

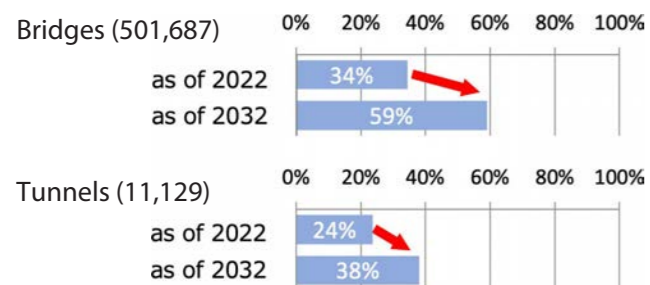
Preventive maintenance measures to aging road

- Safe and secure roads for the next generation -

Based on the lessons learned from "America in Ruins", we have a responsibility to protect the safety and security of roads and to pass on reliable infrastructure to future generations. In order to make an early transition to maintenance based on preventive maintenance that reduces life-cycle costs and achieves efficient, sustainable management, we will accelerate measures for facilities that require repair as identified by periodic inspections and promote the active use of new technologies.

Increasingly serious aging of infrastructure

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



Infrastructure facilities more than 50 years old
*) indicates numbers of bridges and tunnels, excluding those where year of construction is unknown



Judgment category IV (urgent measures should be taken)
Pier scour

America in Ruins

In the 1980s in the U.S., several bridges, elevated roads, and other structures collapsed due to a failure to maintain aging road infrastructure, much of it dating from the 1930s, causing major social and economic impacts. Subsequently, road investment was secured through an expansion of financial resources and the number of defective bridges decreased, but serious accidents still occurred due to aging.



The Brooklyn Bridge's sidewalk closed down after a cable cutting accident. (Taken from "Highways and Automobiles, November, 1981.



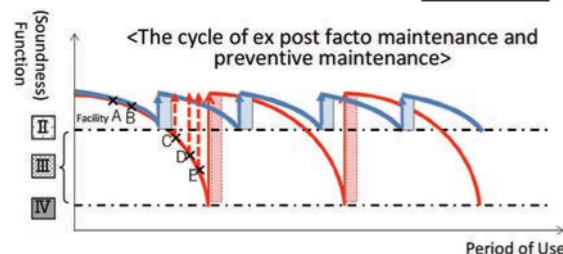
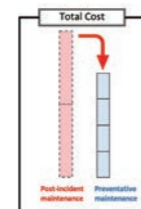
Collapse of the Maianas Bridge (1983)



Fern Hollow Bridge collapse (2022) (from National Transportation Safety Board (NTSB) website)

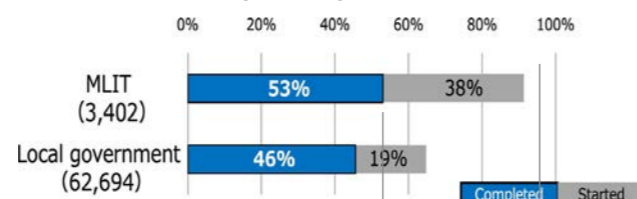
Medium- to long-term cost reduction through preventive maintenance

In order to shift to maintenance management based on preventive maintenance, and to reduce and equalize total costs over the medium and long term, it is vital to take early action on facilities that require early or urgent action (Judgment categories III and IV).



Implementation status of repair and other measures for bridges in Judgment Categories III and IV

The proportion of bridges judged in need of early or urgent action (Category III/IV) in first-round inspections in the five years from FY2014 that have been repaired by local governments is lower than that of bridges managed by MLIT



※ Facilities diagnosed in judgment categories III or IV in the first round of inspections from FY2014 to FY2018 (facilities newly diagnosed as judgment category III or IV in or after the second round of inspections are not included)

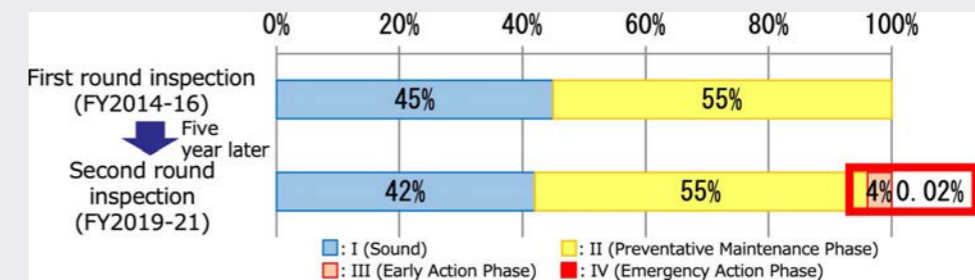
Promote Long Life Repair Plans

For facilities managed by local governments, we provide systematic and intensive financial support to the measures based on "Long-Life Repair Plans" by utilizing the Road Maintenance Project Subsidy Program, and technical support such as direct diagnosis and repair services on their behalf.

Background / data

[FY2022 annual road maintenance report]

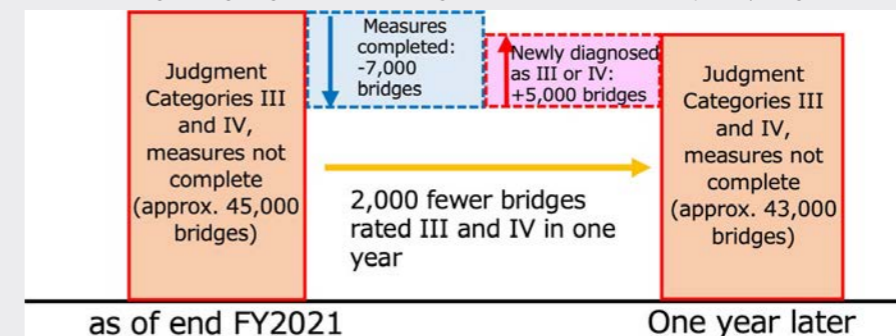
- 46% of bridges managed by local governments that require urgent or early action have been repaired
- Proportion of bridges rated from I/II in the first round to III/IV in the second round of inspections five years later: 4%



[Transition to preventative maintenance]

- At the current budget level, complete transition to preventative maintenance will take about 20 years (based on end FY2021 criteria).

Image showing changes in the number of bridges rated III and IV with measures completed by local governments



Financial support for local communities

Provide financial support to local governments through the Road Maintenance Project Subsidy Program

- Promote the shift to preventive maintenance by providing systematic and intensive financial support for facilities that require early repair and other measures
- Priority support will be given to projects that use new technologies and to the projects of local governments that have established short-term numerical targets for consolidation or removal of bridges as well as the use of new technologies and their cost reduction effects in their Long Life Repair Plans.

Ref 1: Directly managed diagnoses (FY2014-2020): 16 locations; repair and maintenance (FY2015-2021): 15 locations

Technical support for local government

Technical support provided by the government, including repair services and training on repair. Ref.1

- The rate of repair measures for bridges that require urgent or early action on roads managed by local governments. (2019→2025) : Approx. 34%⇒ Approx. 73%
- The number of those trained in maintenance and management at local governments. (2019→2025) : 6,459⇒ 10,000

Maintenance and management using new technology

We will promote the prompt development of catalogs and technical standards necessary for the introduction of new technologies, actively utilize new technologies, encourage the acquisition of qualifications for inspection engineers, and improve the efficiency and sophistication of maintenance and management

Background / data

- In order to promote the use of new technologies, create and publish an performance catalog of inspection support technologies(Ref.1)
- From FY2022, specify the use in principle of some of the technologies listed in the catalog for inspections under direct control (made explicit in particular specifications)

Improve efficiency, sophistication, and quality of periodic inspections

Develop and expand the performance catalog of inspection support technologies for bridges, tunnels, and pavements to promote more efficient and sophisticated periodic inspections

From 2023, qualifications etc. (Ref.2) are required for engineers in charge of bridge inspection on national highways under direct control

- Number of technologies listed in the performance catalog of inspection support technologies (FY2020 ⇒ FY2025): 80 ⇒ 240
- Among local governments that considered using new technology in bridge and tunnel inspections, proportion that have used it (FY2019 ⇒ FY2025): Bridges: 39% ⇒ 50%; Tunnels: 31% ⇒ 50%

Promoting the introduction of new technologies

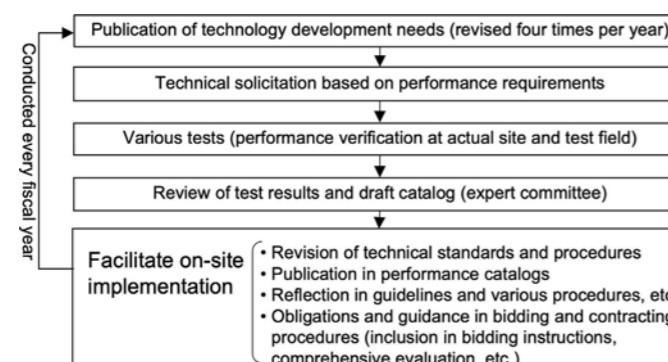
Promote technology research and development by start-up companies, etc. to improve the efficiency and sophistication of maintenance and management

Rapidly develop technical standards necessary for the introduction of new technologies

Priority support for the use of new technologies in the Road Maintenance Project Subsidy Program



Flow of new technology introduction



Ref.1 : Performance values for each technology are organized and published in catalog form according to standards <https://www.mlit.go.jp/road/sisaku/inspection-support/>
 Ref.2 : Qualifications required of management engineers in their work (e.g., professional engineer, doctoral degree, JSC certified engineer, etc.), private qualifications registered as "Ministry of Land, Infrastructure, Transport and Tourism Registered Qualifications," certificates of passing road bridge maintenance technology training, etc.

Improving efficiency of maintenance and management measures in the regions

In order to reduce maintenance and management costs, support the consolidation and removal of aging bridges and other structures and their functional reduction, repair pavements with weakened roadbeds, and promote the use of concrete pavements in appropriate locations.

In order to provide good and efficient public services in the face of a decrease in the number of local construction companies and local government engineers, promote comprehensive private sector outsourcing of road maintenance.

Support for consolidation, removal, and reductions of functionality

Background / data

- Only 40% of municipalities have considered consolidation, removal. (as of the end of May 2021)

Support consolidation (Ref.1), functional reduction, and removal (Ref.2) of replaceable aging bridges and other structures through the Road Maintenance Project Subsidy Program

- Percentage of local governments considering consolidation, removal, or functional reductions of facilities: (2019 -> 2025) : 14% -> 100%



Reduction of Life Cycle Cost (LCC) of pavement

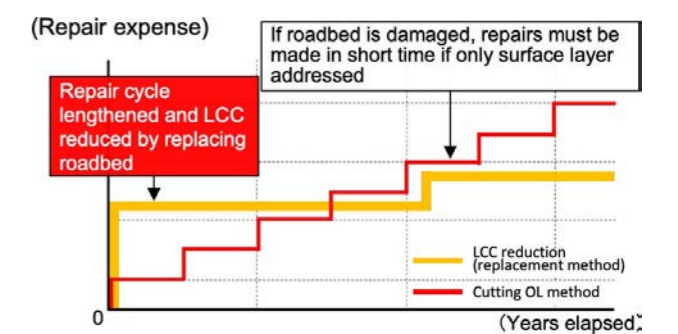
Background / data

- Damage to the roadbed causes premature deterioration of the surface layer and a large increase in LCC
- The percentage of pavements requiring repair, such as roadbed replacement, that have been started is only 15% for direct control and 32% for prefectures and ordinance-designated cities (Ref.3) (as of the end of FY2021)

Reduce LCC by replacing pavement beds and using concrete pavement in appropriate location

- Rate of pavement repair on roads important for disaster prevention for pavements with damaged roadbed or lower layer (approx. 2,700 km as of 2019). (2019->2025):0% ->100%

Image of LCC reduction



Promotion of comprehensive private sector outsourcing

Promote comprehensive outsourcing of road maintenance by local governments to the private sector, including cross-functional projects with sewerage systems, rivers, parks, etc., in accordance with local conditions, so that good public services can be provided through private-sector vitality

Ref.1 : Only in the case of repairing structures at the aggregation site or reconstructing roads for detouring to the aggregation site.
 Ref.2 : Only when removal of structures and road reconstruction are carried out at the same time or in cases where the removal is expected to have a flood control effect, and where a short-term numerical target for removal and its cost reduction effect are specified in the Long Life Repair Plan.
 Ref.3: Roads that carry heavy traffic, such as Important Logistics Roads managed by prefectures and government ordinance-designated cities

Large-scale renewal of Expressways

We will engage in systematic large-scale renewal of expressways managed by expressway companies.

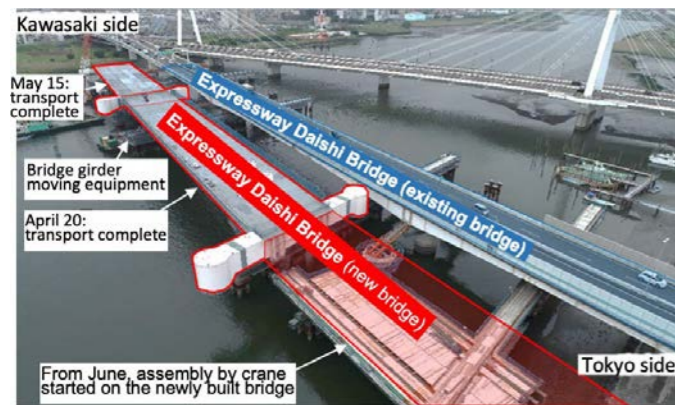
Expressway Renewal

Background / data

- Status of road closures related to specific renewals (2021, six Expressway companies in total): All-day road closures (main line): 13 locations, total of 442 days Two-way traffic restrictions: 56 locations for a total of 4,049 days

Systematically promote renewal projects while devising construction methods and utilizing new technologies to minimize the social impact of traffic restrictions

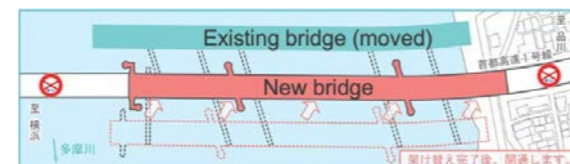
Example: Metropolitan Expressway Daishi Bridge (bridge replacement work)



Numerous fatigue cracks in longitudinal ribs, etc.



Assembly of new bridge downstream of existing bridge



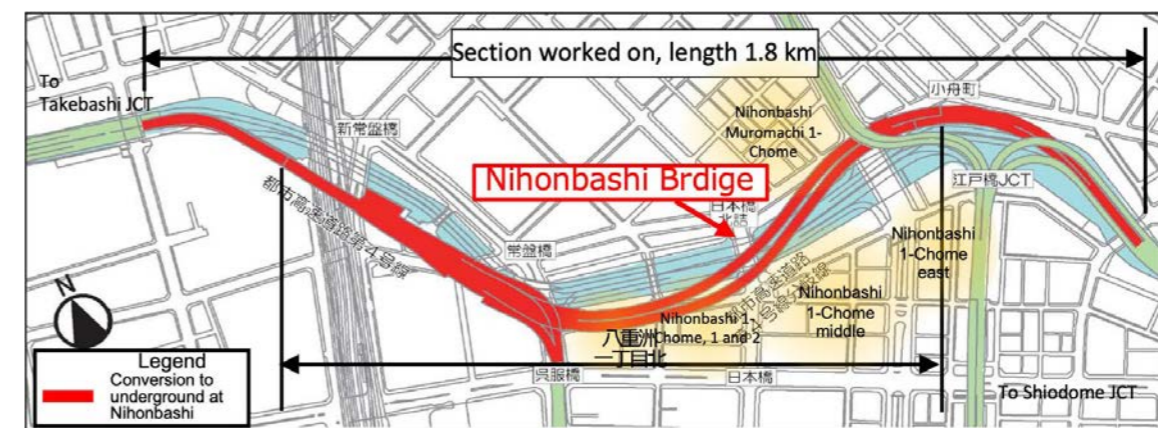
After existing bridge moved upstream, new bridge was moved into place

Devising construction methods to shorten the road closure period

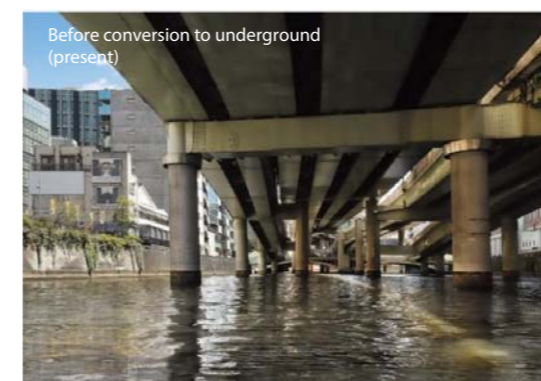
Efforts to develop the Metropolitan Expressway underground in cooperation with urban development

In addition to measures for the aging of the Metropolitan Expressway, we will also work to improve its functionality by widening its shoulders, etc., and will collaborate with private redevelopment projects such as the revitalization of the waterfront area around the Nihonbashi River and the development of a business hub in the city center. [Ref. 1]

Plan of the undergrounding of the Nihonbashi area of the Metropolitan Expressway



Images showing before and after the conversion to underground in the Nihonbashi area



Before conversion to underground (present)



After conversion to underground (image)

※Based on current information on redevelopment plans

Ref. 1: City planning changed in October, 2019, project approved in March, 2020, construction started in November, 2020, underground route scheduled to open in 2035, elevated bridge scheduled for removal in 2040.