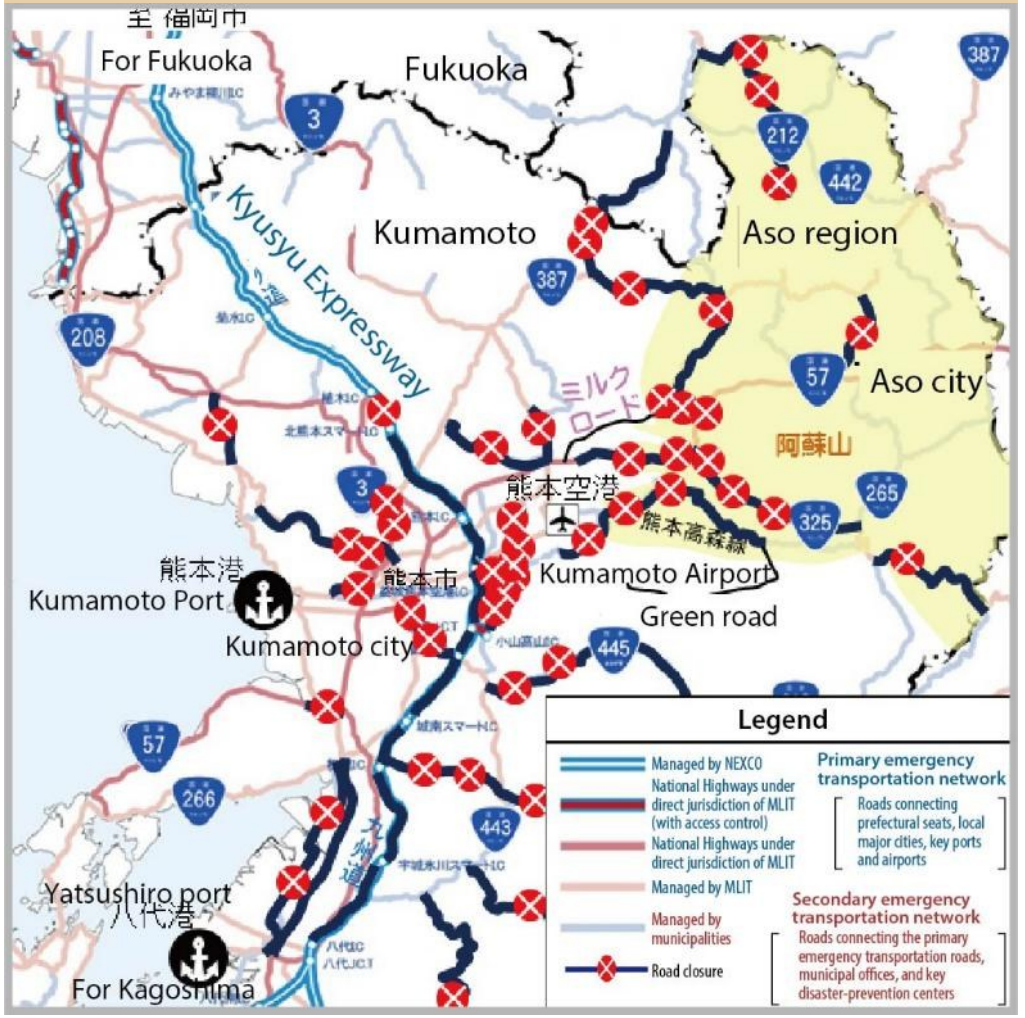


# Ensuring smooth freight transportation during disaster

■ Restricted sections
(national highways under jurisdiction of MLIT)

After the Kumamoto Earthquake in 2016, 50 locations were closed on the emergency transportation routes which extends to about 2,000 km in Kumamoto Prefecture. To ensure smooth freight transportation whether it is a normal time or at the event of disaster, the MLIT is committed to improving accessibility to key locations as well as enhancing functions of arterial network to support stable economy and everyday life by supporting and investing on a priority basis.

Closure of emergency transportation routes after Kumamoto Earthquake
(As of April 17, 2016, which is 24 hours after the event)



# Advanced Road Technologies

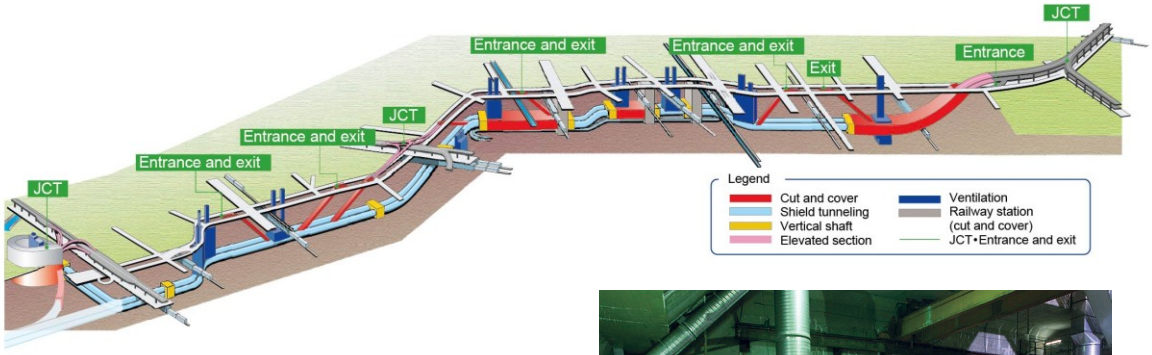
Of Japan's total land area of 378,000km2, only one-third is suitable for living.
Due to its topographical, geological, meteorological and other natural conditions, Japan is prone to numerous natural disasters such as storms, heavy snowfall, floods, landslides, earthquakes and tsunamis.
Consequently, various road construction technologies have been developed to overcome the resulting severe conditions and difficulties posed by these natural disasters.

# Tunnels

The long, thin chain of islands that compose Japan has a spine of steep mountains running north to south down the island chain. The elevations reach 2,000m to 3,000m above sea level and about 70% of the land is mountainous.
Therefore, roads must be constructed on the narrow strips of land between steep slopes and the sea, alongside rivers winding between mountains, and sometimes through mountains.
Tunnels are increasingly used when constructing roads in highly populated areas due to the shortage of land and to protect the environment.

## Kan-etsu tunnel
**(Kan-etsu Expressway)**

## Yamate tunnel
**(Central Circular Oi～Ikebukuro Route of the Metropolitan Expressway)**




Yamate Tunnel (Shinjuku Route) Map

# Bridges

Japan consists of four major islands, Hokkaido, Honshu, Kyushu, along with Shikoku, and a number of smaller islands.
Straits and inland seas hinder traffic between the islands. For well-balanced development, transportation access is required, so bridges connecting islands have been constructed.
Also, since Japan is highly prone to earthquakes, typhoons and strong winds, cutting-edge technologies are used to construct and maintain long-span bridges that can withstand severe weather and natural disasters.

**Honshu-Shikoku expressway**

Akashi Kaikyo Bridge

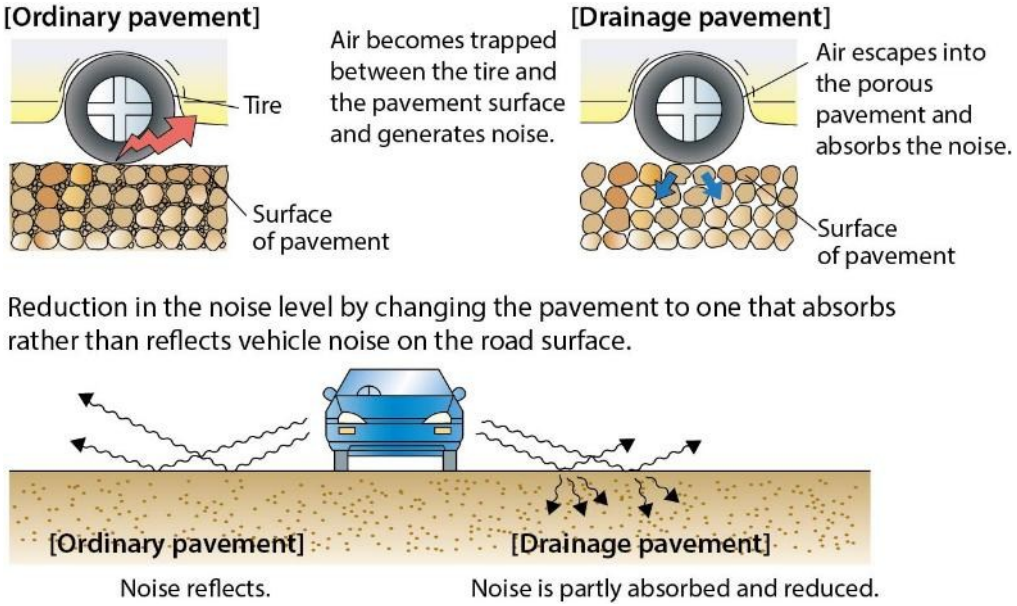
Tatara Bridge

**Tokyo bay aqua-line expressway**

The manmade island “Umihotaru” and the Aqua-line Bridge

# Pavement

## Drainage and low-noise pavement



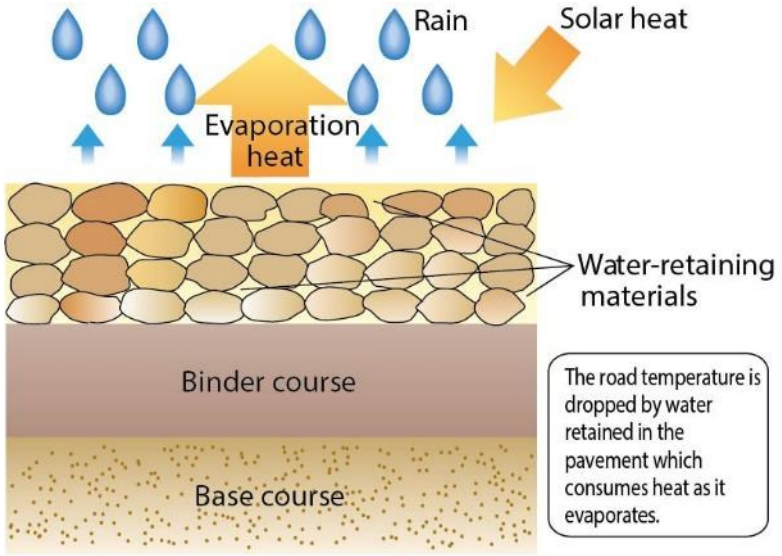

Reduction in the noise level by changing the pavement to one that absorbs rather than reflects vehicle noise on the road surface.



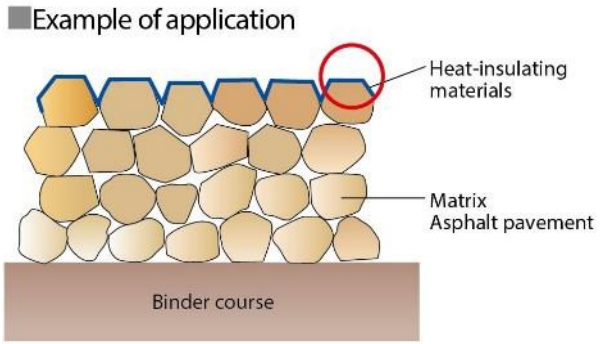

Noise reflects.

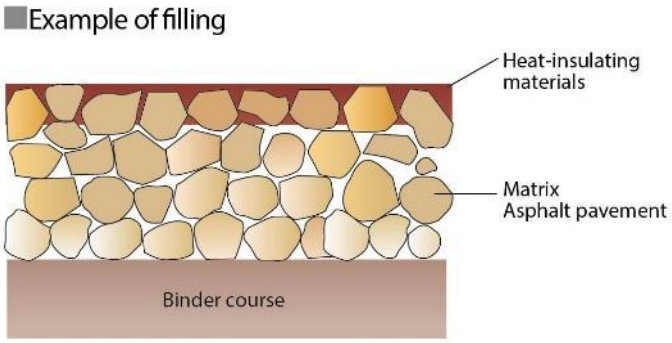
Noise is partly absorbed and reduced.

## Water-retaining pavement




## Heat-insulating pavement



# Utilization of New Technologies : Inspection Support Technology Performance Catalog

## Bridges and Tunnels (From Feb 2019)

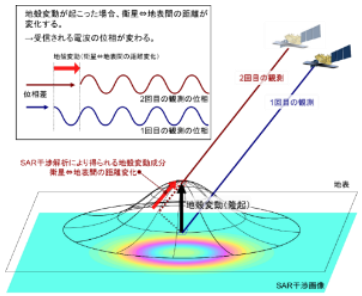
### Image measurement

- Bridges: 91 (11) technologies
- Tunnels: 40 (2) technologies
- Earthwork: 10 (3) technologies

Damage assessment by drone

Deformation assessment by laser scan

Slope and retaining wall inspection using MMS*1




Road earthwork and disaster prevention inspection using satellite SAR, etc.*2

*1 Mobile mapping system (MMS)
*2 Source: Geospatial Information Authority of Japan website

*Number in parenthesis indicate new technologies added in April 2026

## Earthwork (From Nov 2023)

### Non-destructive testing

- Bridges: 48(4) technologies
- Tunnels: 25(2) technologies
- Earthwork: 2 (-) technologies

PC grout filling assessment using AE sensors

Tunnel lining deformation assessment using radar

### Measurement and monitoring

- Bridges: 76 (5) technologies
- Tunnels: 22 (3) technologies
- Earthwork: 1(1) technologies

Bridge monitoring using optical fiber sensors


Anomaly monitoring sensors for tunnel accessories

### Data collection and communication

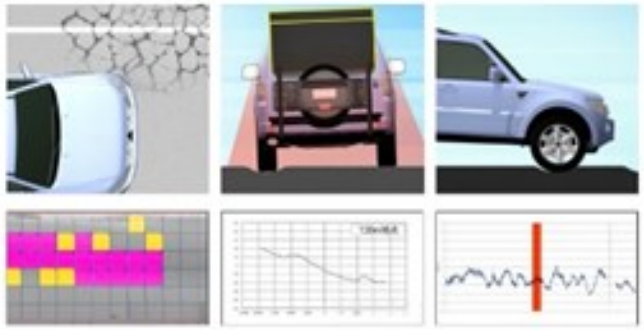
・5 (1) technologies

# Utilization of New Technologies
# : Inspection Support Technology Performance Catalog

## Pavement(From Sep 2022)

**Crack rate, rutting, IRI**

55 (15) technologies



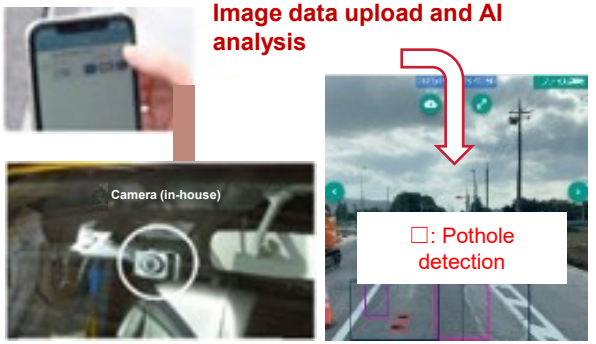
Automatic judgement by AI

Pavement condition measurement using images and acceleration obtained by smartphone

## Road Patrol(From Mar 2023)

**Potholes, lane line wear, exceeding clearance limits, hidden signs**

32 (7) technologies




Pothole detection using images obtained by smartphone

Lane line wear judgement using images obtained from drive recorder

*Number in parenthesis indicate new technologies added in April 2026

# History of Roads in Japan

Japan is a country comprised of four major islands and numerous min or islands.  It is configured as a crescent shape and situated to the eas t of the Asian continent in the Northwestern Pacific Ocean. Of its 378, 000 square km of land, about 70% is comprised of mountainous terrai n. It is inhabited by more than 120 million people.

It is a country that has achieved harmony between its traditional cultu re from ancient eras and its modern society with advanced technolog y. Yet, Japan's fascinating natural environment is one that changes fro m season to season.

The history of land transportation in Japan began over two thousand years ago and can roughly be categorized into the following four eras: 1) Age of People and Nature (ancient times until the Meiji Restoration in 1867), 2) Age of Modernization (from the Meiji Restoration until th e 1950s), 3) Age of High Efficiency Networks (from the 1950s to the pr esent day) and 4) Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads.

# I. Age of People and Nature

## (ancient times until the Meiji Restoration in 1867)

After the Reformation of the Taika Era (645 C.E.), an elaborate central government system was established. A new road network was developed at this time that connected Honshu (the largest island) to Shikoku (the smallest of the four main islands) and then continued all the way down to Kyushu (the southernmost and th -ird largest island). This nationwide public road network was called “Seven Roads” and was composed of To kaido, Tosando, Hokurikudo, San-indo, San-yodo, Nankaido and Saikaido (‘-do’ in Japanese means ‘road’). Ev er since the Seven Roads were first established during this age, they have continued to serve as the backbo ne for transportation routes in Japan.

### (User-friendly Roads in Early Times)

An “Eki” (meaning station) was located at each interval of 16km along a road and would provide necessary services for the officials and people of high rank who travelled that road on their journeys.

The Shogunate, established in 1603 C.E., specified that the five major highways should be about 11m wide and secondary roads should be 5.5m wide. The roads were to be filled with gravel and cobbles to a depth of 3cm and topped with sand after treading them down.


Numazu-juku as depicted by Hiroshige
Source: National Diet Library

## (Road Construction with Consideration for People and Scenery)

The Hakone Road was already paved by 1680 C.E. Japanese surface transportation routes were developed primarily for people and horses, because horse-drawn carriages were not common prior to the Meiji Era (~1868 C.E.). For this reason, roads were usually in good condition since damage caused by traffic was not severe and maintenance was relatively easy to complete. Road cleaning and other regular maintenance was not performed by the Shogunate or the government of feudal clans, but by roadside residents on a voluntary basis. This implies that there was a general understanding that roads were not the exclusive property of the overlords, but considered to be “public property”.

Nihombashi in the Meiji Era
Source: National Diet Library

# 2. Age of Modernization

## (from Meiji Restoration to the 1950s)

After ending two hundred years of isolation, the revolutionary government of the Meiji Era (1868-1912 C.E.) quickly started modernizing the surface transportation system by importing new technologies from Europe. Unlike China and Europe, Japan did not have a history of horse-drawn carriages as a method of transportation. It was thus impossible to transform the ancient roads, designed strictly for the passage of people and horses, into modern roads in a single step.

The beautifully maintained pre-modern roads of the Edo Era began to deteriorate under the burden of modern horse-drawn carriages and human-powered vehicles (or rickshaws). The slow improvement of roads can be partially attributed to the decision by the Meiji Government to give rail and sea transportation higher priority over roads. This decision was intended to allow Japan to catch up with the advanced nations of the West as quickly as possible.

The slow improvement of roads can be partially attributed to the decision by the Meiji Government to give rail and sea transportation higher priority over roads. This decision was intended to allow Japan to catch up with the advanced nations of the West as quickly as possible. The backwardness of the road system in Japan continued until 1945 when the World War II ended and the entire national landscape was devastated by bombings and other catastrophes of war. During the reconstruction process in Japan, the modernization of roads in Japan was fully accelerated along with the development of railways.

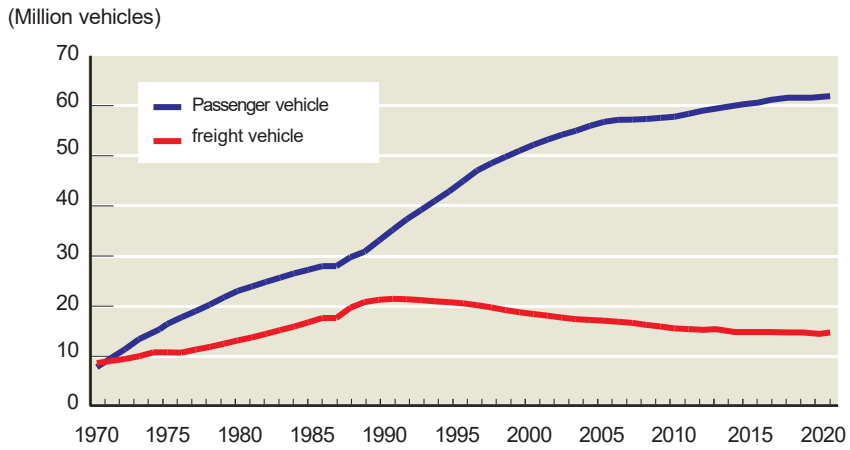
# 3. Age of High Efficiency Networks (from the 1950s ~ today)

## (Arrival of the Motorization Age)

Automobiles proliferated quickly as the Japanese economy recovered from hardship after the war and the standard of living improved. Only 130,000 vehicles were registered at the end of World War II, but the number increased rapidly, reaching 500,000 vehicles by 1951, then doubling to one million in 1953, and doubling again to two million in 1957.

However, Japan's road system in those days was truly terrible. Only two-thirds of national Highway Route 1, supposedly the major arterial highway connecting Tokyo with Osaka, was paved. The Japanese Government at that time accepted Mr. Watkins' proposals and immediately put them into practice. Thus, road improvement in Japan moved into high gear, propelling the nation into the high economic growth era of later years.

■ Change in number of registered vehicles




The state of roads in the mid-1950s was as "incredibly bad" as Watkins wrote in his report.

# 3. Age of High Efficiency Networks

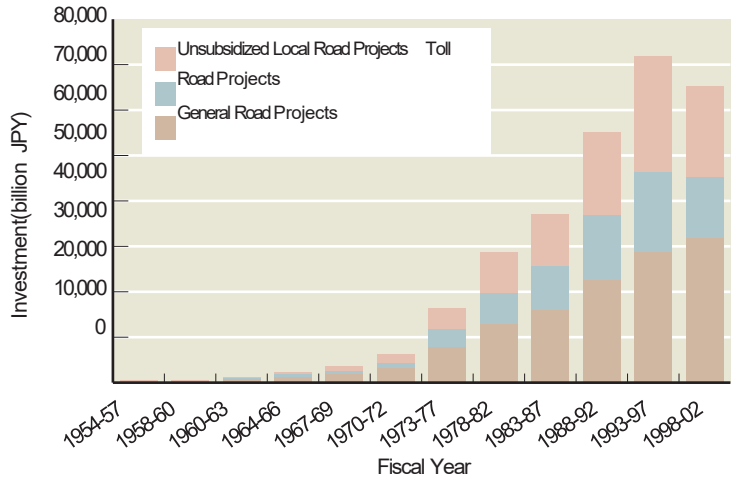
## (The Five-Year Road Development Program, Toll Road System and Tax Revenue System with Earmarks for Roads) (from the 1950s ~ today)

Since the public works budget, under the general revenue scheme, was insufficient in meeting the ever-increasing road traffic demand, two new financing systems were introduced : the toll road system and the tax revenue system with earmarks for roads.

The former “Act on Special Measures concerning Road Construction and Improvement”, which was enacted in 1952, introduced the toll road system and enabled the national and municipal governments to borrow sufficient funds to develop roads.

In 1953, the “Act on State’s Tentative Financial Measures for Road Construction Projects” was enacted and thus ushered in a new tax revenue system with earmarks for roads. This measure secured stable financial resources for the long-term development of roads, including the 1st Five-Year Road Development Program and the subsequent 11 programs that followed.

■ Investment change in the Five-Year Road Development Program





April 1968
Vehicles driving from Okazaki IC to Komaki IC after the opening ceremony of the Tomei Expressway (Photo: Mainichi Shimbun)

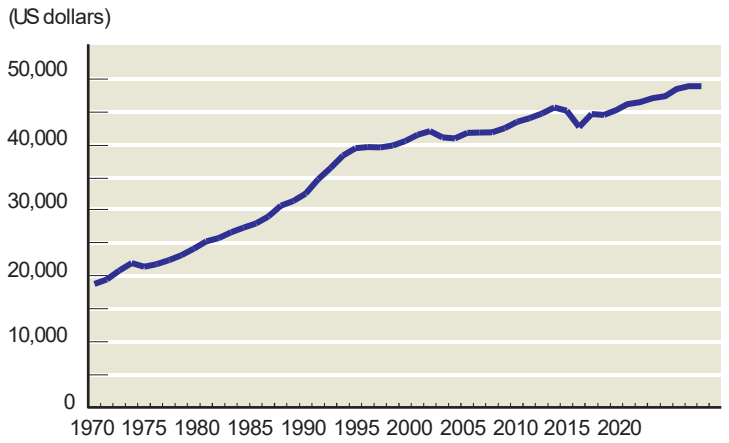
# 4. Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads

By the beginning of the 21st century, Japan entered an age of declining birthrates and an aging population (the national population has been declining since it peaked in 2008). While road development is slowing down, utilization of existing road networks and improvement of asset management is becoming the focus of current programs.

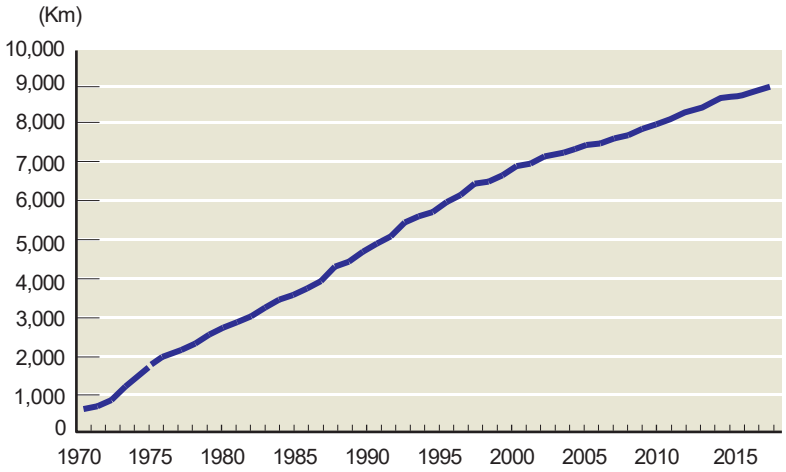
## (Strategies for Aging Road Infrastructure)

The majority of roads and bridges were constructed in the high-growth period of the Japanese economy and will be 50 years old in the next 10 years. To maintain the safety of this aging infrastructure, periodic investigation and database management, as well as systematic repair work, are required.

■ Change in real GDP per capita




■ Change in total length of expressways



# 4. Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads

## (Preparing for Natural Disasters)

The Great East Japan Earthquake in March 2011 forced the reevaluation of the importance of road networks in the face of large-scale natural disasters. As an earthquake-prone country, disaster prevention measures, including improvement of bridges' quake resistance, have been deemed necessary after the repeated experience with these disasters. In addition, it is necessary to enhance road networks to guarantee alternative routes in the event of road closures after a large-scale disaster and in order to add disaster prevention functions to existing roadside service facilities.

## (Improvement of Road Service Provisions using Intelligent Transport Systems (ITS))

Since the 1990s, ITS technologies have provided various services, including car navigation systems and Electronic Toll Collection (ETC). Even now, the technologies are evolving to meet the demands of road infrastructure and the automobile sectors. In the road infrastructure sector, dynamic traffic guidance, warning messaging and vehicular controlling technologies are being studied as part of road-to-vehicle and/or vehicle-to-vehicle communication systems.

The advancement of technology is going to integrate road infrastructure and automobiles into a new synthetic transportation system and will provide a breakthrough solution for traffic congestion, traffic accidents and environmental pollution, all of which have been major issues since the modernization of the road system began.

# Summary of Principal Policies

# First National Resilience Implementation Mid-Term Plan (Road-Related) (1)

To build a disaster-resilient national arterial road network and other infrastructure capable of withstanding increasingly severe and frequent w eather disasters driven by climate change, imminent large-scale earthquakes, and the rapid deterioration of facilities, we will further accelerat e and deepen disaster prevention, mitigation, and national resilience efforts. This includes fundamental measures such as enhancing the disast er resistance of the high-specification road network and addressing aging infrastructure.

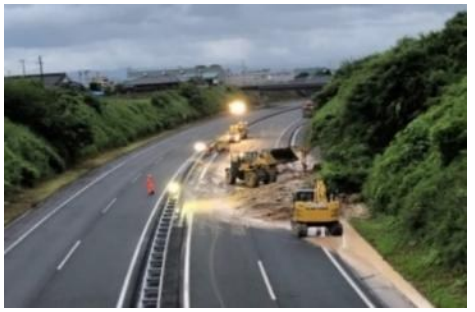
## Measures to Enhance the Road Network

We will eliminate unimproved sections of high-standard roads, expand temporary two-lane segments to four lanes, and reinforce the dual-network function provided by high-standard roads and directly managed national highways.

【Road Network Enhancement Case Study】

Shinmiya-Kihō Road [Opening in Fiscal Year 2024]

【Effectiveness of Four Lanes】



Utilize the undamaged two lanes to maintain traffic functionality

### Flood protection measures for river-crossing bridges and adjacent road structures

Measures to mitigate disaster risks such as bridge washouts at river crossings and erosion in river-adjacent sections that cause prolonged road closures, promote scour and erosion countermeasures.


"Examples of Bridge Replacement Measures

### Measures to eliminate overhead power lines on emergency transportation routes in urban areas and other locations at risk of utility pole collapse

Measures to prevent road closures caused by utility pole collapses, implement underground utility lines on emergency transportation routes in urban areas and similar locations.


Power pole collapses caused by typhoons and other events

# First National Resilience Implementation Mid-Term Plan (Road-Related) (2)

## Measures to Address Aging Road Facilities

On order to expedite the transition to road maintenance based on preventive maintenance that enables sustainable upkeep, we will intensively implement measures for road facilities requiring repairs.

【Bridge Deterioration Cases】

Exposed reinforcement in floor slabs

【Examples of Pavement Deterioration】

Asphalt pavement damage

## Slope and Embankment Landslide Prevention Measures for Roads

We are implementing slope and embankment protection measures to support emergency response activities immediately after disasters.

Case Studies of Slope and Embankment Stabilization Measures

Examples of Embankment Protection Measures (Mattress Gabions)

## Measures to Strengthen Road Management and Information Collection Systems through Digital Transformation of Road Systems

We will strengthen road management systems, such as remotely checking road conditions, and promoting efficiency and labor savings in maintenance through the use of AI technology and other means.

Case Study: Road System Digital Transformation


Use of AI-based image analysis technologies

# First National Resilience Implementation Mid-Term Plan (Road-Related) (3)

The June 16, 2023 amendment to the Basic Act on National Resilience legally established the Mid-Term Implementation Plan, adding new measures: snow and cold countermeasures for roads, enhancement of Michi-no-Eki disaster-response functions, and enhanced seismic resi lience for road bridges and related structures.

## Snow and cold countermeasures for roads

In areas with a high risk of traffic disruption from snow accumulation, we will enhance road traffic management during heavy snowfall—such as snow-melting facilities, snow removal equipment, and avalanche protection.

【Examples of Snow and Cold Countermeasures】

Example of Avalanche Countermeasures (Avalanche Barrier)

## Enhancing the disaster-response hub functions of Michi-no-Eki (roadside stations)

We will strengthen disaster prevention functions at Michi-no-Ekis and similar facilities, while promoting the establishment of disaster response systems through measures such as installing AI cameras and high-value-added containers that can be utilized during disasters.

【Examples of Disaster Prevention Base Measures】


Installation of multifunctional disaster-response containers

## Seismic Performance Enhancement of Road Bridges and Other Structures

We will prepare for imminent large-scale earthquakes, promote seismic retrofitting and other measures for bridges along emergency transportation routes.

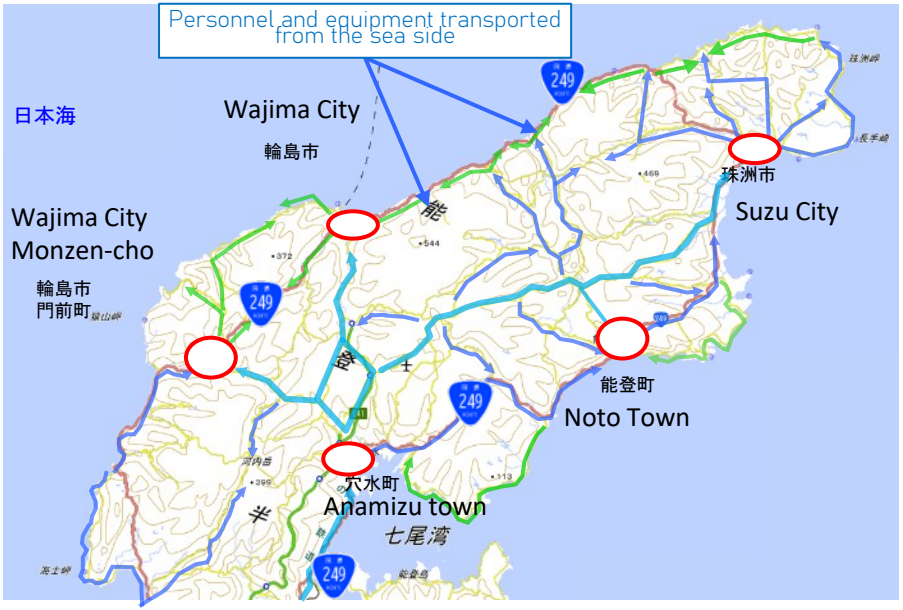
【Case Studies of Seismic Retrofit Measures for Bridges】


Case Study: Seismic Retrofit of the Kamaishi Viaduct

# Recovery and Reconstruction from Natural Catastrophe in Noto Region (1)

## Recovery actions after Noto Peninsula Earthquake in 2024

| | |
|---|---|
| STEP1 | Access to each municipal office (Wajima City, Noto Town, Suzu City) |
| STEP2 | Prioritize securing access to coastal areas such as Route 249, which has numerous isolated settlements |
| STEP3 | Implement road clearance to isolated settlements along coastal routes such as Route 249 |




Road Clearance Operations Following the 2024 Noto Peninsula Earthquake

| | |
|---|---|
| Jan. 1st | Earthquake occurred at 16:10 |
| 2nd | Started emergency recovery work for arterial roads by working to reopen roads using a multi-pronged "comb-tooth" approach from land, sea, and air.<br>Ensured access for regular vehicles from Nanao City to the town halls of Wajima City, Suzu City, and Noto Town. |
| 4th | Secured passage for large vehicles to each town hall. |
| 8th | 80% of emergency rehabilitation for major arterial roads were completed. |
| 12th | Published a Road Restoration Dashboard / Map Portal. |
| 14th | Landed personnel and equipment with the help of the Self-Defense Forces. |
| 15th | 90% of emergency rehabilitation for major arterial roads was completed. |
| 19th | Practically no isolated districts were left unaided. |
| 23rd | MLIT acted on behalf of Ishikawa Prefecture for full-scale disaster restoration. |

［ Road closures as of the end of December, 2025 ］

Road closure due to earthquake：87 locations ⇒ 6 locations（One location is accessible to emergency vehicles ※）
(As of 1 January 2024)

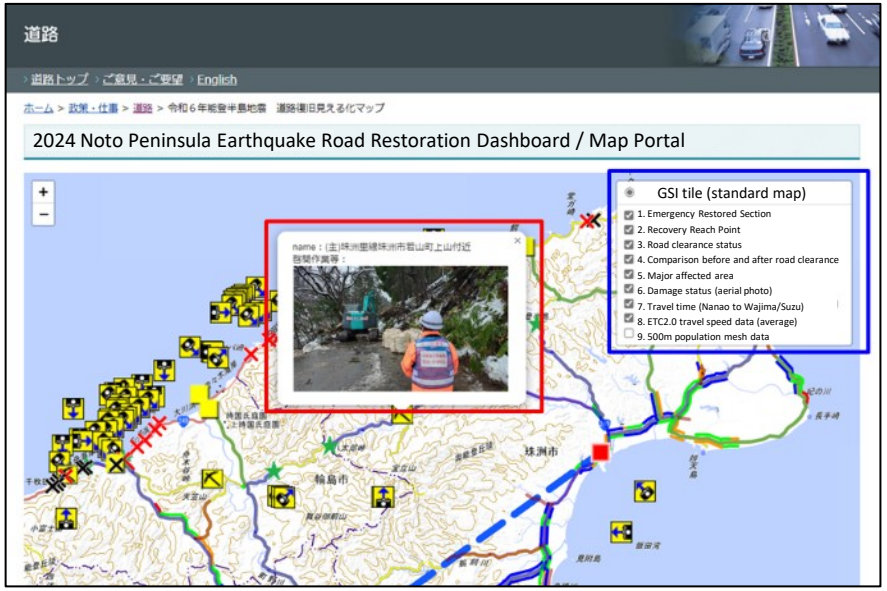
Road closure due to heavy rain：48 locations ⇒ 4 locations（One location is accessible to emergency vehicles ※）
(As of 22 September 2024)

※ Emergency vehicles include local vehicles

# Recovery and Reconstruction from Natural Catastrophe in Noto Region (2)

## Recovery actions after Noto Peninsula Earthquake in 2024

■ Understanding road traffic condition




Road Restoration Dashboard / Map Portal

To assess the traffic situation in the affected area, we collected traffic volume data using ETC2.0 portable roadside units, AI web cameras to provide information on the damage and availability of the road.

■ Disaster restoration on behalf of the Prefecture


Utilized coastal uplift to secure passage
(A section of National Highway No.249 in Senmaida)

MLIT conducted a full-scale disaster restoration of the Ishikawa Prefecture-managed sections of the Noto Expressway and National Highway No.249 coastal areas, the backbone for restoration and reconstruction of the affected region.

# Recovery and Reconstruction from Natural Catastrophe in Noto Region (3)

## Recovery actions after Noto Peninsula Earthquake in 2024

■ Michi-no-Eki

Transportation of relief supplies

### Restoration work in cooperation with other lifelines: water, electricity, and telecommunications

We prioritized the emergency restoration of road sections based on the needs of water, electricity, telecommunications, and other infrastructure in the affected areas, contributing to earlier lifeline recovery.

### Cooperation with local governments and private sector

We responded flexibly to emergency restoration, as well as the procurement and transportation of materials, equipment, and emergency relief supplies, in cooperation with local construction companies in accordance with pre-signed agreements.
Established a liaison and coordination meeting between the national government and local governments to share information on the road restoration to support recovery and reconstruction.

## Recovery action in response to the disaster caused by the heavy rainfall on September 20, 2024

To support the recovery of areas affected by the heavy rainfall in September
We secured the route between Wajima (Monzen-cho) and Suzu via the coastal area of National Highway No.249 within 2024 as the previous target
The access to all villages, fishing ports, water purification plants, etc.* on prefectural roads, etc., which were secured at the end of August, will be secured again within 2024

*Excludes areas related to long-term evacuation areas

# Initiatives for the Recovery of the Noto Peninsula

We are promoting initiatives to develop the Scenic Coastal Road into an attractive route for visitors from Japan and abroad. These efforts include improving coastal road facilities, encouraging longer-stay tourism, revitalizing cycle tourism, and enhancing the appeal of ‘Michi-no-Eki’ (roadside stations).”

## Creative Revitalization of the Noto Peninsula Scenic Coastal Route

Based on the basic policy for the creative revitalization of the Noto Peninsula Scenic Coastal Road, we implemented collaborative initiatives with the local community. These included developing parking areas offering scenic views, incorporating the logo mark into signage and information boards, hosting a “Michi-no-Eki (roadside station)” relay event, supporting cycling sports events, and promoting regional revitalization using the Japanese crested ibis as a symbol.

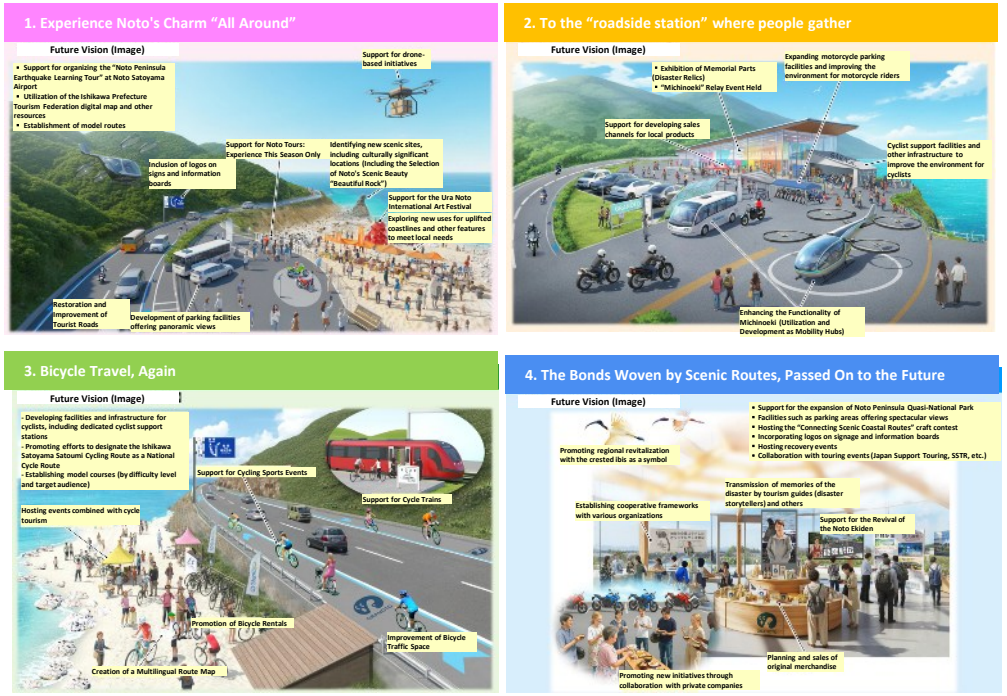



Image of Noto Peninsula Scenic Coastal Road

GRANOTO

Noto Peninsula Scenic Coastal Route Logo

# Enhancing Disaster Response Based on the Noto Peninsula Earthquake

## Enhancing Initial Response

- Legalize road opening plans and implement road openings based on effective plans (establish special provisions for approved construction projects)

## National government's flexible support during disasters

- Expanding he system under which the national government implements disaster response and recovery projects on behalf of local governments
  - ・Management services required when utilizing locally managed parking lots for disaster recovery and similar purposes
  - ・Management services for disaster recovery and similar purposes on roads managed by local road corporations

## Enhancing the Function of Automobile Parking Lots as Disaster Response Bases

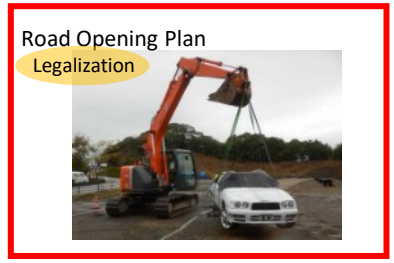
- Relax occupancy permit standards for toilet containers and similar facilities that can be used during normal times and deployed to disaster areas during emergencies; establish an interest-free loan system for their installation
- Establish a system allowing the national government to directly undertake reconstruction and other work for locally managed disaster response base vehicle parking lots

(Normal Conditions)

- Consult with relevant parties to formulate and periodically review emergency response plans. Conduct practical drills and training.
- Promote the development of Michi-no-Ekis as disaster response hubs and the deployment of toilet containers, etc.

(During a disaster)

- Implementation of road clearance based on clearance plans. The national government will manage “MIchi-no-Eki” serving as disaster response hubs
- Deployment of toilet containers and other facilities to disaster-stricken areas, etc.





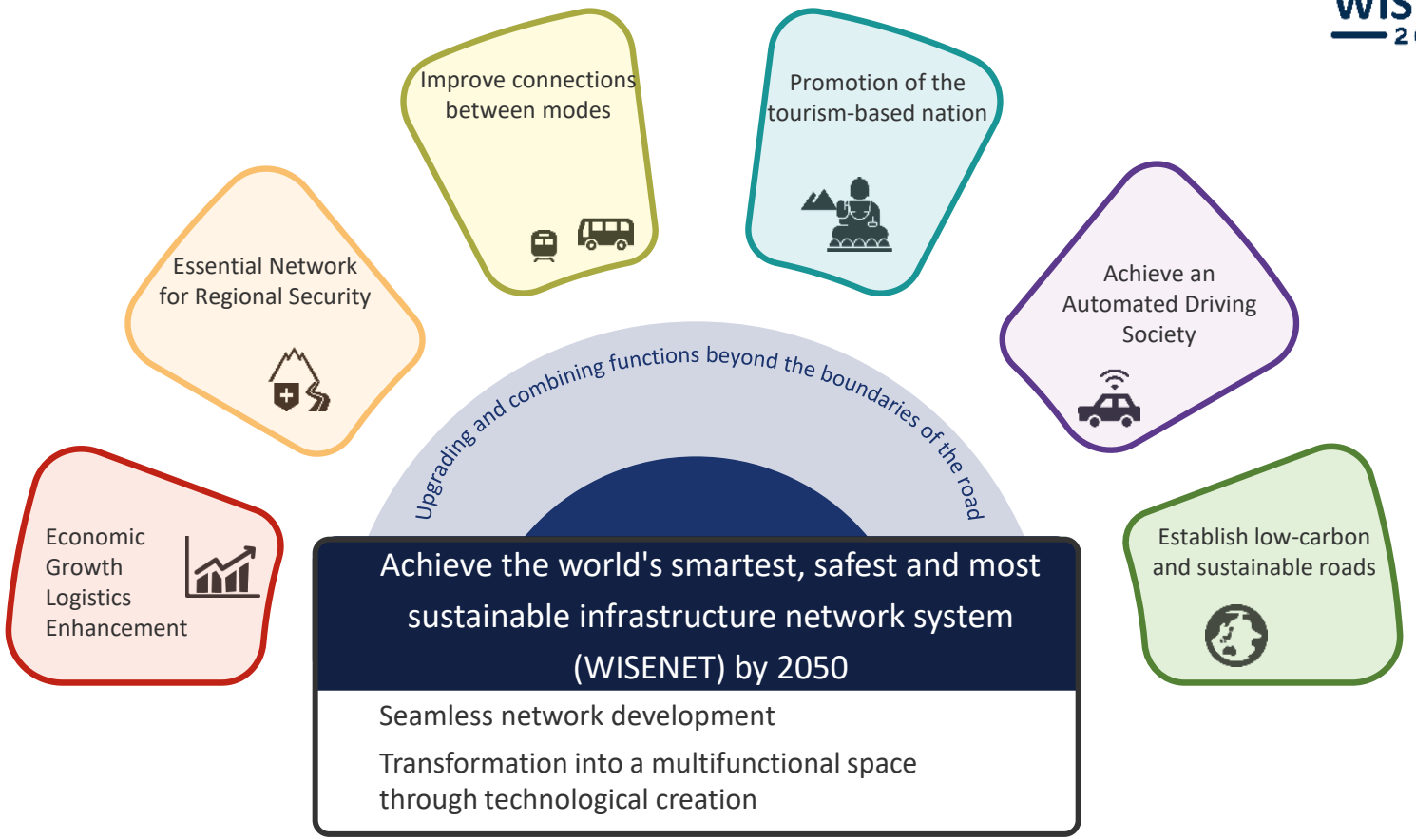
Road Clearance and Disaster Recovery

Deployment of toilet containers and other supplies to disaster-stricken areas

Status of installation work

# Realization of WISENET by 2050 (1)

"We will realize the world's smartest, safest, and most sustainable infrastructure network system (WISENET) by 2050, solving the challenges of the new era and creating value."



# Realization of WISENET by 2050 (2)

Focus Areas: International Competitiveness, National Security, Logistics Crisis Response, and Decarbonization

**Main Features of WISENET**

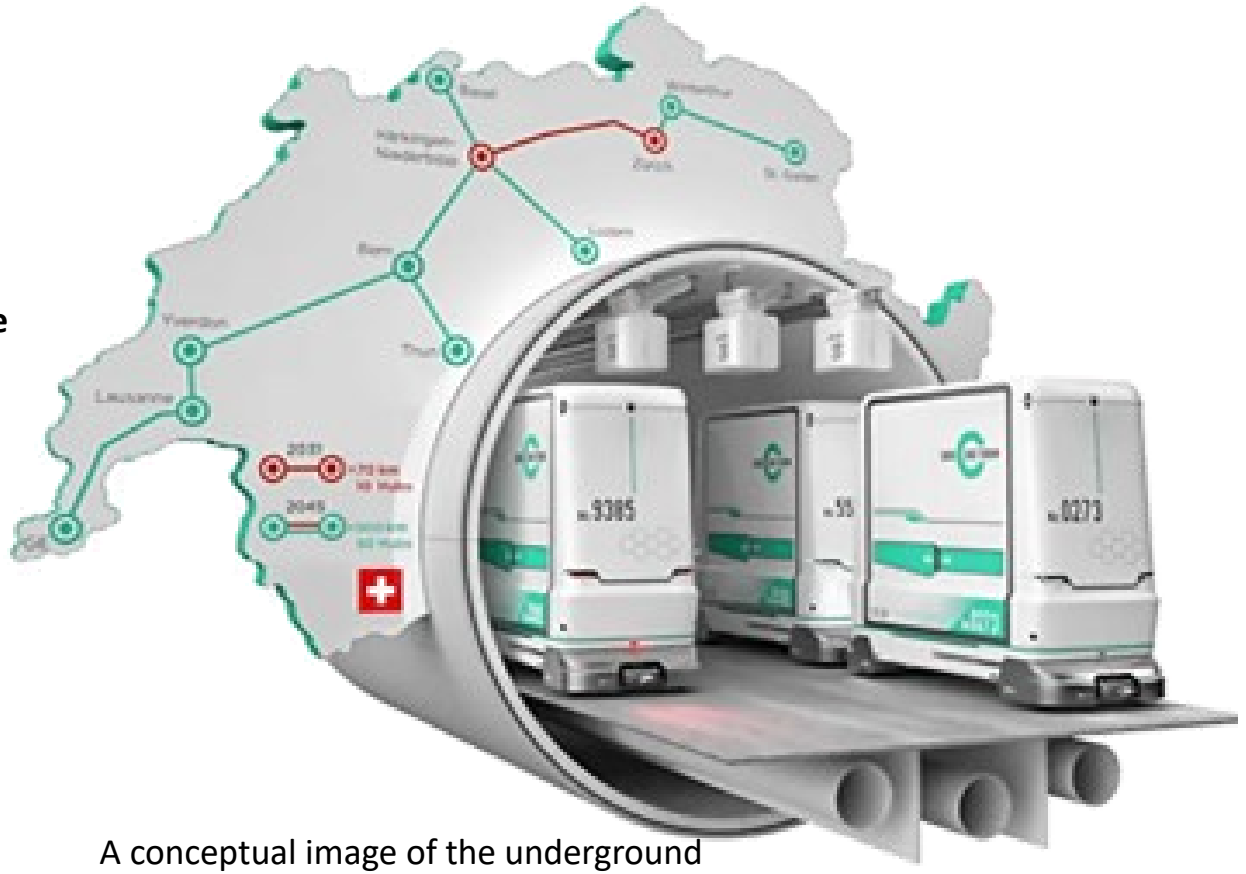
**Establishing a seamless network**

Shifting to service-level-oriented road administration and aiming for seamless service provision

**Evolution into a multifunctional space through innovation**

Fully utilizing the road network across the nation to contribute to solving challenges and creating value

Establishing the “Autoflow Road”



A conceptual image of the underground logistics system being considered in Switzerland

Source: Cargo Sous Terrain website

# Realization of WISENET by 2050 (3)

## Economic Growth and Logistics Enhancement

-Develop a robust logistics network, including the ring roads in three major metropolitan areas and a strengthen trans-Japanese axis connecting the Sea of Japan side and the Pacific Ocean side for international competitiveness

-Develop logistics support initiatives: the enhancement of networks around logistics hubs, freight rail stations, airports, and seaports, and the further develop  relay transportation hub

## Promotion of the tourism-based nation

-Enhance access to gateway airports, seaports, and tourist destinations to attract more visitors

-Analyze data on tourist destinations where overtourism is an issue, and conduct traffic congestion countermeasures in cooperation with local communities in terms of both infrastructure-based and non-infrastructure-based measures


Review of highway toll discounts

Promotion of shared bicycles

# Realization of WISENET by 2050 (4)

## Essential Network for Regional Security

Position high-standard arterial highways, which are essential for maintaining the residential population in rural areas and mitigating large-scale disaster risks, as the "Essential Network for Regional Security" and promote their early development.

Support the formation of zones that go beyond traditional regional and block-based concepts.

Sanriku Coastal Road (Yamada, Iwate)

## Realizing an Automated Driving Society

Promote the digitalization of National Expressways to enable advanced coordination between roads and vehicles, aiming for the early realization and social implementation of autonomous driving.

[Initiatives will begin on the Shin Tomei Expressway in FY2024 and on the Tohoku Expressway and other highways from FY2025 onward, with plans for nationwide expansion in the future]

Autonomous driving with vehicle and road coordination

# Realization of WISENET by 2050 (5)

## Improve connections between modes

Strengthen collaboration with maritime and rail transportation to achieve the optimal modal combination, from the perspectives of carbon neutrality and labor reduction.

Create future-oriented spaces that support MaaS and autonomous driving by fostering human-centered environments and seamless integration with diverse mobility options through the development and management of bus terminals.

Conceptual image of Shinagawa Station Bus Terminal

## Achieving low-carbon and sustainable roads

Promote the digitalization of National Expressways to enable advanced coordination between roads and vehicles, aiming for the early realization and social implementation of autonomous driving.

[Initiatives will begin on the Shin Tomei Expressway in FY2024 and on the Tohoku Expressway and other highways from FY2025 onward, with plans for nationwide expansion in the future.]

Basic policy
1

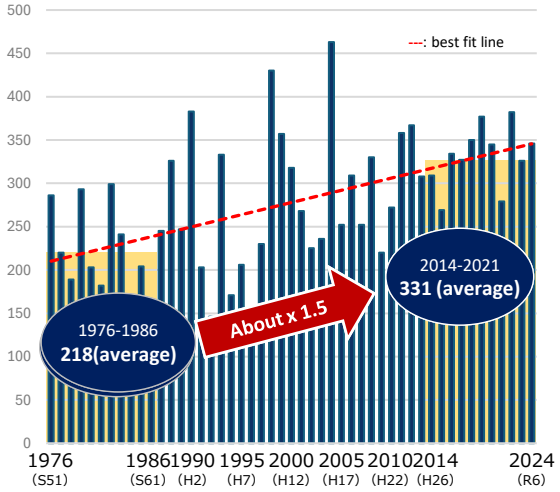
# Disaster prevention and mitigation, national resilience enhancement

## ~Protecting the lives and livelihoods of the people from disasters~

Roads play a crucial role in **protecting the lives and livelihoods of the people** from the frequent weather-related disasters and large-scale earthquakes in recent years. We are working on **initiatives to support evacuation and recovery activities** after a disaster, as well as the **development of a disaster-resistant road network**, to ensure the early passage of general vehicles.

### Intensified and more frequent weather hazards

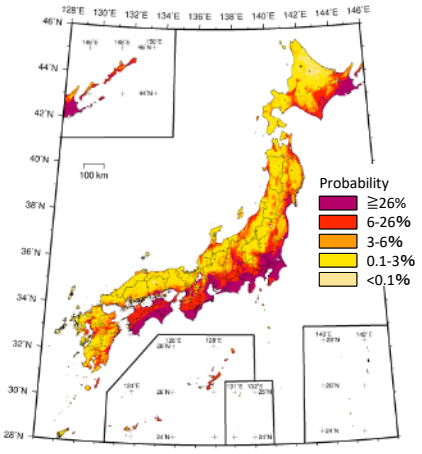
Annual frequency of rainfall events with an hourly precipitation of 50mm or more
(Per 1,300 AMeDAS stations)




Source: Japan Meteorological Agency

### Imminent large-scale earthquakes

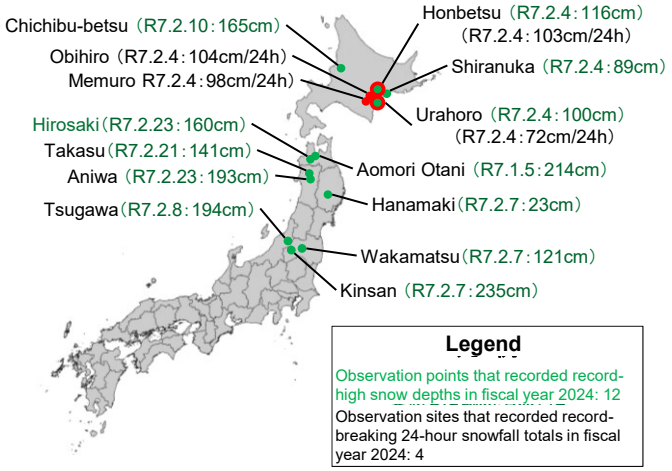
Probability of an earthquake occurrence with a seismic intensity of 6 or higher in 30 years




Source: 2020 National Earthquake Prediction Map
(Headquarters for Earthquake Research Promotion)

### Torrential snowfall

Record-high snowfall depth and maximum 24-hour snowfall across the country




Source: Compiled from JMA data

Basic policy

2

# Full Transition to Preventive Maintenance-based Approach

**~Safe and secure roads for the next generation~**

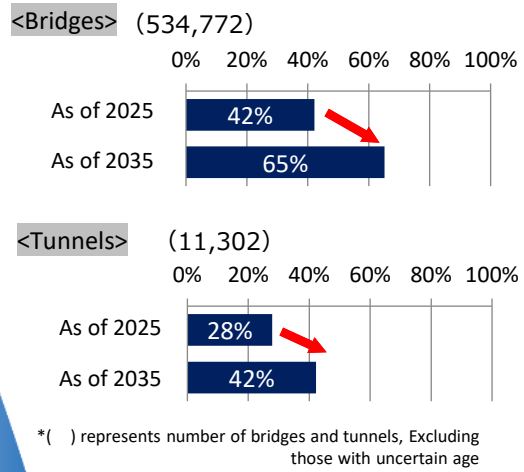
Road administrators have the responsibility to ensure our **roads are safe and secure** while **passing on well-maintained infrastructure to the next generation**.

To **achieve efficient and sustainable maintenance management**, we will **leverage new technologies** and shift to a preventive maintenance approach, where repairs are carried out before issues arise.

## Growing deterioration of aging infrastructure

The percentage of road facilities over 50 years old is rapidly increasing

■Percentage of road facilities over 50 years old

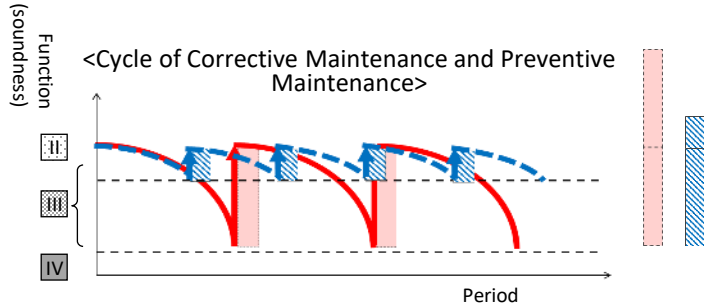



*( ) represents number of bridges and tunnels, Excluding those with uncertain age

## Preventive Maintenance vs Corrective Maintenance

| Preventive maintenance | Corrective maintenance |
|---|---|
| Repairing roads **before** their functionality or performance deteriorate | Repairing roads **after** their functionality or performance deteriorate |

Preventive maintenance can **reduce and smooth out the total cost** in the medium to long term




## Road Collapse Countermeasures

On January 28, 2025, a truck driver fell to his death when his vehicle plunged into a road collapse caused by a sewer pipe that had been in place for over 40 years on a prefectural road in Yashio City, Saitama Prefecture. As of February 2026, the collapsed section remains impassable.The risk of road damage and traffic disruption due to aging underground utilities has become apparent.

Basic policy

3

# Development of Networks and Hubs to Support the Flow of People and Goods ~Connecting people and communities~

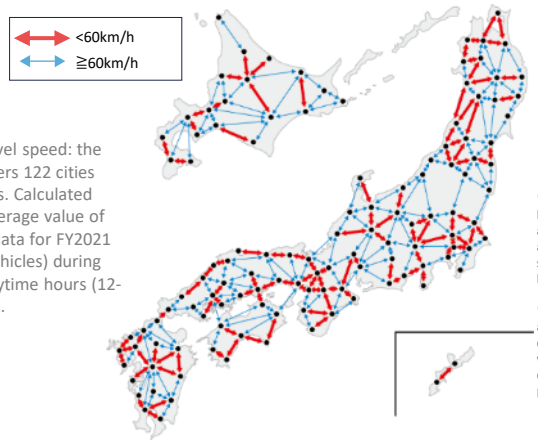
Building arterial road networks that connect hubs for livelihood and industries is essential for supporting the flow of people and goods.

We will **develop high-standard highways that enable fast and safe travel**, **enhance their functionality**, **strengthen modal connectivity (integration of roads with various transportation modes)** through the development of transportation hubs, and will promote measures such as **congestion mitigation and logistics support**.

## Intercity travel speed

Japan lags behind other countries, with about 40% of intercity travel speeds falling below 60 km/h (101 out of 235 links).

Intercity travel speeds




Intercity travel speed: the analysis covers 122 cities and 235 links. Calculated using the average value of the ETC2.0 data for FY2021 (for small vehicles) during weekday daytime hours (12-hour period).

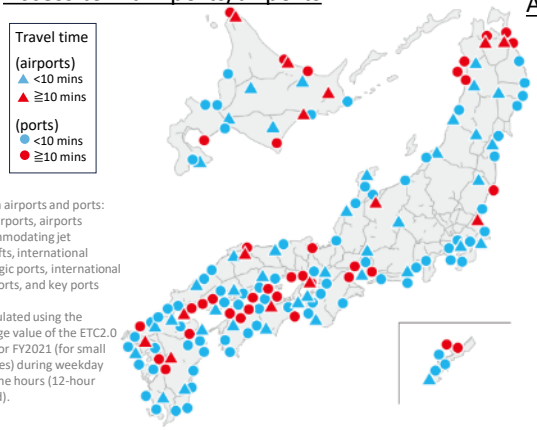
<Reference> Average intercity travel speeds in other countries

| Japan | Germany | France | UK | China | Korea |
|---|---|---|---|---|---|
| 61km/h | 84km/h | 88km/h | 74km/h | 87km/h | 77km/h |

## Access to sea ports/airports

About 30% of airports and seaports are located more than 10 minutes away from the nearest high-standard highway (50 out of 170 locations).

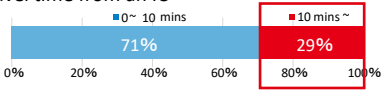
Access to main ports/airports




*Main airports and ports: hub airports, airports accommodating jet aircrafts, international strategic ports, international hub ports, and key ports

*Calculated using the average value of the ETC2.0 data for FY2021 (for small vehicles) during weekday daytime hours (12-hour period).

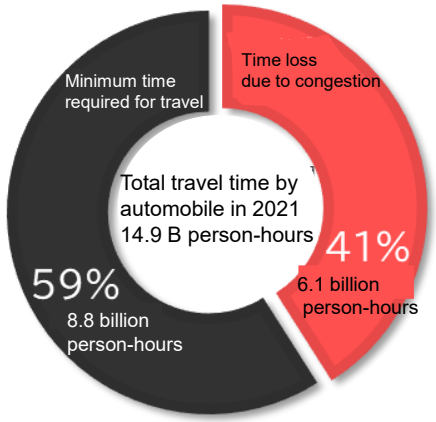
Travel time from an IC




## Time loss due to traffic congestion

About 40% of travel time is lost due to traffic congestion, totaling 6.1 billion person-hours annually—equivalent to the working hours of 3.7 million people. This represents 1.3% of Japan's total CO2 emissions.

Annual total travel time by automobiles (nationwide)



Basic policy

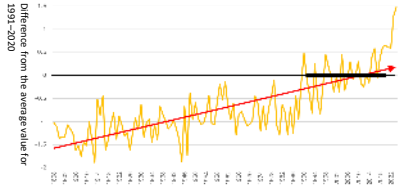
4

# Achieving a Carbon-Free Society through GX (Green Transformation)

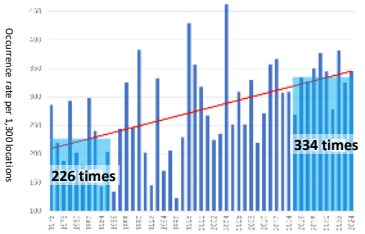
## ~ Contribution to Carbon Neutrality by 2050 ~

In response to the global climate change crisis, the road sector works toward achieving carbon neutrality.

**Rising at a rate of +1.4°C per century**



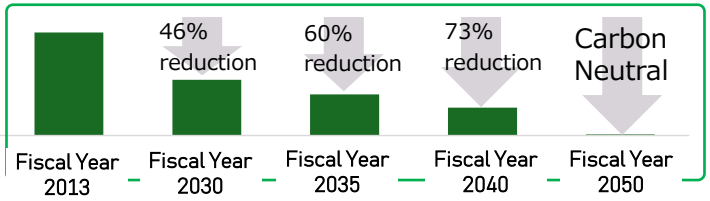

**The number of heavy rainfall events has increased by about 1.5 times over the past 50 years.**




**[New Framework for Decarbonization through Amendments to the Road Act and Other Laws]**

Basic Policy on Decarbonization of Road Transportation [National] ⇄ (Policy Presentation / Report) ⇄ Road Decarbonization Promotion Plan [National Government, Expressway Companies, Local Governments, etc.]

**[Road-wide $CO_2$ Emission Reduction Target]** **(Set identically to the national reduction target)**




**Road Management Scope【Scope 1, 2】**

Set the same quantitative targets as for the entire road sector

(Promoting decarbonization of roads through measures such as converting street lighting to LED)

**Road Maintenance Sector / Road Usage Sector [Scope 3]**

We plan to set quantitative targets going forward.

**[Basic Direction of Measures]**

**(1) Low-carbonization throughout the lifecycle of roads**

Reducing CO2 emissions throughout the entire lifecycle from construction to management

**(2) Creating road spaces that support the greening of road transportation**

Promotion of power generation, transmission, distribution, and storage in road spaces

**(3) Transition to low-carbon mobility of people and goods**

Promoting the shift to low-carbon transportation and the development of logistics systems

**(4) Optimization of road traffic**

Measures for bottlenecks and localized congestion points

**[Promoting road construction that enables humans and animals to coexist, aiming to achieve nature positivity]**

Analysis of roadkill data enables implementation of effective countermeasures through road markings, car navigation systems, and other measures.


MLIT

# Promoting Road Decarbonization to Achieve Carbon Neutrality by 2050 (1)

In response to the global climate crisis, we will promote the decarbonization of roads while seeking synergies with nature-positive initiatives.

## Basic Policy Direction

### 1 Low-carbonization throughout the entire road lifecycle

**[Low-Carbon Road Construction and Management]**

- Reduce CO2 emissions from road construction through the adoption of low-carbon construction machinery
- Promote the introduction of next-generation vehicles※1 for road-related vehicles such as patrol cars, while considering the current development status

Electric hydraulic excavator

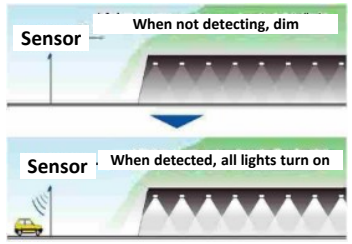
Electric Wheel Loader

Promoting the adoption of low-carbon construction machinery
(Source：VOLVO Construction Equipment Japan HP)

Converting road-related vehicles to next-generation vehicles
(Source: Sendai City Official Website)

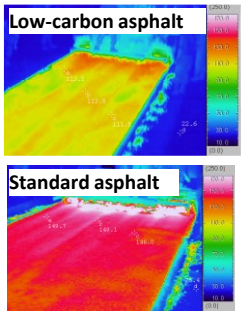
- Promoting the conversion to LED and enhancement of road lighting


Conversion of Road Lighting to LED

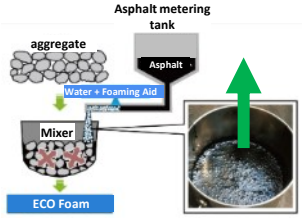



Advanced Road Lighting

- Steadily promote the introduction of low-carbon materials and the use of recycled construction materials such as reclaimed asphalt
- Based on newly created guidelines to promote the implementation of street tree inspections, advance road greening and appropriate maintenance while utilizing new technologies




Introduction of Low-Carbon Asphalt




Asphalt Medium-Temperature Technology

Promoting Roadside Greening
(Inzai City, Chiba Prefecture)

# Promoting Road Decarbonization to Achieve Carbon Neutrality by 2050 (2)

To promote the development and adoption of next-generation vehicles, as well as the utilization and integration of renewable energy, we will advance initiatives for power generation, transmission, distribution, and storage within road spaces. This will be done in collaboration with relevant ministries and agencies, while also strengthening disaster response measures.

## Basic Policy Direction

### 2 Creating road space that supports greener road transportation

#### [Power Generation]

- Regarding perovskite solar cells, commence demonstration projects at anticipated future installation sites while advancing implementation at already suitable locations to promote adoption in road spaces
- Relax occupancy standards for decarbonization facilities under the Road Decarbonization Promotion Plan to facilitate the introduction of solar power generation equipment
- For road surface solar power generation equipment, conduct technical demonstrations while exploring specific application cases for societal implementation

#### [Power Transmission]

- Examine the potential for utilizing road space for power system development and other purposes

#### [Disaster Response

- Installation of energy storage facilities in roadways to respond to power outages
- Implementation of charging support for electric vehicles during vehicle congestion caused by heavy snowfall, etc.

#### [Power Supply, etc.]

- Promote the adoption and convenience of next-generation vehicles by facilitating the installation of EV charging facilities and hydrogen stations, and by improving EV charging facility signage
- Advance technical demonstrations to verify performance and other aspects for the social implementation of in-motion charging, primarily for public transportation


Pulling into the hydrogen station
Large next-generation vehicle (Ashigara SA (downbound)

Promoting the installation of EV charging facilities

Demonstration of Power Supply Facilities During Operation

#### [Energy Storage]

- To address the unstable power generation of renewable energy sources, introduce storage batteries and other equipment.

Portable Rapid Charger

# Promoting Road Decarbonization to Achieve Carbon Neutrality by 2050 (3)

We will promote the shift to low-carbon transportation modes such as public transit, bicycles, new mobility options, and walking, using both hardware improvements and software measures as dual drivers.
We will also promote the development of low-carbon logistics systems to advance CO2 emissions reduction.
We will promote the reduction of CO2 emissions from vehicle traffic through measures such as improving driving efficiency via c ongestion countermeasures.

## Basic Policy Direction

### 3 Transition to low-carbon passenger and freight transportation

**【Human Flow】**

- Promote the development of dedicated bicycle lanes and other traffic spaces appropriately separated from pedestrians and motor vehicles
- Promote the adoption of integrated public transport, bicycle, and automobile systems such as cycle trains, shared bicycles, and on-street car sharing
- Support the introduction of public transport systems such as BRT and promote the development of transportation hubs such as bus terminals and mobility hubs

Busta Development Concept

(Yokkaichi City, Mie Prefecture)

Bicycle parking facilities near railway stations

# Promoting Road Decarbonization to Achieve Carbon Neutrality by 2050 (4)

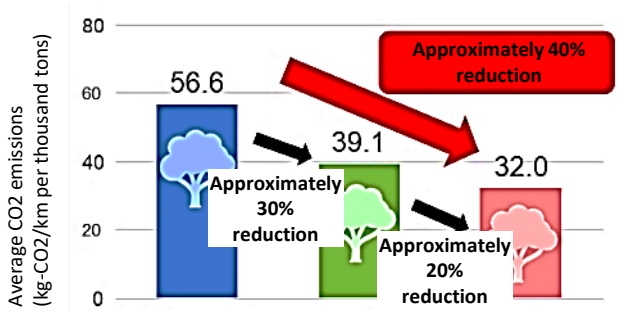
We will promote the shift to low-carbon transportation modes such as public transit, bicycles, new mobility options, and walking, using both hardware improvements and software measures as two wheels of progress.
We will also promote the development of low-carbon logistics systems to drive down CO2 emissions.
We will promote reductions in CO2 emissions from vehicle traffic through measures such as improving driving efficiency via congestion countermeasures.

## Basic Policy Direction

### 4 Optimization of Road Traffic

**[Logistics]**

- Based on business needs and other factors, designate sections for double-trailer trucks and promote the development of parking spaces.




CO2 Reduction Effect of Double-Linked Trucks
(Emissions per 1,000 ton-km)

**【[mproved Driving Efficiency and Reduced Vehicle Acceleration/Deceleration]**

- In addition to addressing localized congestion hotspots, improve traffic flow by eliminating vehicle bottlenecks at railroad crossings
- Promote society-wide initiatives to effectively utilize traffic capacity by dispersing demand through Traffic Demand Management (TDM) and other measures


Photographed in February 2007
Provided by: Aichi Prefecture Photography

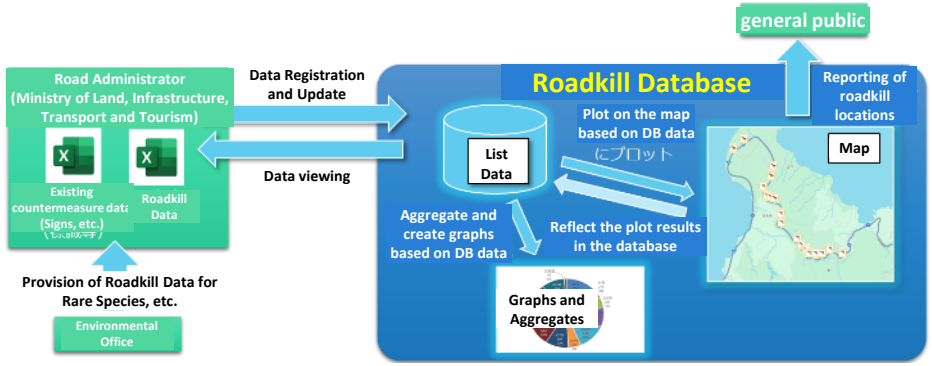

Photographed in March 2021
Provided by: Aichi Prefecture Photography

# Promoting Road Decarbonization to Achieve Carbon Neutrality by 2050 (5)

To achieve nature positivity, we will promote the creation of roads where humans and animals can coexist.
To prevent frequent roadkill incidents, we will utilize accident data and other information to strengthen driver awarene ss through road markings, car navigation systems, and other means.

## Biodiversity Initiatives

- To prevent frequent roadkill incidents, we collected roadkill data, built a database, and provided information to road users and road managers.
- By analyzing roadkill data, we implemented effective countermeasures using road markings, car navigation systems, and other methods.

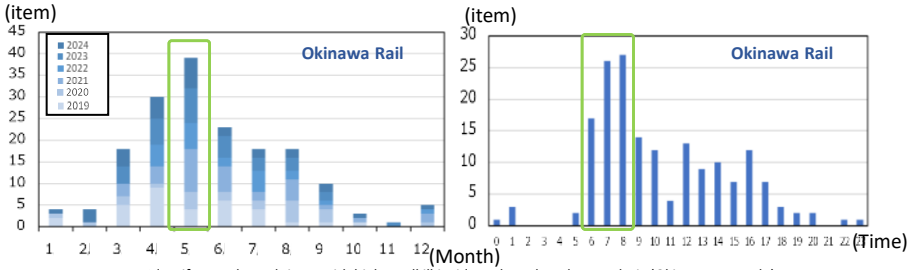



Roadkill Database Construction Concept


Examples of road markings indicating locations where caution for animals is required, based on data analysis


Examples of Using Road Information Boards to Indicate Animal Caution

- Consolidate know-how gained from piloting data-driven roadkill countermeasures and roll it out nationwide
- Promote society-wide initiatives to effectively utilize traffic capacity by dispersing traffic demand through Traffic Demand Management (TDM) and other measures




Identify months and times with high roadkill incidents based on data analysis (Okinawa example)

○Fostering accident prevention awareness among drivers and others through collaboration with the private sector


Collaboration with Automobile Manufacturers, etc.
Initiatives to Foster Awareness Among Drivers


Collaboration with Convenience Stores
Display of Roadkill Prevention Awareness Posters

Basic policy

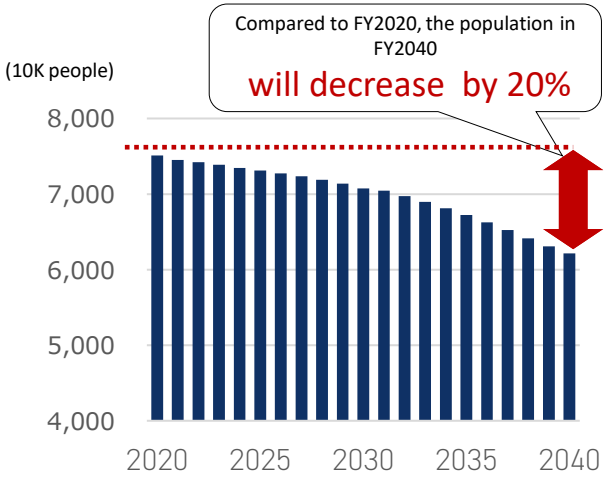
5

# Digital Transformation(DX) of the Road System

## ~ Promotion of xROAD ~

As the working-age population declines, **digitalization is essential** in the road sector to sustainably develop and maintain infrastructure, create new added value, and enhance productivity. To **ensure safer and more secure passage** for road users while **providing advanced road usage services**, we will accelerate the "xROAD", digital transformation initiative. This initiative aims to advance and streamline road surveys, construction, and maintenance through the introduction of new technologies and the utilization of data.

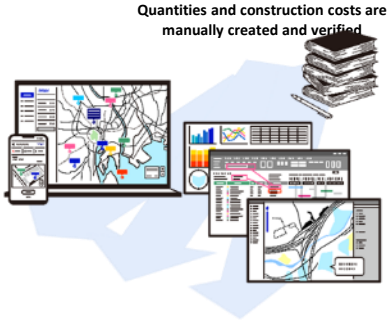
### Decline in the working-age population




Source: National Institute of Population and Social Security Research "Future Population Projections for Japan (FY2023 Projections)" (Birth Rate Median (Death Rate Median) Projections)

### Potential for streamlining administrative procedures

While social and economic activities mature and become more complex, and digitalization advances across society, there remains an analog component in administrative procedures, traffic volume surveys, and the collection and analysis of information. These tasks present opportunities for streamlining.




**The need for disclosing road data is increasing**

### Development of the road system

**By the end of FY2023**

- Utilizing support technologies for road patrols and pavement inspections
- Deploying snow removal machines with automatic control capabilities
- Digitizing the location data of road occupation
- Operating and publishing the road facility inspection database
- Publishing the road foundation map database

**By the end of FY2024**

- Operating the road management information integration viewer
- Operating the road data platform
- Publishing real-time traffic volume data
- Promoting initiatives toward the realization of autonomous trucks

**FY2025 onward**

- Increasing the number of national highway offices that have introduced in-vehicle cameras for patrol cars
- Deploying snow removal machines with automatic control capabilities
- Digitizing road information to be recorded as a priority
- Exclusive use of ETC
- Developing and operating the next-generation ITS

Basic policy

6

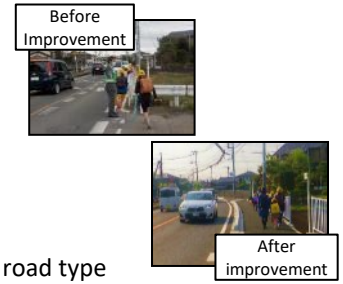
# Creating Safe and Secure Road Space and Vibrancy

## ~Community/City Development~

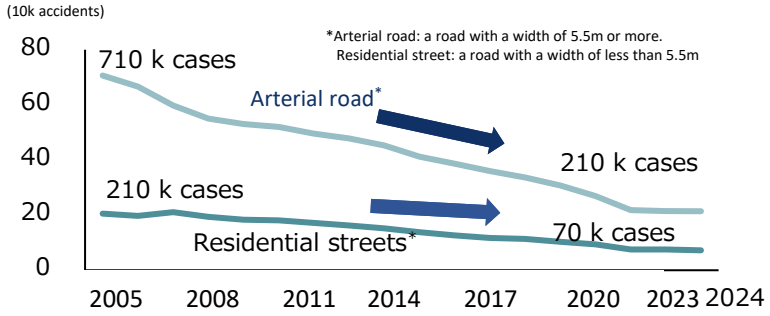
We are creating a society where everyone can live safely, securely, and comfortably through **traffic safety improvements**, accommodation of universal design, **removal of utility poles**, and **development of cycling routes**. We are also promoting initiatives to respond to the diverse needs of road spaces, such as the integration of **new mobility** options such as electric scooters and the **creation of local vibrancy.**

### Creation of safe and secure road space

While the number of traffic accidents is decreasing, a significant number of accidents still occur, making the promotion of traffic safety measures essential. Efforts will be made to encourage the shift of automobile traffic to dedicated motorways and arterial roads, thereby separating their functions from residential streets, and to develop safe, secure, and universally designed spaces suited to an aging society with fewer children.



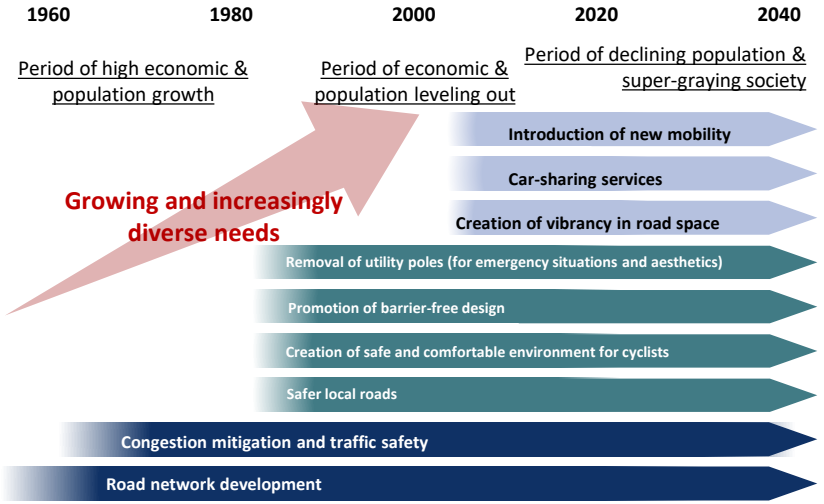

■ Change in traffic fatality and injury accident by road type




*Arterial road: a road with a width of 5.5m or more.
Residential street: a road with a width of less than 5.5m

Source: Annual Report of Traffic Accident

### Increasingly diverse road policies in response to social needs



# Individual subsidy and grant system (1)

## Subsidy Program for High-Standard Roads and IC Access Roads

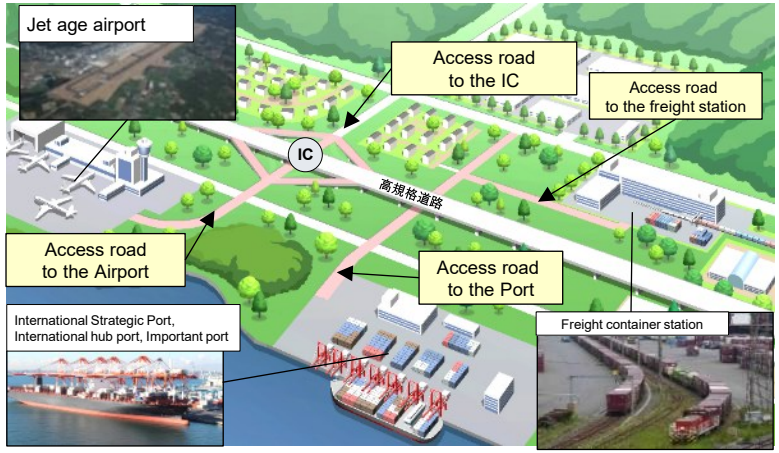



Image of subsidized access roads for ICs, airports, ports, etc

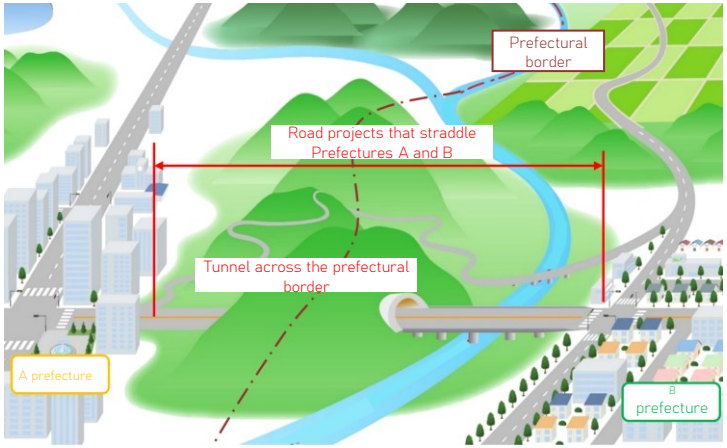


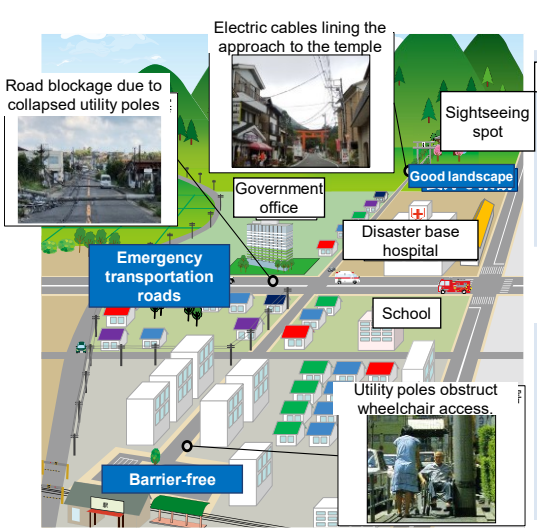

Image of Subsidized Prefectural Border Road Maintenance

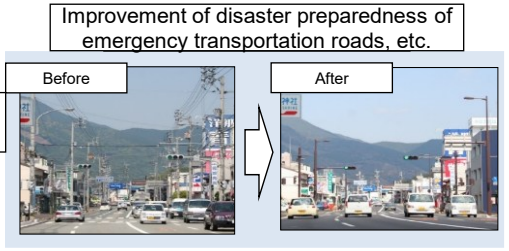
## Road Maintenance Project Subsidy Program

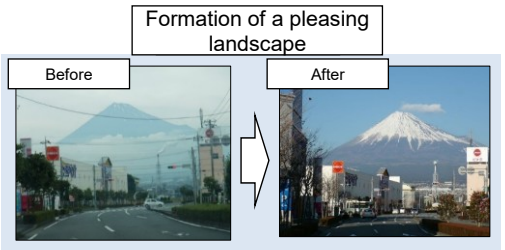
| ○○ City **Bridge** Long-Life Maintenance Plan [Individual Facility Plan] | ○○ City **Tunnel** Long-Life Maintenance Plan [Individual Facility Plan] | ○○ City **Road facilities** Long-Life Maintenance Plan [Individual Facility Plan] |
|---|---|---|
| Contents<br>・Overall plan policy<br>・Short-term numerical targets and their cost reduction effects<br>・Items for each individual structure (Specifications, inspection results, etc.) | Contents<br>・Overall plan policy<br>・Short-term numerical targets and their cost reduction effects<br>・Items for each individual structure (Specifications, inspection results, etc.) | Contents<br>・Overall plan policy<br>・Short-term numerical targets and their cost reduction effects<br>・Items for each individual structure (Specifications, inspection results, etc.) |




## Subsidy Program for the Project to Promote the Removal of Utility Poles

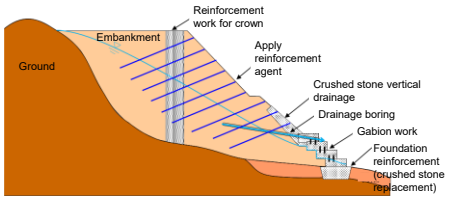


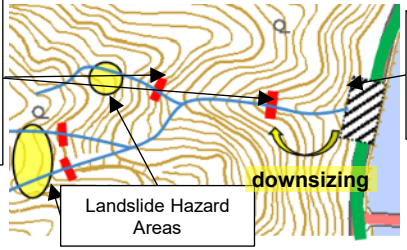
# Individual subsidy and grant system (2)

## Subsidy system for slope disaster prevention measures on road embankments (created in 2025)




## Subsidy Program for Landslide Disaster Prevention Road Projects

Development of landslide countermeasure facilities in conjunction with erosion control projects

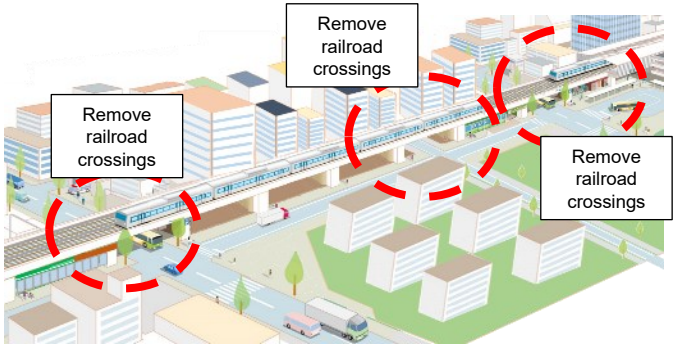



Landslide disaster prevention project by the road sector

## Traffic Safety Subsidy Program

Image of the Traffic Safety Measures Subsidy System
(Emergency Measures for School Routes)


## Subsidy Program for Continuous Elevated Railroad Projects





## Level Crossing Road Improvement Project Subsidy Program