



Ministry of Land, Infrastructure, Transport and Tourism
National Institute for Land and Infrastructure Management

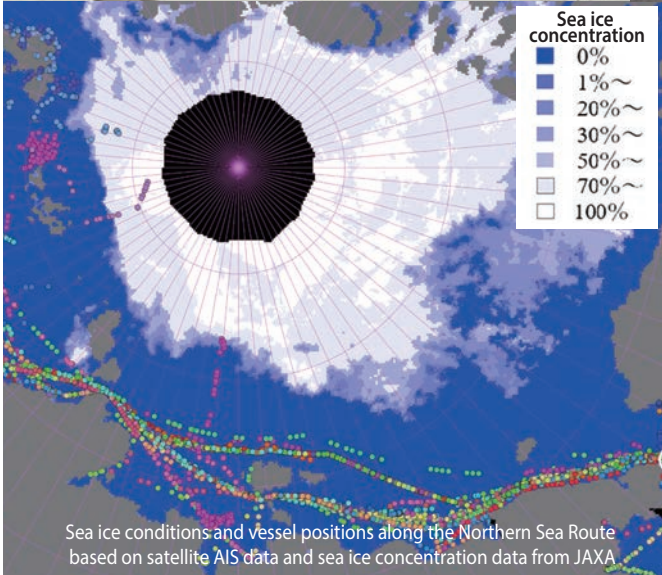
NILIM



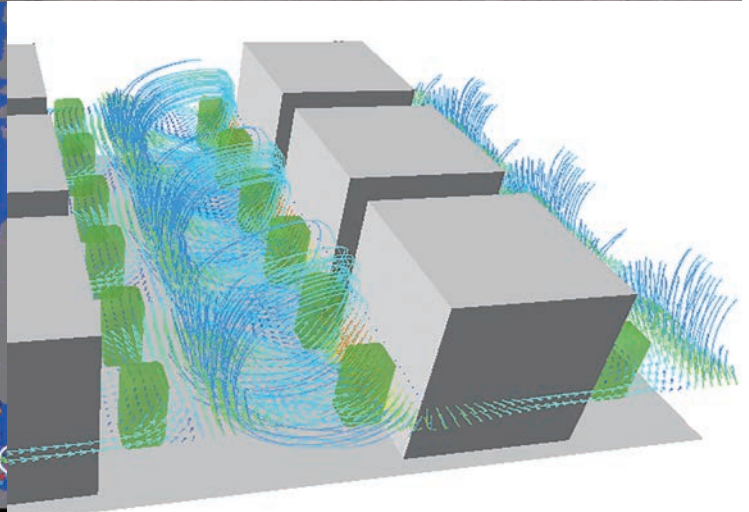
Large-scale levee model experiment channel in which a four-meter full-scale levee can be installed



Use of bollards to protect pedestrians



Sea ice conditions and vessel positions along the Northern Sea Route based on satellite AIS data and sea ice concentration data from JAXA



Simulation of the impact evaluation of street trees on ventilation paths using a 3D city model

Research Institute that creates the society of the future

2021



<http://www.nilim.go.jp/>

Mission of the National Institute for Land and Infrastructure Management (NILIM)

As the only national research organization in the social infrastructure/housing field, our goal is to use technology as the driving force to create an attractive country and society that are safer, more secure, and more vigorous, both now and in the future.

■ NILIM research policy (excerpt)

Basic stance

- Participate in policy development of the Ministry of Land, Infrastructure, Transport and Tourism as a technical specialist taking into account the administrative perspective among other aspects
- Return advanced, comprehensive technical capabilities cultivated by research activities to practical work fields
- Connect to the creation of new policy by insight into the future image of national land/society and promotion of technology development

Activities forming the basis

- Research and development that supports planning, drafting, and spreading the policy for land, infrastructure, transport, and tourism (pp. 3–14)
- Advanced technical support for response to disasters/accidents and improvement of countermeasure techniques (pp. 15–16)
- Support for improvement of the field technology of regional development bureaus (p. 17)
- Collection, analysis and management of data forming technical basis of policy formation, and return to society (p. 18)

Click here for the full research policy. →



Yokosuka Office



Asahi and Tachihara Offices

Research and development that supports the planning, drafting, and

The main research themes of NILIM in FY 2021

1. Research to improve national resilience and protect the lives and livelihoods of the people

... 05 ~ 08

2. Research to increase the productivity and growth potential of society

... 09 ~ 12

3. Research to support comfortable and secure living

... 13 ~ 14

P. 9 Development of a DX Data Center for the digital transformation of construction processes

P. 10 Expansion of construction types and application technologies for construction using ICT

P. 6 Research on strengthening of road structures against floods and heavy rain

P. 6 Research to eliminate areas without flood risk information in small and medium-sized rivers

P. 12 Improvement of the efficiency of sewerage facility management by promoting DX

P. 10 Research on promotion of i-Construction in ports and harbors

P. 12 Research on measures to improve the efficiency of the hinterland transport of international maritime containers

P. 14 Visualization of environmental values of coastal areas

P. 7 How do we stack and tie down containers to resist strong winds?

P. 8 Maintenance and management of infrastructure

spreading of the policy for land, infrastructure, transport, and tourism



P. 6 Efforts to clarify the mechanism of sediment disasters

P.13 Use of bollards to protect pedestrians waiting at intersections

P.13 Regional invigoration through the support for promoting the development of smart cities

P.13 Promoting the use of 3D city models in urban planning and urban development

P.11 Realization of automated driving with support from infrastructure

P.11 Improvement of the efficiency of maintenance and management through the use of BIM models for public rental housing stock

P. 7 Preparedness for medium- and long-term power outages in housing

P. 7 Measures against strong winds for building exterior materials and wooden roof trusses

P.14 Regeneration of suburban housing complexes to improve sustainability

P.14 Development of design and construction techniques for mixed-structure buildings using new woody materials

1. Research to improve national resilience and protect the life and livelihood of the people

Disaster prevention and reduction, national resilience

- In recent years, weather disasters have become more severe and frequent due to the effects of climate change.
- Infrastructure that was intensively developed during and after the high growth period will become obsolete at the same time in the future.



Levee breakage due to heavy rain in July, 2018



Damage to the seawall caused by the tidal waves of Typhoon No. 15 (Faxai) in 2019

Three-year emergency measures for disaster prevention, disaster mitigation, and national resilience (FY 2018 to FY 2020)

In light of the July 2018 heavy rains, the government of Japan will implement emergency measures over a three-year period, in addition to the existing measures.

■ Examples of measures implemented throughout Japan



Example of reinforcement at the foot of slopes (Kuji River)

■ Examples of measures implemented by NILIM



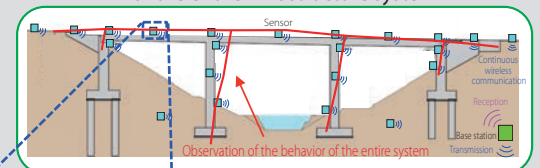
Construction of an experimental channel to enable experiments using a full-scale embankment model (approximately four-meter high)

Three years to date



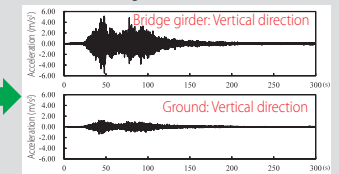
Construction of evacuation routes in dense urban areas that are extremely dangerous during earthquakes etc.

Development and maintenance of a seismic monitoring system for the entire infrastructure system



Example of sensor installation on a bridge

System installation on bridges (about 20 locations nationwide)



Acquisition of observation records of structural behavior

Five-year acceleration measures for disaster prevention, disaster mitigation, and national resilience (FY 2021 to FY 2025)

The next five years

Further accelerate and deepen the measures implemented in the three-year emergency measures and implement focused and intensive measures.

■ Examples of measures implemented by NILIM

Research on strengthening of road structures against floods and heavy rain → P. 06

This study contributes to improving the reliability of the road network by proposing methods for designing and reinforcing road structures that are less vulnerable to flooding and heavy rainfall and methods for assessing the risk of large-scale slope failures.

- Recent torrential rains, including the heavy rains of July 2020, have often caused scouring of road earthwork structures and bridge foundations, resulting in the long-term loss of road functions.
- Loss of road functions due to the collapse of slopes far from the road area also occurred.

- Research on risk assessment methods for the degree of impact on road functions due to damage to road structures caused by rising rivers and slope failure in road areas
- Research on design and reinforcement methods for road structures with a high risk of damage

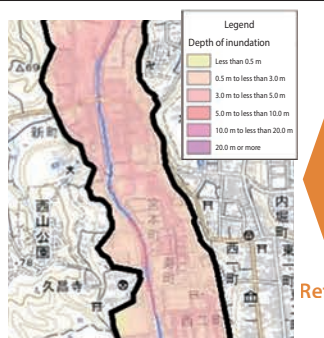


(Road Structures Department)

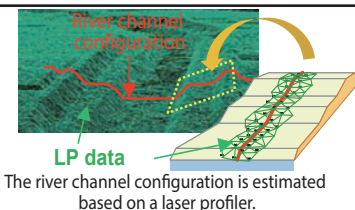
This research is to develop a method for estimating flood inundation area based on LP data etc. and a method for examining the impact of large amounts of sediment deposition in rivers during large-scale heavy rains and promote the elimination of areas without flood risk information in the large number and length of small and medium-sized rivers nationwide.

- An urgent task is to eliminate areas without flood risk information in the large number and length of small and medium-sized rivers nationwide.
- Establishment of an inundation estimation method using aerial laser profiling (LP) and other methods to quickly eliminate areas without flood risk information in small and medium-sized rivers
- The impact of massive amount of sediment deposition* in the river is reflected in the method of creating the flood hazard map.

*The method of estimating the amount of sediment inflow into a river channel is developed jointly with the Sabo Department.



Examples of estimating potential flooding area of small and medium-sized rivers



The river channel configuration is estimated based on a laser profiler.



Hydraulic experiments to understand the effects of sediment deposition

(River Department)

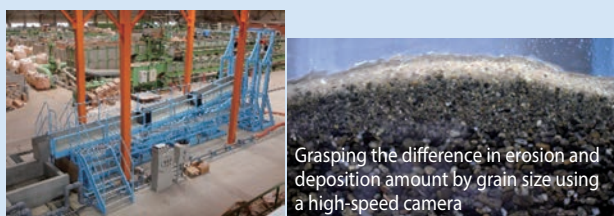
This study clarifies the mechanism of new types of sediment disasters, such as sediment and flood damage and landslide without rainfall, and contributes to more efficient and focused countermeasures against large-scale sediment disasters.

- In recent years, sediment and flood damage has caused widespread deposition of large amounts of fine sediment and increased the severity of damage.
- To promote countermeasures, a numerical simulation model that can accurately predict the reach of sediment is necessary.

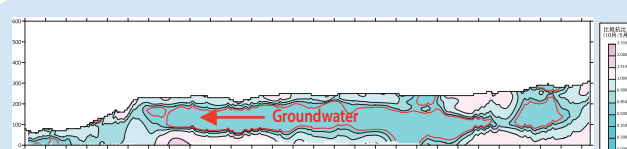
- Erosion and deposition processes of debris flow or sediment laden flow with a wide range of particle sizes distribution are clarified through experiments, and a numerical simulation model is developed.

- Heavy rains are occurring frequently. Meanwhile, disasters occur when there is no rain or after the rain has stopped and the weather has gotten better.
- Investigation techniques for groundwater-induced slope failure are needed.

- Invented an investigation technique to identify slopes where groundwater is concentrated.



Grasping the difference in erosion and deposition amount by grain size using a high-speed camera



Understanding the 3D structure of groundwater concentration by comparing the electromagnetic survey results before and after rainfall

(Sabo Department)

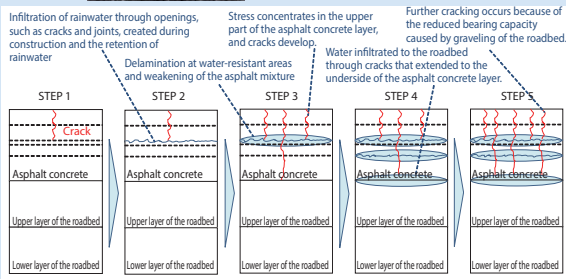
(Housing Department)

7 Infrastructure maintenance and management

This study contributes to the realization of more efficient and effective inspections and repair of infrastructures (civil engineering structures) by standardizing rational repair, reinforcement, and design methods and by utilizing new technologies, such as unmanned aerial vehicles.

Research and study on long-term performance of pavements

- Repeated repairs that are basically to restore original conditions have increased the risk of early deterioration.
- The **Pavement Inspection Guideline** was issued in 2016 as the first guideline showing basic matters concerning the inspection of road pavements.
⇒ Increased awareness to reduce early deterioration
- Clarification of the mechanism of early deterioration caused by water retained within the asphalt mixture layer and delamination between layers through excavation surveys etc.
- Research on effective ways to extend service life corresponding to the early deterioration mechanisms



An example of early deterioration mechanism of asphalt pavement

Development of an inspection and diagnosis system for port facilities using UAV and AI

- As the human and financial resources of port managers and private businesses are limited, the implementation of more efficient and accurate inspections and diagnoses is required.
- Development of a system for more efficient inspections and diagnoses of port facilities by using image acquisition by UAV (unmanned aerial vehicle) and image processing by AI (artificial intelligence)

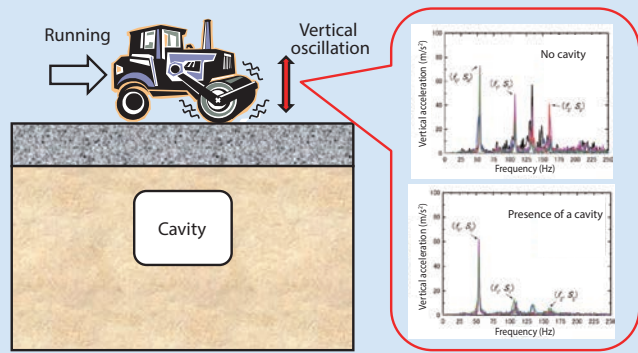


Image of inspection of port facilities by UAV

Study of the evaluation method of bearing capacity of airport pavement in the event of a large earthquake

- When soil liquefaction occurs in an airport, it is desirable to be able to check for cavities under the airport pavement easily and quickly without using special equipment.
- A simple and quick method is developed to check the reduction of bearing capacity of airport pavement due to cavities caused by soil liquefaction based on the vertical acceleration of vibrating rollers running on airport asphalt pavement.

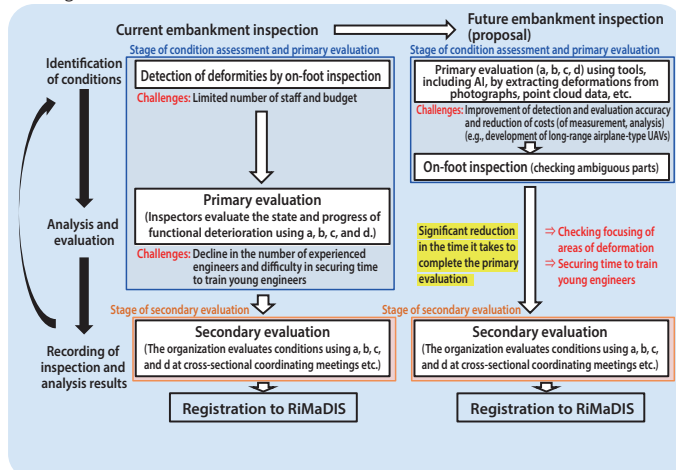
<Image of inspection using vibrating rollers>



Research on improvement of inspection efficiency of river embankments etc.

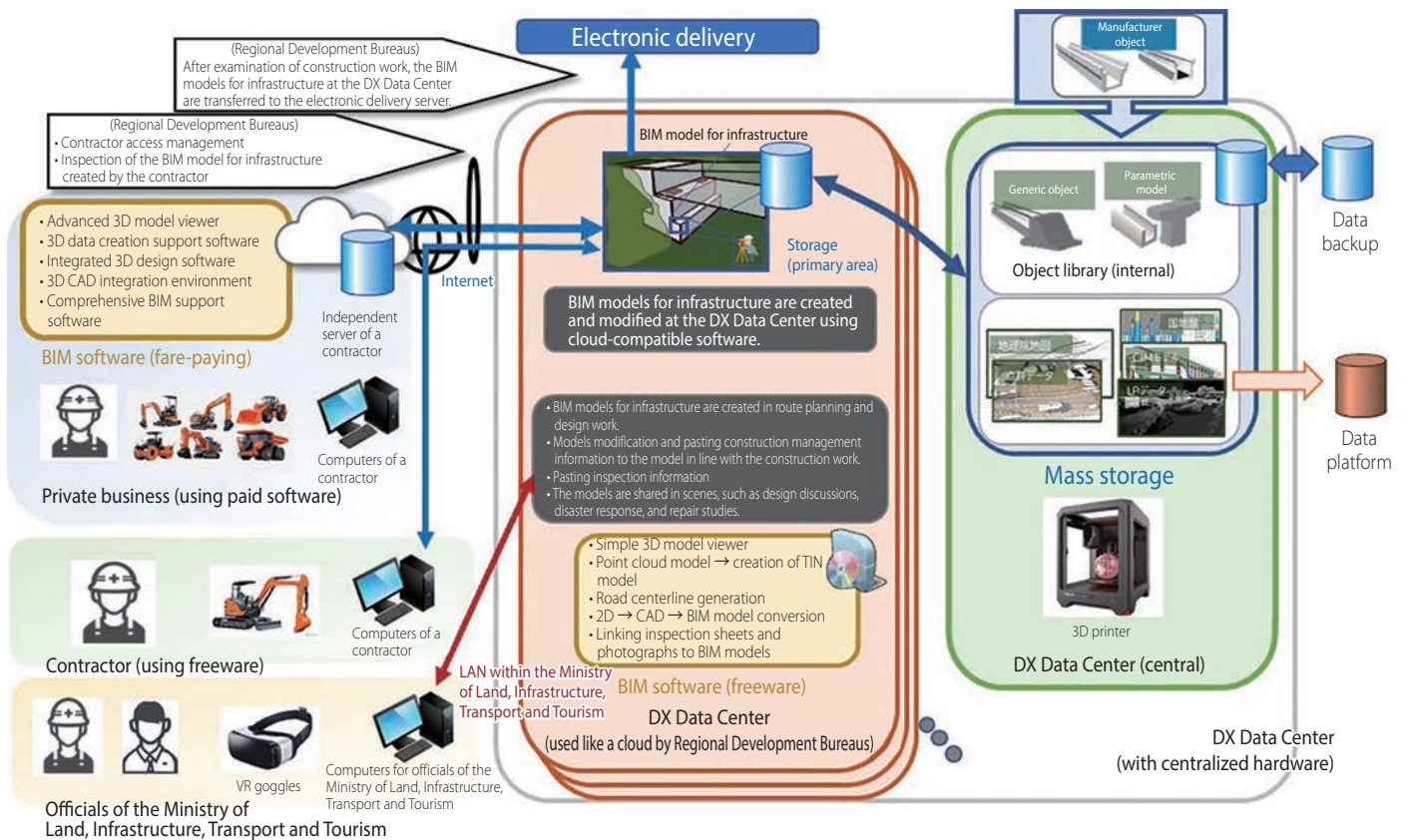
- Carrying out DX of river management while utilizing accumulated knowledge -

- There is a need to train young engineers and to implement river management efficiently with limited personnel and budgets.
- The efficiency of levee inspections is improved by replacing on-foot inspections that mainly focus on visual observations with desktop inspections using AI etc.
- Inspection techniques are inherited and improved by focusing on checking deformed areas and securing time to train young engineers



2. Research to increase the productivity and growth potential of society

1 Development of the DX Data Center for the digital transformation of construction processes



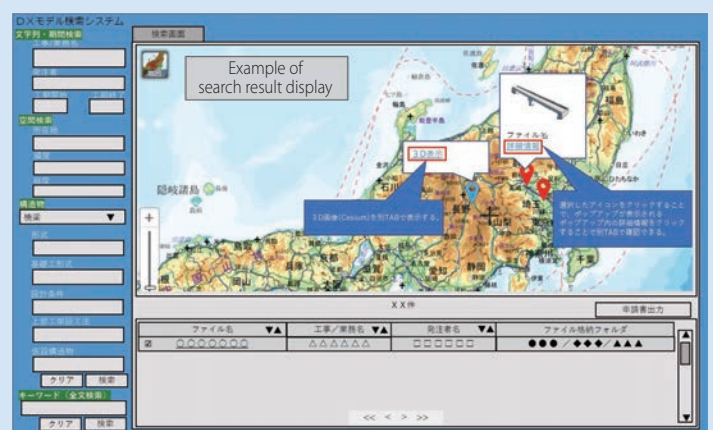
The DX Data Center is built to centrally store and utilize 3D digital data to promote the overall digital transformation of construction processes etc. and contribute to improving the efficiency of infrastructure design, construction, and maintenance management processes.

- The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has announced that it will switch to the use of BIM/CIM for all public works, except small-scale ones, by FY 2023, taking the opportunity of implementing measures to respond to the COVID-19 pandemic.
- The MLIT needs to create an environment in which BIM for infrastructure can be used in the outsourcing and the construction projects it orders.

- Assumption of use cases and consideration of functions that the DX Data Center should have
- System configuration study, system design, hardware development and system access management functions, BIM search, display and download functions for BIM data, and implementation of a Web conference system for sharing 3D models



Image of information sharing using the DX Data Center



BIM data search result display screen

(Research Center for Infrastructure Management)

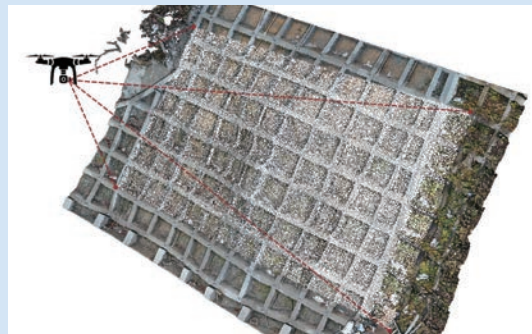
2 Expansion of construction types and application technologies for constructions using ICT

This study is contributing to the improvement of productivity in the construction industry by establishing rules for the use of ICT-based construction and measurement technologies in the management of workmanship in public works.

- With regard to ICT construction, which is the main initiative of the i-Construction project that started in FY 2016, the applicable construction types and technologies are gradually being expanded based on the progress of technological development in the private sector.
- While taking into account proposals from private sector organizations, we are continuing to improve the standards so that they can be applied to the workmanship management of public works.
- In FY 2020, the draft of various standards corresponding to the new measurement technology was prepared, such as the utilization of the recorded data of cutting edges etc. acquired from construction machines during earthwork construction for workmanship management.



Workmanship management using the recorded data of the cutting edges of construction machinery



Improvement of shooting method of UAV photogrammetry (facing slopes etc.)

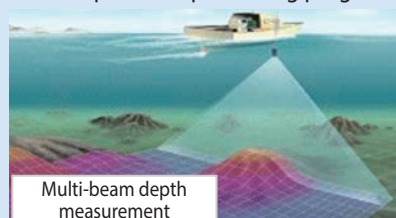
(Research Center for Infrastructure Management)

3 Research on the promotion of i-Construction in ports and harbors

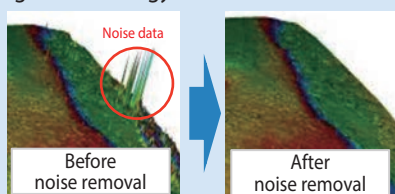
By developing processing programs that utilize AI technology, studying efficient UAV photogrammetry methods, and maintaining a BIM/CIM library, this study will contribute to reducing the time and effort required for each task at construction sites.

- In order to improve productivity in construction projects that use ICT, it is necessary to reduce the processing time of data acquired by multi-beam depth measurement (dredging work) and to improve the efficiency of UAV photogrammetry (block installation work).
- To promote the use of BIM/CIM, it is necessary to reduce the time and workload required to create 3D models on-site.
- The development of a processing program using AI technology is expected to improve the efficiency of noise removal work, improve the efficiency of surveying work through the study of UAV photogrammetry methods used in ports, and reduce on-site work time through the development of a BIM/CIM library.

<Development of processing programs using AI technology>

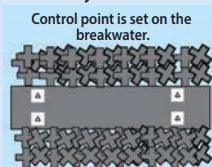
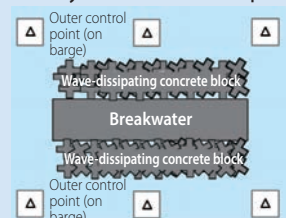


Multi-beam depth measurement



• Reduction of processing time and effort through the use of AI technology

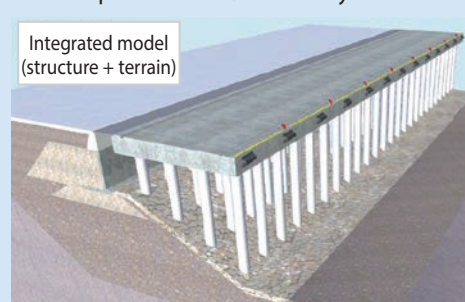
<Study on efficient UAV photogrammetry method>



• The cost and workload required to install a control point at sea are reduced.

- When measuring is conducted based on the Manual of Public Surveying Using UAV, it is necessary to set up a control point at sea.
- An efficient measurement method specific to ports is explored.

<Development of BIM/CIM library>



- The prototype model (above) of port facilities (piers etc.) is being used to develop an environment (library) that can provide generic objects to users.
- Reduction of time and workload required to create 3D model on site

(Port and Harbor Department)

4

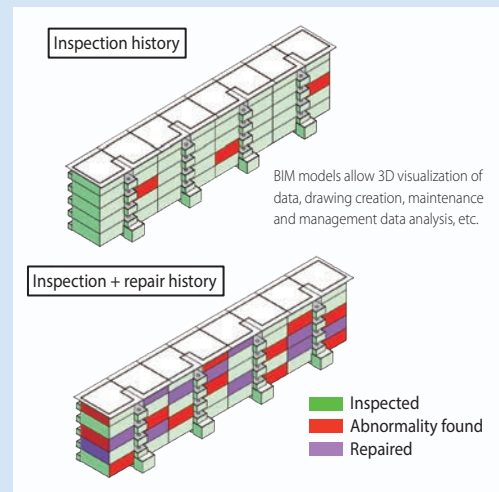
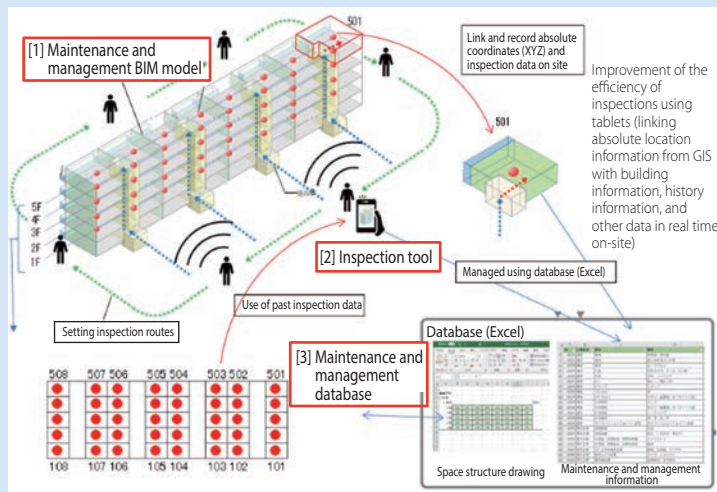
Improvement of the efficiency of maintenance and management through the use of BIM models for public rental housing stock

By developing maintenance management BIM models and smartphone-based inspection methods for public rental housing stock and other apartment buildings, this study will contribute to improving the efficiency of data-based preventive maintenance of stock and other activities.

- The use of BIM^{*1} is being promoted under the i-Construction initiative, which aims to improve the productivity of the entire construction production system.

*1 Abbreviation for "Building Information Modeling"

- A BIM model that combines building attribute information in addition to 3D shape information is developed. Then, verification experiments concerning the coordination with inspection information etc. using tablets is conducted, and a guideline for the use of BIM in the maintenance management phase is drafted.



(Housing Department)

5

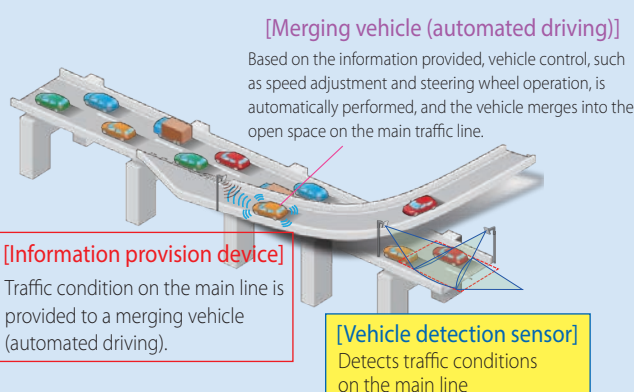
Realization of automated driving with support from the infrastructure

This study contributes to the realization of automated driving by developing a system that supports smooth merging on expressways by providing information from the road and by developing simulation models.

Development of a merging support information provision system

- At the merge point, it is not possible to confirm safety with only the technology of the vehicle itself; thus, it is necessary to provide information from the road.
- This study developed a system that detects traffic conditions on the main line and provides it to the merging vehicles (automated driving). System specifications are drafted, and field tests are conducted on actual roads to confirm effectiveness.

Merging support information provision system



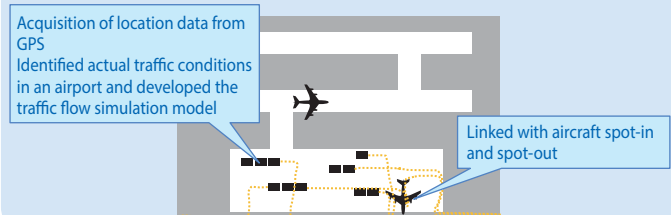
Research to promote automation of airport operations support vehicles

- Increased demand for air transportation due to the increased inbound tourists
- Manpower shortage due to decrease in working-age population

Development of a simulation model for traffic flow in an airport

- Evaluation of safety and efficiency
- Examination of necessary facility improvements
- Examination of operational rules for automated vehicles etc.

<Image of this study>



Demonstration experiment on automated driving at airports

By FY 2020, demonstration experiments of automated driving have been conducted at Tokyo International Airport and five other airports.

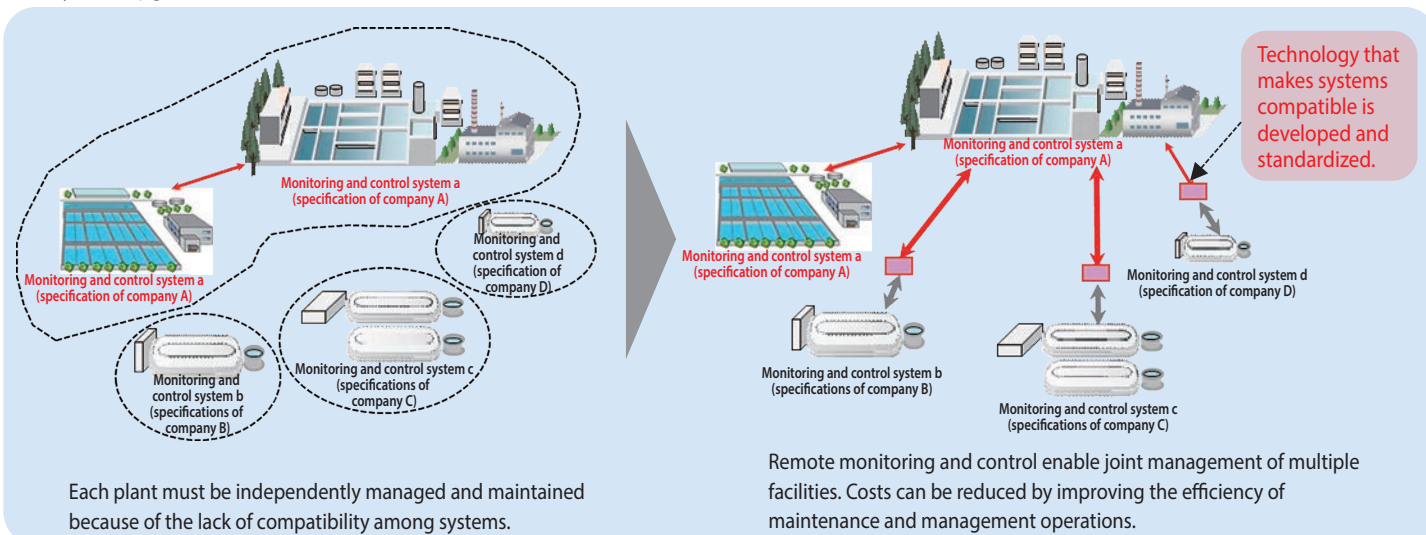


(Road Traffic Department, Airport Department)

6 Improvement of the efficiency of sewerage facility management by promoting DX

By developing technology to make remote monitoring and control systems compatible with each other, this study will promote the widespread and joint use of sewerage facilities and contribute to improving the efficiency of maintenance and management operations.

- The specifications of monitoring and control systems for sewage treatment plants differ from manufacturer to manufacturer, and the incompatibility between systems is the bottleneck in promoting wide-area and joint management.
- In order to promote wide-area and joint use of sewerage facilities and improve the efficiency of maintenance and management operations, the B-DASH Project* is developing and standardizing the technology to make the systems of each treatment plant compatible without large-scale system upgrades.



* Refers to a project to demonstrate innovative sewage technologies. Demonstration studies are conducted using full-scale facilities. (Water Quality Control Department)

7 Research on measures to improve the efficiency of the hinterland transport of international maritime containers

This research examines and proposes measures, such as promoting cooperation among companies and improving transportation systems to/from inland areas, aiming to maintain international maritime container transportation functions and reduce costs in the future.

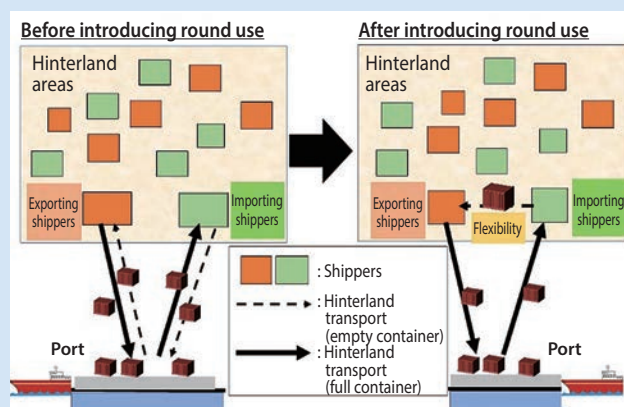
- International maritime containers are transported to/from the hinterland regions mainly by truck, and there are concerns about the impact of driver shortages.
- Inter-company cooperation is seen in some areas to address driver shortages etc. (e.g., container round use). Expanding this collaboration is expected to provide further benefits. There is also the possibility of improving efficiency by utilizing inland ports or depots etc.

(Content of research)

- [1] Estimation of expected driver shortage specific to the hinterland transport of containers
- [2] Examination of social systems to maintain the hinterland transport of containers (measures to promote cooperation among companies, improvements of means to transport containers to/from hinterland areas, etc.)
- [3] Verification of the effect of improving the efficiency of hinterland transportation
- [4] Development of a guideline as an outcome

(Target)

- Presentation of the estimated shortage of truck drivers
- Proposal for a social system to improve the efficiency of the hinterland transport functions
- Presentation of evaluation methods for the effects of the above system



Container round use: The exchange of empty containers between importing and exporting shippers at the hinterland area.

(Port and Harbor Department)

3. Research to support comfortable and secure living

1 Regional revitalization through support for smart city promotion

By surveying advanced cases and developing evaluation methods, this research supports the promotion of smart cities (*) by local governments, contributing to increased productivity and convenience in the lives of citizens.

- The theme of smart cities has become multifaceted in the areas of transportation, livelihood support, disaster prevention, crime prevention, and tourism, and new technologies have become more diverse.
- However, new technologies that can solve various urban problems have not been systematically organized, and evaluation methods for smart city plan in terms of the effectiveness of installing new technologies in solving urban problems have not been established
- Support is needed for local governments to examine the direction of smart cities.

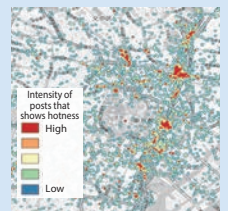
* A sustainable city in which management (planning, development, management and operation, etc.) is carried to address various issues that the city is facing by utilizing new technologies, such as ICT, to achieve optimization in the overall aspects.



Transport and livelihood support
(automated driving bus)



Maintenance and management,
disaster restoration, and
livelihood support (drones)



Environment and tourism
(heat map based on SNS data)

(Urban Planning Department)

2 Promoting the use of 3D city models in urban planning and urban development

This study will contribute to the promotion of DX in urban administration by developing use cases that solve urban problems, such as environmental issues and disaster management through advanced simulations using extended specifications of 3D city models.

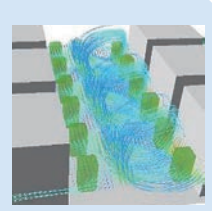
- Progress in developing an open 3D city model that contributes to the creation of new innovations
- Challenges include reducing the cost of creating and updating 3D city models and developing diverse use cases in government and the private sector.



[Reduction of creation and
update costs]
Use of point cloud survey data
etc. from constructions
conducted as i-construction.



[Expansion of 3D city model]
Creation of detailed
specifications for buildings,
trees, etc.



[Development of use cases]
Implementation of studies,
such as the evaluation of the
impact of street trees on
wind paths

(Urban Planning Department)

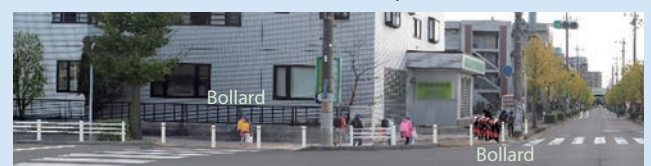
3 Use of bollards to protect pedestrians waiting at intersections

This study establishes the necessary strength settings and installation methods for bollards to resist vehicle collisions to contribute to ensuring safety at intersections that children use.

- In recent years, there have been a number of accidents involving elderly drivers and accidents in which children have been killed or injured.
- The strength of bollards, which are often installed at pedestrian crossing junctions, is not yet known to protect pedestrians behind them from entering vehicles.



Bollard collision test (collision speed 45 km/h)



Installation image of bollards

- The strength of bollards and its evaluation methods are compiled based on crash tests etc.
- Reflected in technical standards for bollard installation etc.

(Road Traffic Department)

By providing standard design examples of mixed-structure buildings that incorporate large wooden panels, such as CLT, into reinforced concrete and steel structures, this study will contribute to expanding the demand for and promoting the use of wooden materials.

- There is demand for expanding the use of CLT (cross-laminated timber) and other materials to mid- and high-rise buildings.
- Fire prevention and evacuation regulations have been streamlined under the 2018 amendments to the Building Standards Act, but they have not been fully utilized, especially in mixed-structure buildings.

- Five prototype buildings are established, and the structural, fireproof, and durability performance required to realize them are verified through experiments.
- Standard specifications for joints and other components that anyone can use and design examples of prototype buildings are presented.



Design example of RC + wood
(government building)



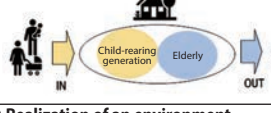



Experiment of fire spread
prevention measures
on the upper floors

(Building Department)

This study will contribute to the realization of a compact plus network by developing a revitalization method to increase the sustainability of suburban residential complexes that are becoming old towns and using them as bases for suburban residences.

- Residential complexes developed in the suburbs of cities during and after the rapid-growth period were constructed upon a high level of infrastructure.
- On the other hand, they are becoming old towns that are less convenient to live in and facing challenges, such as an aging population with fewer children.

- Construction of a regeneration scenario to enhance sustainability to use them as bases for suburban residences
- Development of planning methods for inducing lifestyle support functions (facility functions, service functions, transportation functions, etc.) according to the regeneration scenario

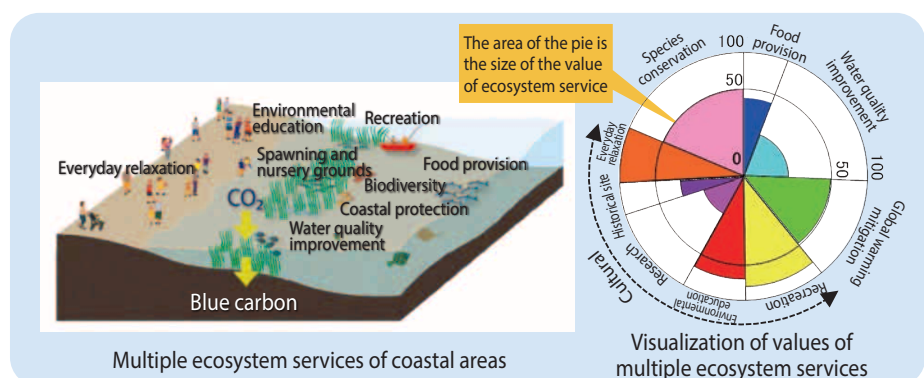
Target	Scenarios for ensuring sustainability
Development of mixed communities	<ul style="list-style-type: none"> • Realization of an environment where households with children can move in and settle down  <ul style="list-style-type: none"> • Induce childcare support functions by utilizing vacant facilities etc. 
Improvement of the QOL of the elderly	<ul style="list-style-type: none"> • Realization of an environment where elderly people can continue to live safely and with peace of mind  <ul style="list-style-type: none"> • Induce elderly housing by utilizing vacant houses. 

(Housing Department)

This study develops a method to visualize the values of multiple ecosystem services in coastal areas and contributes to making coastal areas a space that many people can enjoy and relax in.

- Coastal areas provide multiple ecosystem services, but the values of services have not been recognized.
- In particular, cultural services, such as recreation and environmental education, are often underestimated.

- Development of a method for evaluating (visualizing) multiple ecosystem services
- Used for planning, design, and evaluation of environmental improvement projects to meet society's needs.



(Coastal, Marine, and Disaster Prevention Department)

Advanced technical support for response to disasters/accidents

Results from dispatch of TEC-FORCE by NILIM during the past three years

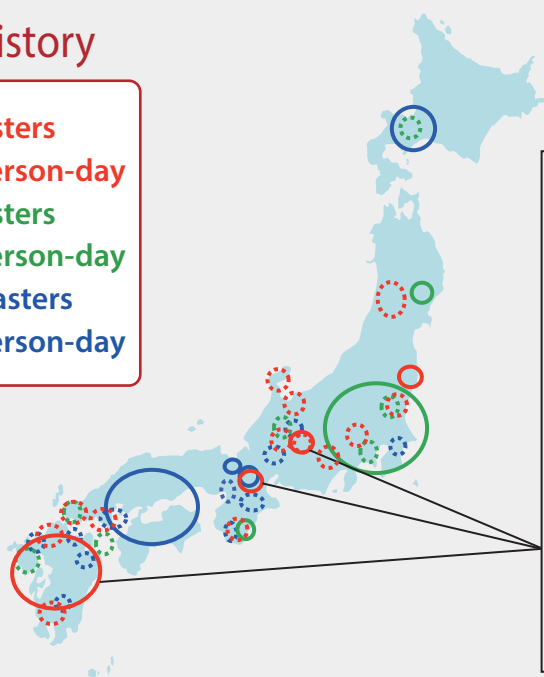
When a disaster occurs, in response to requests from the disaster region, NILIM sends its own research personnel with advanced technological expertise in various fields to the disaster region. When a particularly severe disaster has occurred, it sends TEC-FORCE* etc. to give stronger support for measures to prevent secondary disasters and to reconstruct the region.

In recent years, NILIM dispatched experts to the disaster sites of the July 2018 heavy rains, the 2018 Hokkaido Iburi Eastern Earthquake, Typhoon No. 15 (Faxai) and Typhoon No. 19 (Hagibis) in 2019, and the July 2020 heavy rain and Typhoon No. 10 (Haishen) in 2020, among others.

* **Technical Emergency Control Force:** Team dispatch system established in FY 2008 by the Ministry of Land, Infrastructure, Transport and Tourism in order to respond to a large-scale natural disaster by surveying disaster damage and providing local governments etc. in the disaster regions with technical assistance.

○ Dispatch history

FY 2020: 9 disasters
105 person-day
FY 2019: 8 disasters
156 person-day
FY 2018: 15 disasters
215 person-day



○ **Legend**
Solid line: Disasters to which NILIM dispatched TEC-FORCE
Dashed line: Disasters other than those mentioned above

[Disasters caused by torrential rains in 2020] (Heavy rain in July 2020 and Typhoon No. 10 (Haishen))

Yatsushiro City, Hitoyoshi City, Kuma Village, and Sagara Village in Kumamoto Prefecture, Takashima City in Shiga Prefecture, Tenryu Village and Takagi Village in Nagano Prefecture, Kushima City and Shiiba Village in Miyazaki Prefecture, Hirado City and Nagasaki City in Nagasaki Prefecture, etc.



Support for restoration from the 2016 Kumamoto Earthquake - Technological support for creative reconstruction

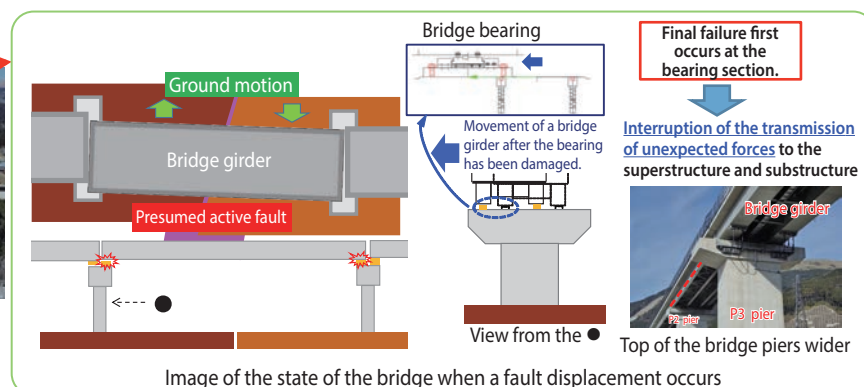
The Kumamoto Earthquake Recovery Division, which was established at the disaster restoration site to further accelerate the restoration and reconstruction efforts after the Kumamoto Earthquake, is providing technical support for the restoration of roads not only to restore them to their original state but also to make them more disaster-resistant in preparation for another major earthquake, which may occur in the future.

■ Planning and design of bridges at locations where lateral fault displacement occurs

Technical support is provided for the planning and design of bridges that take into account the ability of the entire bridge to absorb forces and recover its functions as quickly as possible in the event of fault displacement, which is difficult to predict and highly uncertain.



The Shin-Aso-ohashi Bridge, constructed to replace the Aso-ohashi Bridge (opened in March 2021).



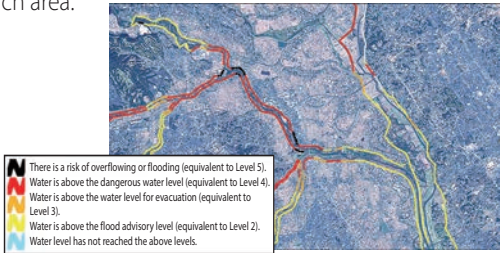
and improvement of countermeasure techniques

Contribution to the provision of information before a disaster occurs and evacuation of residents

By developing a system that identifies and predicts flood risk and communicates the imminence of river flooding in real time, the study will contribute to the realization of quick and optimal evacuation of residents.

Flood risk line

To encourage proper evacuation actions, the imminence of river flooding, which changes from moment to moment, is predicted for each area.



Visualization of floods using VR technology

Development of a flood VR display system to correctly communicate the predicted flood risk to residents

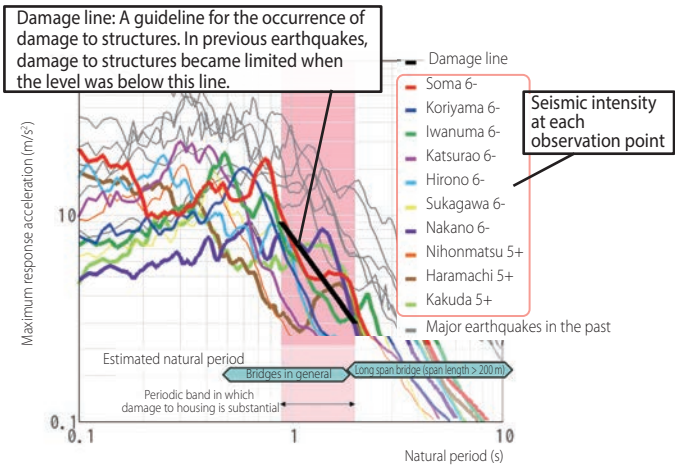


Contribution to information gathering and recovery immediately after a disaster

Contribution to quick information gathering and recovery in the event of a large-scale disaster by developing effective uses of existing facilities, such as CCTV cameras and satellites, and by developing a building safety diagnostic method that does not require confirmation by experts

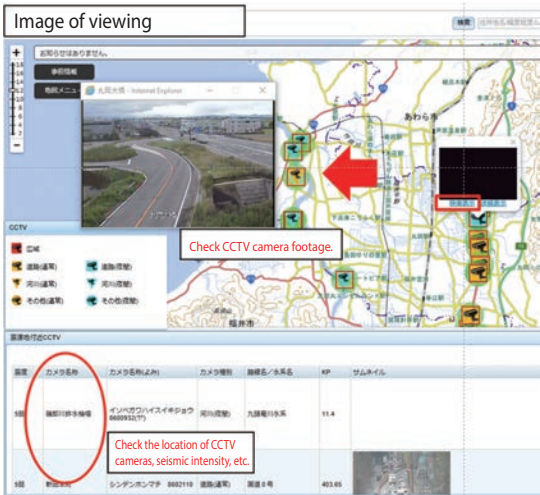
Spectrum analysis information

Estimation of the scale and extent of damage during the initial response period immediately after an earthquake by comparing the acceleration response spectrum of the earthquake with the damage line created on the basis of previous earthquakes.



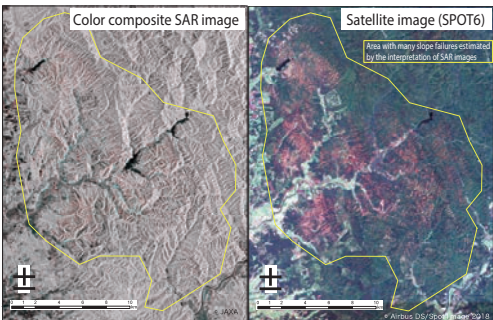
List of CCTV cameras

Prompt view of situations through the extraction of cameras in areas of high seismic intensity



SAR image interpretation support system

Helicopter survey in areas selected based on interpreted outcomes

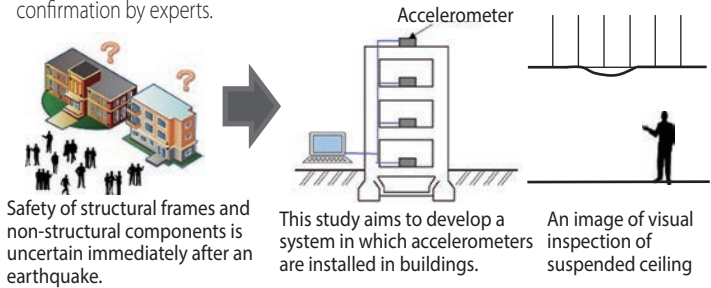


Example of the detection of slope deformation based on SAR images (the earthquake in Eastern Iburi, Hokkaido, in 2018)

Issues under development

Building diagnosis immediately after an earthquake

A criterion for determining structural safety for immediate occupancy is being examined and a guideline for the visual inspection of non-structural components is under development so that the non-expert managers of buildings can quickly confirm whether they are able to stay inside immediately after an earthquake without the confirmation by experts.



Support for improvement of field technology of regional development bureaus

Hosting of personnel

● Acceptance of local governments and private businesses

NILIM is accepting people from local governments and private businesses as exchange researchers and supporting them in improving their technical skills through technical guidance and workshops. (Fifty exchange researchers have been accepted as of April 2021.)

● Hosting personnel from regional development bureaus

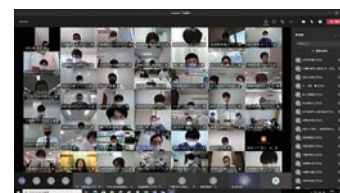
We accept staff members from regional development bureaus who have realized field issues through their work as researchers or staff holding two posts for a certain period to help improve their skills. Personnel who have acquired technical skills are active as core technicians in each region after returning to their regional development bureaus.

Completing and strengthening training

NILIM holds training sessions and lecture courses, and sends out lecturers in order to spread and establish its technical policy and improve the technological level of society as a whole.

(A total of 188 lecturers dispatched in FY 2020 as of the end of March 2021)

(Twelve training courses with 422 participants held in FY 2020 (Yokosuka Office No. 2))



Practical course for port planners

Support for local issues

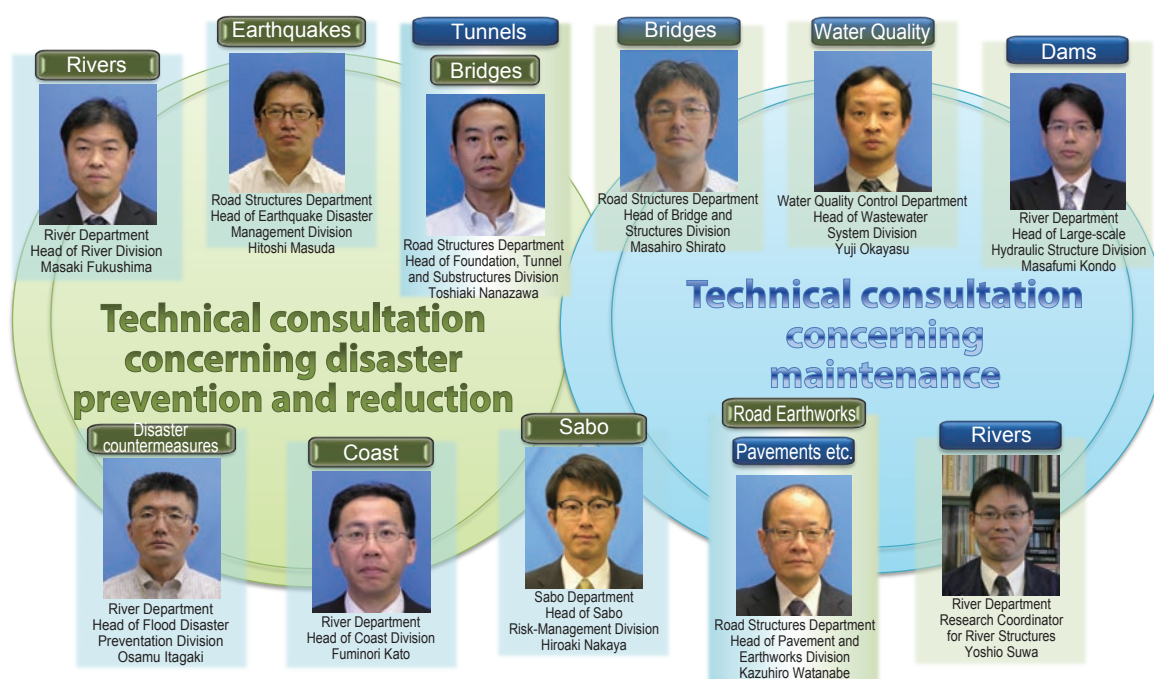
NILIM is working to overcome issues that arise on site in cooperation with local offices and other outposts. In addition, we have established the Kumamoto Earthquake Recovery Division at the site of the Kumamoto earthquake to accelerate restoration and recovery efforts. We have also dispatched staff to Sediment Disaster Prevention Technology Center of Kinki Regional Development Bureau to perform research and technical development concerning large-scale landslide disasters.

Technology consultation

NILIM constantly provides national government agencies and local governments etc. with technical support of various kinds for policy implementation and project execution. For example, the Coast Division looks after a technical support counter for storm surge flooding simulations necessary for preparation of maps, which show areas likely to be affected by storm surge flooding as created by prefectural governors based on the Flood Control Act.

● Technical Consultation Office

In December 2014, NILIM Technical Consultation Office was established. Covering all fields over which NILIM is in charge, this one-stop service accepts consultations regarding all fields and facilities.



■ Contact (E-mail: nil-soudanmadoguchi-gijyutu@gxb.mlit.go.jp)
Manager of Planning Division, Planning Department (TEL: 029-864-4343)

■ Website address
<http://www.nilim.go.jp/lab/bbg/tec-soudan>



Collection, analysis, and management of data forming technical basis of policy formation, and return to society

NILIM is reorganizing housing and social infrastructure-related data collected for administrative purposes and using it for research and to support on-site operations.

Supporting the establishment of a maintenance cycle for road bridges

Deterioration analysis data of road bridges managed by the national government, obtained through periodic inspections, were organized based on deterioration characteristics under 272 conditions and posted on the website as NILIM Reference Data No. 985.

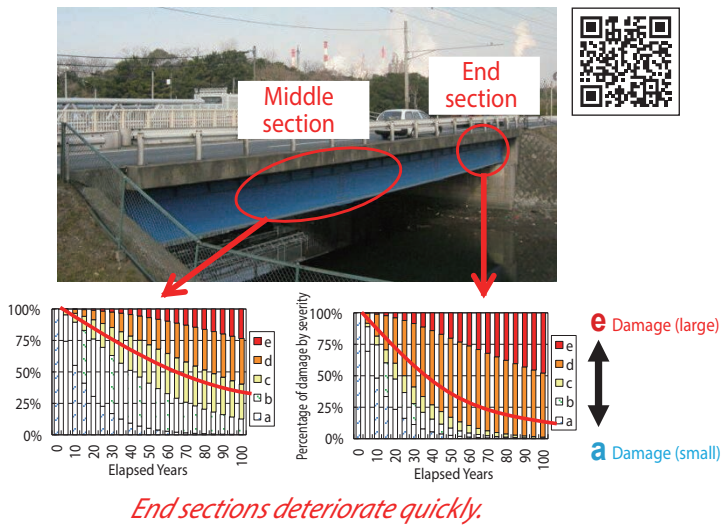


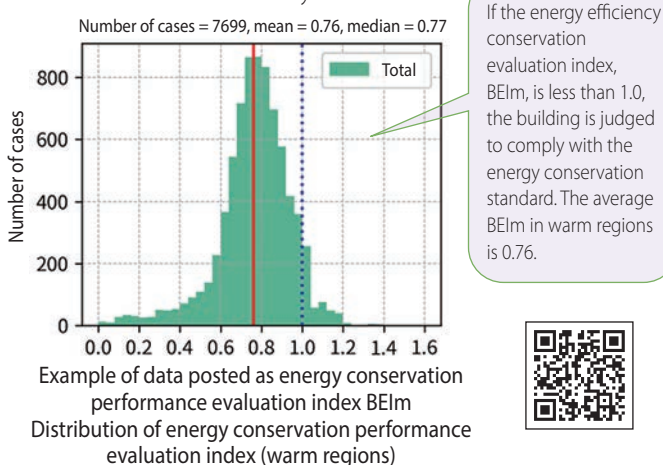
Image of inspection data of 24,000 bridges managed by the government

Support for planning of energy conservation measures for office buildings etc.

Information related to applications for energy conservation standards based on the Act on the Rational Use of Energy was gathered and analyzed (15,000 cases/year).

Energy conservation performance and design specifications (heat insulation performance, efficiency of air-conditioning equipment, etc.) were organized for office buildings etc. and posted on the website as NILIM Reference Data No. 1143.

The study also contributes to the promotion of the government's energy-saving measures established in response to the 2050 Declaration on Carbon Neutrality.



Support for the promotion of sewerage stock management

The database of sewer pipe deterioration, which collects the results of surveys conducted by local governments and organizes information, such as deterioration assessment results, is made available to the public (approximately 250,000 spans from 56 local governments as of June 2017).

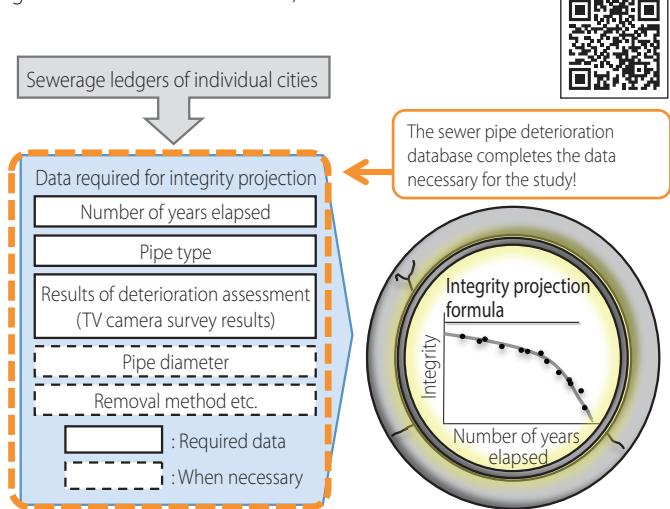
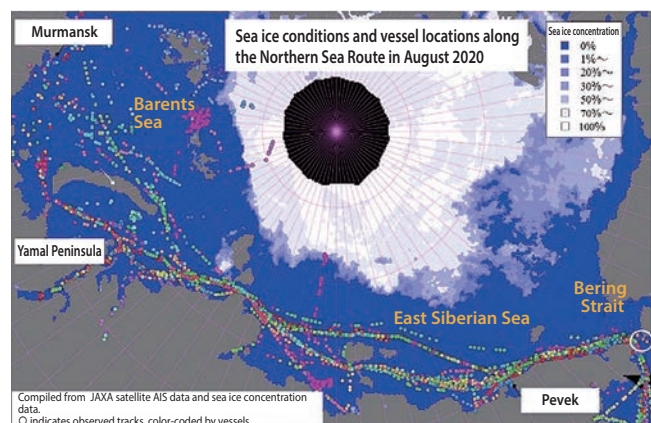


Image of the sewer pipe deterioration database

Support for port policies through the analysis of maritime big data

Regarding ship dimensions, sailing conditions, and trends of marine cargo transportation, maritime big data, such as global ship data (Lloyd's data), location data transmitted by ships (land-based and satellite AIS data), and cargo flow data (PIERS data) are analyzed, and the results are published as needed.



Example of Northern Sea Route analysis using satellite AIS data

International research activities

NILIM is promoting international research activities based on the perspectives of “Technical contribution to domestic policy”, “Technical cooperation with developing countries”, and “Overseas deployment of infrastructure systems”.

Technical contribution to domestic policy

Technical contribution to domestic policy

A platform for research activities related to international conferences etc. scheduled for FY 2021 is constructed.

Exchange of opinions for Japan-Netherlands joint research: River Department

Views on flood risk management are exchanged in the context of climate change.

Bilateral research cooperation program with the Federal Highway Administration (FHWA) of the United States: Road Structures Department

A new research cooperation plan on Structural Health Monitoring – Non-Destructive Evaluation (SHM-NDE) and Innovative Materials was established in August 2020.



Exchange of opinions on flood risk management*1

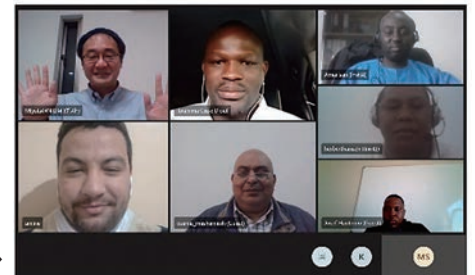
Technical cooperation with developing countries

Cooperation with JICA projects and training: Administrative Coordination Department, Research Center for Infrastructure Management

Two training sessions were conducted in online format in FY 2020.

Acceptance of foreign trainees: Road Structures Department

Practical training was provided for one trainee from Chile.

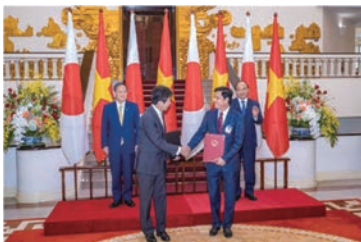


Training on port development and planning (for port engineers) ➔

Overseas deployment of infrastructure systems

Cooperation in the development of national port standards in Vietnam: Port and Harbor Department

- Cooperation in the development of national standards based on the memorandum of understanding signed between the Ministry of Land, Infrastructure, Transport and Tourism of Japan and the Ministry of Transport of Vietnam
- In FY 2020, the above MOU was renewed, and a Web workshop was held.



Exchange of the memorandum of understanding
(October 19, 2020)



(Vietnam side)



(Japan side)

Web workshop with the Vietnam counterpart

Activities related to ISO: Water Quality Control Department, Building Department, and Housing Department

Participated in TC to review and discuss the respective standards

*1: Taken from the website of the consortium for promoting climate change adaptation in the field of water
[http://www.climatechangeconsortium.com/report/plan_report.html]



Management initiatives supporting high-quality research

Cooperation with external organizations

By implementing joint research, contract research, calls for technologies, and social experiments; concluding agreements; and leveraging technologies provided by industry and academia, as well as knowledge of different fields, such as social science and the humanities, NILIM strives to improve the efficiency and quality of its research.

□ Contract research

Research aiming to achieve better research results efficiently by entrusting to other organizations

□ Joint research

Research aiming to achieve better research results by conducting joint research with other organizations

□ Call for technologies

It aims to promote the use of superior technologies by inviting technologies from the public, which will be tested on-site by the MLIT.

□ Social experiment

This is an experiment on the implementation of research results with a local government etc.

■ Domestic cooperation

It aims to develop education and research on the university side and to contribute to the activities of NILIM through coordination and cooperation between universities and NILIM.

University of Tsukuba, Kansai University, Tokyo University of Science, etc.

■ International cooperation

It aims to improve the quality of research results of NILIM and to give technical support to other countries (international contribution) through joint research, as well as regular information exchange between overseas research institutes and NILIM.

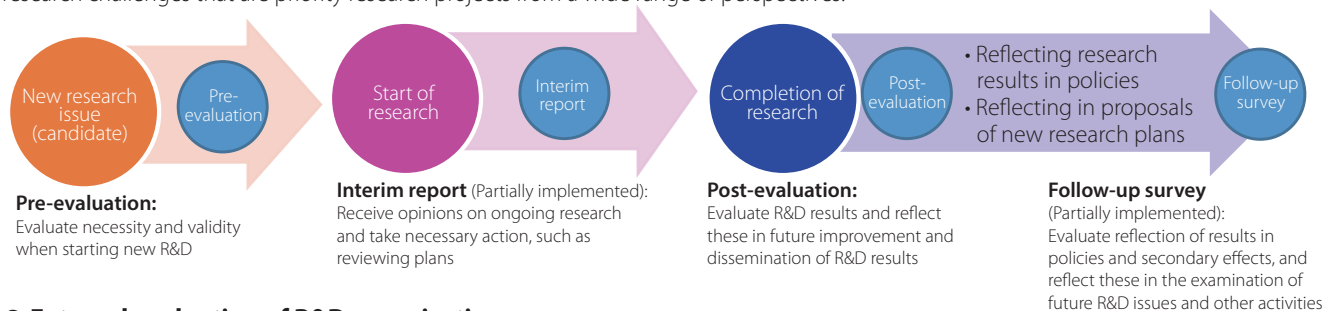
Indonesia Department of Public Works and Department of Citizen Housing Road Research Institute, Korean Research Institute for Human Settlement, Sri Lanka Ministry of Disaster Management National Building Research Organization, German Federal Institute for Research on Building, Urban Affairs and Spatial Development, etc.

Research evaluation

Internal evaluations and external evaluations of individual research challenges, achievements, and the operation of institutions are performed on the basis of the General Guidelines on the Evaluation of National R&D to build an independent and individual management cycle, promote, and improve the quality of research activities.

● External evaluation of individual research challenges

NILIM strives to improve the quality of research results by introducing systems allowing external experts to evaluate individual research challenges that are priority research projects from a wide range of perspectives.



● External evaluation of R&D organization

Outside experts evaluate research activities as a whole at NILIM, as well as environment improvement initiatives that support the research activities, and NILIM strives to improve its operation based on these results.

Internal training

Research Departments and Administrative Departments cooperate and work on developing young personnel systematically by combining Off-JT and OJT effectively. NILIM holds internal presentation meetings for young researchers who have little presentation experience and a study group by young personnel aimed at enhancing development through mutual learning.

Experience and Know-how Transmission Lectures are held in order to make use of the accumulation of research, experience, and know-how of predecessors for improving the skills of each staff member.



Internal presentation meeting for young researchers

Compliance

We conduct compliance activities according to the promotion plan for the current fiscal year while giving due consideration to the monitoring results and advisory opinions of the Compliance Advisory Committee (External Expert Committee).

Response to misconduct in research

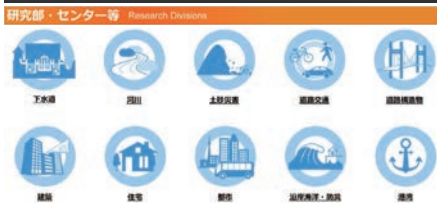
In addition to establishing NILIM Guidelines for Responding to Misconduct in Research, NILIM makes efforts to improve awareness toward research ethics to prevent misconduct (fabrication, falsification, and plagiarizing).

To create a deeper understanding of NILIM

Website

The site actively provides information, including an outline of NILIM, direction of research activities, research subjects, results, and event information. (URL: <http://www.nilim.go.jp/>)

Visit this site to view information about lecture meetings, open houses, open experiments, and other PR information.



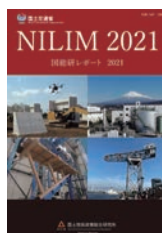
E-mail service

We make simple and timely introductions of the activities and research achievements of NILIM. We normally send information out twice a month. You can register to receive the e-mail service from the QR code on the right.



NILIM Report

NILIM Report is published annually to introduce and explain research trends and the reflection of research results in policy and presents recommendations concerning technology policy challenges. (The full report is published on NILIM website)



Comprehensive Research Report of NILIM

A Comprehensive Research Report of NILIM is a report of the research results that have academic value, contribute to the planning and enactment of policy, or present the results of surveys, testing, observations, etc. that are deemed valuable enough to be released to the public. (The full report is published on NILIM website.)



Presenting papers

NILIM announces approximately 560 papers per year, and receives awards for papers in many fields, both from inside and outside of Japan.

- Won the Excellent Paper Award at the 75th Annual Conference of the Japan Society of Civil Engineers (October 2020)
- Won the Most Excellent Paper Award in the 2020 Land and Infrastructure Research Conference (November 2020)
- Won the Excellent Paper Award in the 32nd Technical Research Presentation Conference (November 2020) etc.

Lectures

NILIM Lectures

NILIM holds the NILIM Lectures every year and introduces its activities, announces research results, and makes recommendations for the resolution of technical policy issues.

Approximately 700 people attend every year.

In FY 2020, the event was distributed for the first time as an on-demand video on YouTube.

It also holds specialist lecture meetings and symposiums in each field whenever necessary.

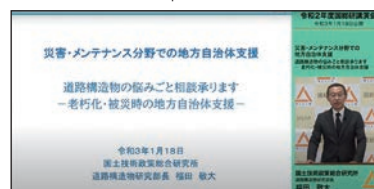


NILIM Lectures (Dec. 2019)



The NILIM YouTube channel

Videos of experiments and lectures in the field of housing and social infrastructure of NILIM are available on YouTube with easy-to-understand explanations.



On-demand distribution of the NILIM lectures (January 2021)



Lectures on demand

Lectures on demand are held with the aim of having NILIM researchers go directly to schools etc. to explain research contents and answer questions while holding open communications with people.

Online lectures are also available in order to prevent the spread of COVID-19. (Data in FY 2020: 17 lectures)



View of a lecture



Open house and facility tour

Open house is provided to introduce research facilities while explaining NILIM's research contents.

We also conduct facility tours where we introduce our research facilities while introducing research cases.

Open house is being suspended for the time being in order to prevent the spread of COVID-19.



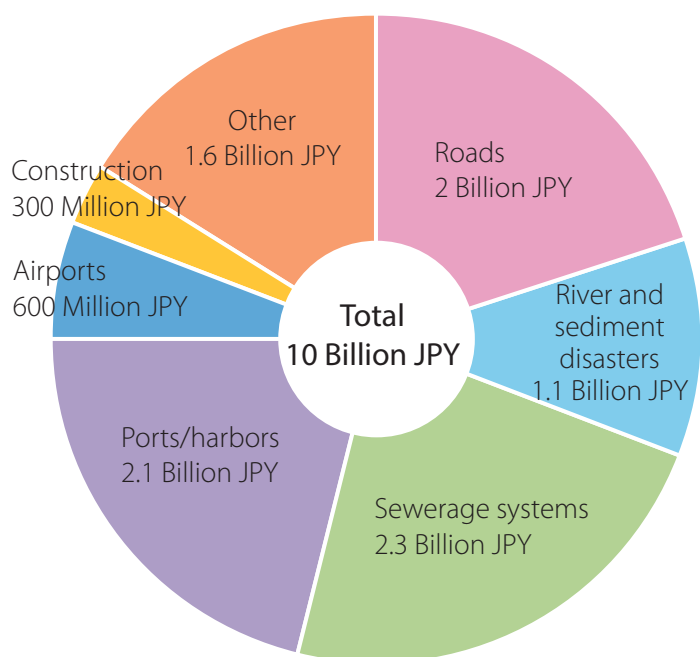
Contest for making bridges out of cardboard (Scene of the awards ceremony)



Facility Tour

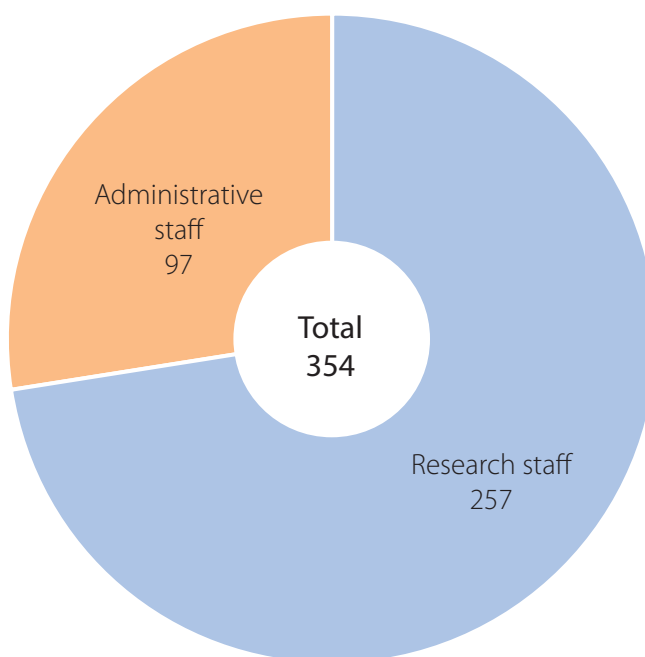
Research budget and employees

Research budget



Structure of research budget (initial budget for FY 2021)

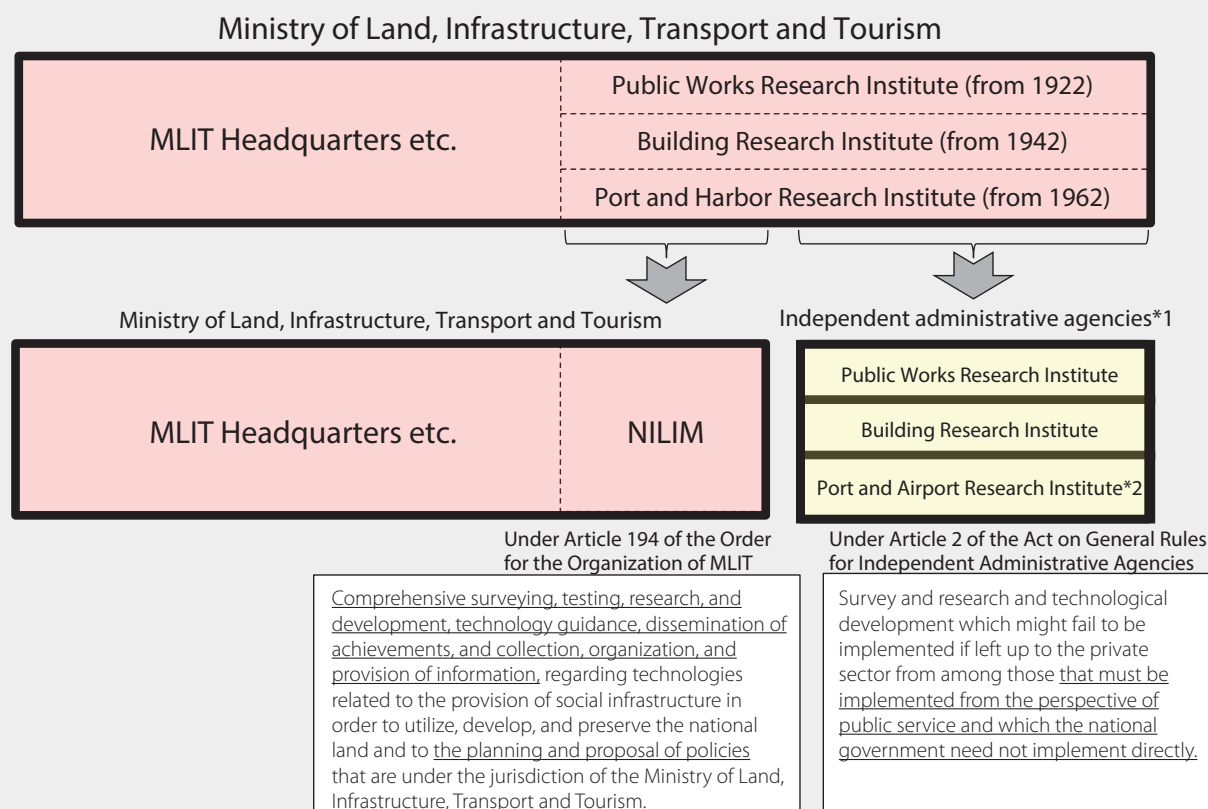
Employees



Structure of employees (April 2021)

Establishment of NILIM

- As part of the establishment of the independent administrative corporation system following on from the reorganization of ministries and agencies in January 2001, departments conducting work in close and inseparable cooperation with the Ministry of Land, Infrastructure, Transport and Tourism were integrated into one organization as of April 2001. In April 2021, NILIM celebrated its 20th anniversary.



*1 With the April 2015 revision to the Act on General Rules for Incorporated Administrative Agencies, the Public Works Research Institute, Building Research Institute, and the Port and Airport Research Institute became the National Research and Development Agencies.

*2 In April 2016, the National Maritime Research Institute and the Electronic Navigation Research Institute were merged to form the Port and Airport Research Institute.

Introducing research departments etc.

Director-General

- Deputy Director-General ● Deputy Director-General
- Executive Director for Research Affairs ● Executive Director for Research Affairs

General Affairs Department

- Deputy Director of General Affairs Department ● Senior Officer for Welfare
- Senior Officer for Contract and National Property

Personnel and Welfare Division General Affairs Division Accounting Division
Head Officer for General Affairs (Asahi, Tachihara Office)

Planning Division

- Research Coordinator for Digital Transformation of Infrastructure Systems
- Research Coordinator for Evaluation ● Research Coordinator for Codes and Standards

Planning Division Research Administration and Evaluation Division
Research Facilities Division International Research Division
Senior Officer for Cybersecurity and Information

Administrative Coordination Department

- Research Coordinator for Information and Construction Systems

Administrative Division Planning and Coordination Division Technological Information Division
Cost Estimation System Division International Coordination Division

Water Quality Control Department

- Research Coordinator for Water Quality Control
- Research Coordinator for Wastewater Energy Management and System Restoration

The Water Quality Control Department researches technical standards and management methods for sewerage facilities in order to protect hygienic living environments and beautiful water environments, reduce flood damage in cities, and at the same time, conserve the global environment and form a recycling society.

■ Wastewater System Division

The Wastewater System Division conducts research to support stock management, earthquake countermeasures for wastewater facilities, mitigation of urban storm water damage, and wastewater system planning using low cost methods in order to appropriately manage sewer networks.

■ Wastewater and Sludge Management Division

The Wastewater and Sludge Management Division conducts research on the effective use of resources, energy, and stocks of wastewater systems, the building of a sound water cycle and conservation of the water environment through wastewater treatment, and improvement of hygienic safety through river system water quality risk measures and global warming countermeasures for wastewater systems.

River Department

- Research Coordinator for River Structures
- Research Coordinator for Irrigated Water Disaster Management
- Research Coordinator for Water Environment

The River Department conducts research on technologies to plan, design, manage, and perform crisis management concerning facilities on rivers, coastlines, and at dams to ensure the safety and peace of mind of the people of Japan against floods, tsunamis, and other natural disasters and the increasingly severe conditions caused by climate change. The department also works to maintain beautiful national land by preserving rivers, coastlines, water cycles, and sediment systems in good condition.

■ River Division

The River Division develops methods and accumulates knowledge about river management for socially safer and environmentally better rivers and then systematizes and standardizes technologies that promote policies based on these researches.

■ Coast Division

The Coast Division is involved in research initiatives that preserve the coast in order to protect the coastal areas from storm surges, tsunami, and erosion with consideration given to the environment and use, as well as research related to the technical standards for shore protection facilities.

■ Water Cycle Division

The Water Cycle Division researches methods of advanced control of the water cycle using technologies, facilities, etc. to clarify and to predict the state of the flow of water during floods and during normal times, and ways to link these to disaster prevention, environmental conservation, and to ensure water resources.

■ Large-Scale Hydraulic Structure Division

The Large-Scale Hydraulic Structure Division researches the development, systematization, and standardization of technologies related to the design, maintenance, management, and functional improvement of large-scale structures, such as dams and related facilities that play a key role in flood control and water utilization on a basin scale

■ Flood Disaster Prevention Division

The Flood Disaster Prevention Division conducts research on flood risk evaluation methods and schemes of reflecting the result in flood risk reduction planning, the use of flood hazard maps or flood risk information, and flood risk reduction countermeasures integrating structural and non-structural measures together with promoting both self-help and mutual assistance.

Sabo Department

- Research Coordinator for Sediment Disaster Prevention

With the influence of climate change and the imminence of massive earthquakes, the department is researching ways to prevent and mitigate serious damage from frequent sediment disaster hazards, such as sediment and flood damages, by improving the efficiency and emphasis of countermeasures, early detection and damage prediction of large-scale sediment movements, and upgrading warning and evacuation support information based on data science, by taking into account recent sediment disaster hazards and new challenges.

■ Sabo Planning Division

The Sabo Planning Division researches on the establishment of high-precision prediction methods for the occurrence of sediment hazards; damage estimation for sediment and, flood damages, and deep-seated landslides; and the establishment of response methods, as well as the establishing technical standards for master plan for Sabo (erosion control), including countermeasures against debris flow and driftwood.

■ Sabo Risk-Management Division

The Sabo Risk-Management Division develops a large-scale sediment disaster monitoring method using remote sensing and UAVs, and a method for upgrading sediment disaster warning information based on a database.

(Eleven research departments, one research center, and three administrative departments)

Asahi Office Tachihara Office Yokosuka Office

Road Traffic Department

- Research Coordinator for Road Affairs
- Research Coordinator for Road Disaster Prevention

Roads have transportation functions that support the movement of people and the transport of goods, plus space functions: forming the backbone of cities, accommodating lifelines, and providing disaster prevention spaces.

The Road Traffic Department researches technologies that clarify, evaluate, and improve these functions and the use of ICT (information communication technologies).

■ Road Division

The Road Division conducts research into road traffic survey/road traffic management techniques to implement initiatives making smart use of roads, analyses of the effects of road network maintenance, and road geometry construction for smooth road traffic etc.

■ Road Safety Division

The Road Safety Division conducts research into the acceleration of road traffic safety measure management by applying big data, safety improvement policies for community roads, ensuring safe and pleasant bicycle routes, risk assessment/countermeasures for snow damage to roads, etc.

■ Road Environment Division

The Road Environment Division conducts researches to achieve a better road space and road environment by speeding up the elimination of utility poles, accelerating the effort through cost reductions, creating and utilizing road space to meet diverse needs, and preserving the roadside, natural, and global environment.

■ Intelligent Transport Systems Division

The Intelligent Transport Systems Division conducts research to achieve Smartways that comprehensively incorporate ITS (Intelligent Transport System) technologies that are used to build systems to integrate people, vehicles, and roads using information communication technologies.

Road Structures Department

- Research Coordinator for Road Structures

The Road Structures Department conducts research on better design, execution, and maintenance and management methods for road structures, and technological standards that achieve these, so that road networks can appropriately perform their functions, such as ensuring safe and smooth traffic and supporting social and economic activities of all kinds plus emergency response to disasters.

■ Bridge and Structures Division

The Bridge and Structures Division conducts research on design standards to ensure the quality of execution in order to create good quality, highly durable road bridges and rational road bridge maintenance methods to economically prolong the service lives of bridges.

■ Foundation, Tunnel and Substructures Division

The Foundation, Tunnel and Substructures Division conducts research on the required performance, rational design, construction, and maintenance methods of road structures, such as road bridge substructures and foundations and tunnels, large culverts, retaining walls, and other structures that are greatly impacted by the earth pressure of soil.

■ Pavement and Earthworks Division

The Pavement and Earthworks Division conducts research on the required performance, rational design, execution, and management methods of road structures, such as embankments in particular, slope countermeasures, paving, and other soft ground countermeasures that ensure safe road functions.

■ Earthquake Disaster Management Division

The Earthquake Disaster Management Division conducts researches on earthquake disaster information systems, disaster management and the characteristics of earthquake ground motions.

Building Department

- Research Managing coordinator for advanced Building Technology
- Research coordinator for Quality control of Building
- Research Coordinator for Disaster Mitigation of Building

In an effort to ensure the safe and pleasant use of buildings where living and economic activities are carried out, we conduct research on standards for structures, fire safety, equipment, materials, and members of buildings in compliance with the Building Standard Law, systems for standards and certification, and performance assessment.

■ Standards and Accreditation System Division

The Standards and Accreditation System Division conducts investigations, research on building standards and certification systems, and helps facilitate general coordination with the MLIT.

■ Structural Standards Division

The Structural Standards Division conducts research on technologies such as building structures, grounds, and performance evaluation methods related to seismic force etc. to secure and improve the safety of buildings.

■ Fire Standards Division

The Fire Standards Division conducts research on the assessment of evacuations and safety performance of buildings etc. in the event of a fire, a fire suppression system to prevent fire from spreading, and the securing of the fire-resistance performance of structures.

■ Equipment Standards Division

The Equipment Standards Division conducts surveys, testing, and research concerning the building equipment of buildings etc. and the maintenance, management, and protection of building equipment.

■ Material and Component Standards Division

The Material and Component Standards Division conducts surveys, testing, and research on materials and members of buildings etc.

■ Evaluation System Division

The Evaluation System Division surveys and researches technologies for evaluating the performance of buildings etc.

Housing Department

- Research Coordinator for Housing Performance
- Research Coordinator for Housing Information System

Research studies are being conducted on the safety and security of housing and residences, housing stock measures, such as improving the performance of existing houses and measures to deal with vacant houses, environmental and energy measures for housing and buildings, and rationalization of housing and building production with the aim of realizing safe, secure, and prosperous housing for people.

■ Housing Planning Division

Research on the formulation of housing plans based on an analysis of trends in residential life and housing supply and demand, ensuring housing safety and security, building and strengthening housing safety nets, and improving the performance and proper management and the use of housing

■ Housing Stock Management Division

Research on methods for identifying the actual condition of the housing stock and the sophistication and efficiency of maintenance and management, as well as research on renovation technologies and ways to disseminate them to improve the housing stock and enhance its performance

■ Building Environment Division

Research on the improvement of the indoor environment (thermal environment, light/visual environment, air environment, etc.) and energy-saving performance in houses and buildings, institutional measures for dissemination, and continuation of residence in times of disaster

■ Housing Production Division

Investigation of housing production and other building production, research on production technology for rationalization of production, and research on technical and institutional responses to ensure the safety of residences and the protection of consumers

Urban Planning Department

The Urban Planning Department researches evaluation methods and technologies for the reconstruction of urban structures, improvement of the safety of cities, and the formation of urban environments needed to create low carbon cities in order to create sustainable cities in the face of changing social conditions, such as a falling birthrate, aging of society, and the spread of global environmental problems.

■ Urban Planning Division

The Urban Planning Division is involved in research initiatives on advanced administration standards of urban land use planning, such as performance zoning codes for quality of environment, to promote such land use patterns that are compatible with functional activities and sound residential environments.

■ Urban Facilities Division

The Urban Facilities Division is involved in research on integrated urban facility management. We improve survey methods through new technologies, in urban traffic management for example.

■ Urban Disaster Mitigation Division

The Urban Disaster Mitigation Division is involved in research initiatives on disaster prevention measures in built-up areas by developing advanced technologies, such as proactive mitigation methods for spreading fire, planning of disaster prevention programs in urban areas, and evaluation measures for greenery and open space planning in terms of disaster prevention performance.

■ Urban Development Division

The Urban Development Division conducts research concerning urban development and improvement methods toward the formation of safe and pleasant urban environments and the appropriate locations of urban functions, such as restructuring and renewal of built-up areas and efforts that contribute to the development of compact cities.

Coastal, Marine and Disaster Prevention Department

- Research Coordinator for Coastal and Marine Affairs
- Research Coordinator for Coastal and Marine Disaster Prevention

The Coastal, Marine, and Disaster Prevention Department researches the development of ocean environment regeneration techniques, tsunami/flood tide damage assessment/disaster reduction policies, and methods of utilizing coastal regions in a balanced manner with regions and societies in order to make smart use of the land and sea areas of coasts and enhance disaster prevention properties.

■ Marine Environment and Emergency Management Division

The Marine Environment and Emergency Management Division develops techniques for conservation, restoration and creation of marine environment ecosystems, research into the implementation and evaluation of environmental monitoring, and research regarding how to perform crisis management and continuous functioning in harbors.

■ Coastal Disaster Prevention Division

Research on risk assessment of damage caused by storm surges, high waves, strong winds, and tsunamis; disaster prevention and mitigation through structural and non-structural measures; climate change adaptation measures; and maintenance and management of coastal protection facilities.

■ Coastal Zone Systems Division

Analysis of trends in industrial sites and land use conversion in coastal areas and support and research on the establishment and evaluation of spatial formation and planning methods in order to revitalize coastal areas

Port and Harbor Department

- Research Coordinator for Advanced Port Technology

The Port and Harbor Department meets the need for ports and harbors to strengthen international competitiveness and support the more enriched and safer lives of people by conducting research on improved port and harbor planning methods and designs while ensuring quality and maintaining public works projects.

■ Port Planning Division

The Port Planning Division conducts research on analyzing worldwide maritime trends and port planning methods based upon such analyses, and analyzes ship movements using AIS.

■ Port Systems Division

The Port Systems Division conducts research on seaborne cargo demand trends, the development of an international marine container cargo flow model, and cruise ship demand trends.

■ Port Facilities Division

The Port Facilities Division conducts research on advancing technology standards for necessary port and harbor structures, such as breakwaters and quay walls, and the internationalization and international expansion of related technology standards.

■ Port Construction Systems and Management Division

The Port Construction Systems and Management Division conducts research related to improvements in productivity by applying ICT etc. in the port field, effective maintenance and management of port facilities, quality control of public works in the port field, and the use of environmental goods etc.

Airport Department

- Research Coordinator for Advanced Airport Technology

The Airport Department conducts research to facilitate policymaking to strengthen Japan's international competitiveness and revitalize local economies; drafts standards to ensure risk management, safety, and security; and develops efficient maintenance methods etc. in the midst of the process of the deregulation of aviation.

■ Airport Planning Division

The Airport Planning Division conducts research on policy simulations, such as aviation demand forecasting methods, analysis of aviation networks and demand trends, airport risk management, effect of airports on local communities, and the introduction of advanced technology into airport operations.

■ Airport Facilities Division

The Airport Facilities Division conducts research related to the development of outlines for the design and repair of runways and taxiways etc. to contribute to high-quality airport operations that ensure safe, on-time air transport.

■ Airport Construction Systems Division

Research on integration and construction standards and operational support systems etc. for the rationalization and advancement of construction related to the development and maintenance of airports

Research Center for Infrastructure Management

- Research Coordinator for Construction Management
- Research Coordinator for Land Management and Disaster Prevention
- Research Coordinator for Advanced Information Technology

The Research Center for Infrastructure Management researches all construction production processes, from the roles/effects of infrastructure development through to design/construction/ inspection/maintenance and management/renovation, and the role of information platform in supporting construction processes based on changes to the conditions of society around social capital maintenance.

■ Construction and Maintenance Management Division

The Construction and Maintenance Management Division conducts research into policymaking and guideline maintenance etc. related to suitable and efficient service of public utilities, including consideration of optimum bidding contract formats and business execution format in survey/design work and the supply of public works.

■ Construction and Maintenance Systems Division

The Construction and Maintenance Systems Division conducts research into optimization/ acceleration of standards and systems related to public supply processes in design/ estimates/supervision/inspection required in proceeding with social capital maintenance and the management thereof, as well as evaluation/reduction of construction costs etc.

■ Advanced Construction Technology Division

The Advanced Construction Technology Division conducts research into the acceleration of the building of construction machinery and other construction in order to save labor, optimize and improve precision construction production systems, and focus on the construction stage in the construction production processes necessary for social capital maintenance.

■ Information Platform Division

The Information Platform Division conducts research into basic technology related to information compilation, processing, and application through surveys, designs, construction, and inspections for the efficiency and sophistication of infrastructure development and management.

■ Construction Economics Division

The Construction Economics Division conducts research in order to clarify the roles and social economic effects of housing/social infrastructure supporting society/economy/living based on grasping the circumstances and trends surrounding housing and social capital.

■ Landscape and Ecology Division

The Landscape and Ecology Division conducts research in the fields of greening, conservation of living organisms and ecosystems, development and management of greenery and open spaces, and landscape and historical town planning with the aim of creating a society in harmony with the environment, including the creation of a sustainable national land where nature and people can coexist in harmony, and the creation of a living environment in which people can feel the richness of their lives

■ Kumamoto Earthquake Recovery Division*

The Kumamoto Earthquake Recovery Division conducts research into organization/standardization of expertise obtained at each stage (advanced technical support, surveys, design, and construction) in recovery projects in the wake of the 2016 Kumamoto earthquake.

* Government office building established at the site of Kyushu regional development bureau Kumamoto reconstruction project office

Interdepartmental Organizations

At the same time as each department conducts its specialized research, interdepartmental organizations have been established to contribute to organizational flexibility and undertake comprehensive interdepartmental activities.

■ Climate Change Adaptation Research Group

The Climate Change Adaptation Research Group conducts crossover research from the perspectives of flood control, water resources management, and river environment protection for climate change adaptation.

■ Environmental Research Committee

The Environmental Research Committee promotes the sharing of information concerning environmental research and interdisciplinary research in this field.

■ Disaster Prevention and Reduction Research Committee

The Disaster Prevention and Reduction Research Committee promotes the sharing of information concerning research on disaster prevention and reduction, as well as interdisciplinary research in this field.

■ Maintenance Research Committee

The Maintenance Research Committee promotes the sharing of information concerning research on maintenance and management, as well as interdisciplinary research in this field.

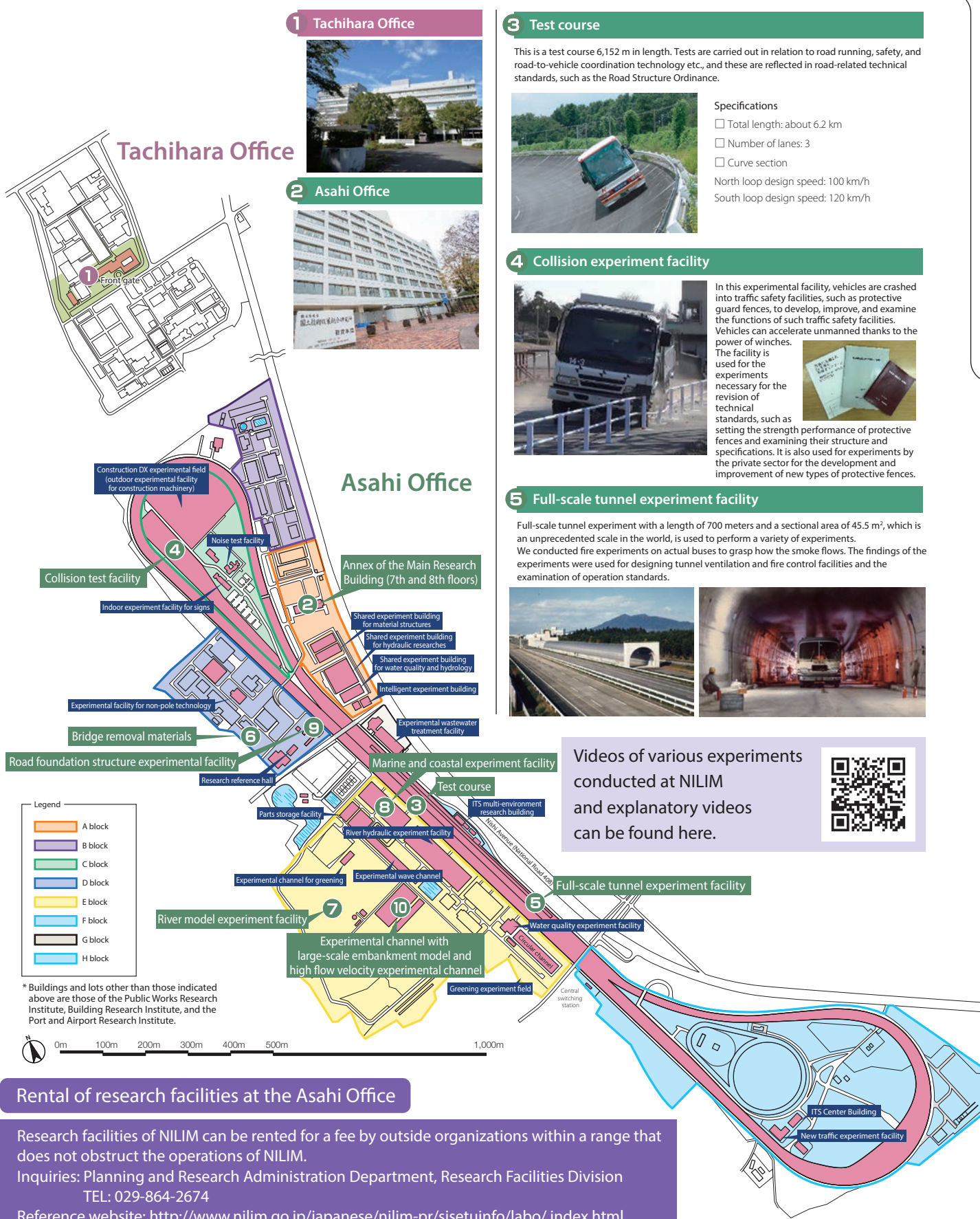
■ Digital Transformation of Infrastructure Systems Research Committee

The Digital Transformation of Infrastructure Systems Research Committee promotes research and development on digital transformation in the infrastructure field and disseminates DX-related technologies in this field.

Introduction to facilities

Asahi Office Tachihara Office

Asahi Office and Tachihara Office are in Tsukuba city and numerous experimental facilities are deployed in the enormous compounds.



Yokosuka Office

1 Yokosuka Office

The main building was completed in April 2004 and has a patio with a vaulted ceiling to allow natural ventilation and natural lighting to enter the research laboratory and other features that give consideration to protection of the Earth's environment, such as solar energy generation and greening of the rooftop.



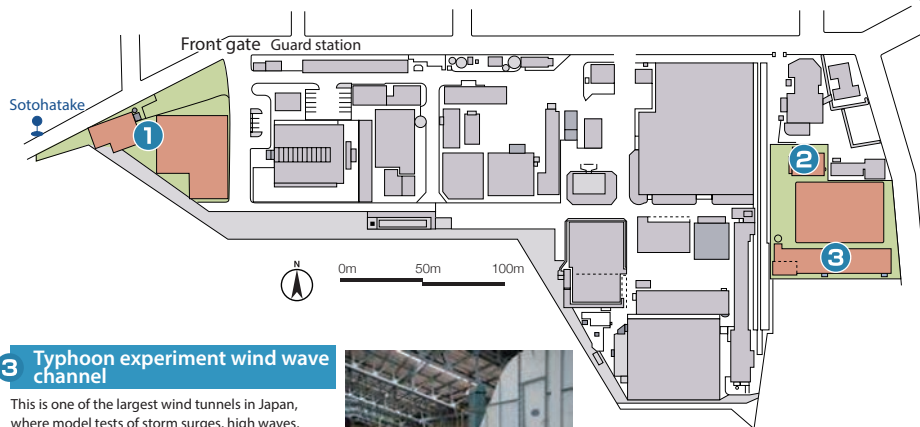
2 Aircraft load simulator

The aircraft load simulator with one set of four-wheeled landing gear the same size as that of B747-400 aircraft is an apparatus for the evaluation of bearing capacity and the durability of airport pavements, such as runways, taxiways, and aprons.



3 Typhoon experiment wind wave channel

This is one of the largest wind tunnels in Japan, where model tests of storm surges, high waves, strong winds, and tsunamis are conducted. Research studies are being conducted to protect large cities, ports and harbors from natural disasters by using wind blowers to generate typhoon winds and flow generators to generate currents.



6 Dismantled bridge members

Parts of bridges, which were actually used, are used for research to study road bridge maintenance standards and design and execution technology standards.



For example, the effect of repair and reinforcement work can be obtained by examining the strength of a bridge reinforced with cover plates.



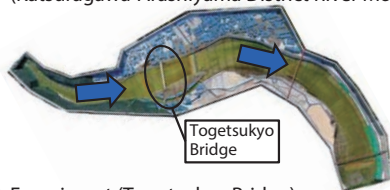
Specimens cut out of dismantled bridge members

7 River model experiment facility



This is an enormous facility with an area of 15 ha that is outdoors. On the site, it is possible to install a maximum of 15 models of rivers. For example, the river model experiment facility in the Katsuragawa-Arashiyama District grasps the hydraulic phenomena in the Arashiyama District, where it is difficult to obtain data on hydraulic phenomena because of the complicated land features, and whose observation data are very limited, via hydraulic model experiments for use in implementing flood measures.

- Overall view of the facility (Katsuragawa-Arashiyama District River Model Experiment Facility)



16.0 k up to 19.0 k can be reproduced.
Model scale: 1/40

- Experiment (Togetsukyo Bridge)



In normal times



In the event of heavy rains



Model

8 Oceanic and coastal experiment facility

This is used for hydraulic experiments concerning shore protection in order to protect the lives of people from the danger of storm surges, high waves, tsunami, and coastal erosion.



9 Road foundation structure experiment facility

This facility reproduces damage to roads (such as the generation of road surface bumps) and uneven subsidence during earthquakes to verify road technology that is resistant to ground deformation.

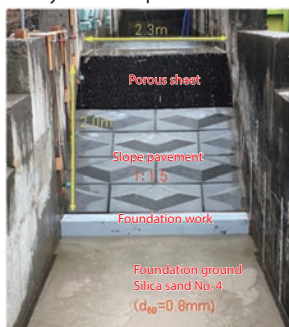


10 Experimental channel with large-scale embankment model



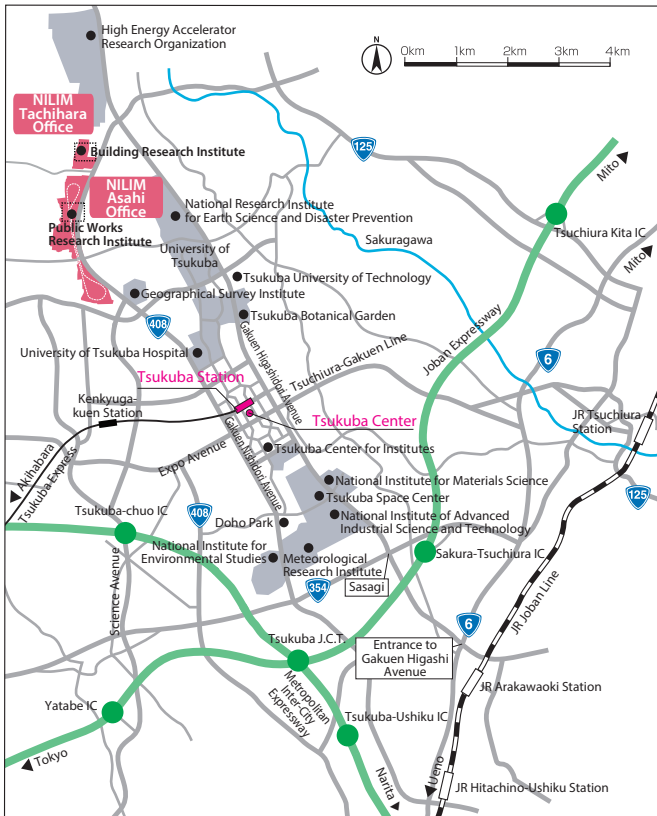
The experimental channel with a large-scale embankment model uses models close to actual size to study the external forces acting on river structures, such as levees and their failure mechanisms to study rational design methods for river structures. Crisis-management hard countermeasures (riverbank construction that slightly extends the time until bank collapses), which reduce damage even in the case of an overflow, are carried out based on expertise etc. obtained from experimental results using this overflow channel.

- Hydraulic experiment on the reinforcement of slopes



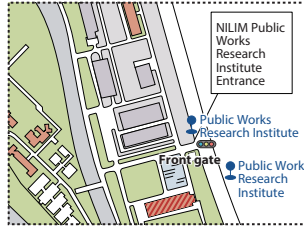
sediment and hydraulic experiment channel, a river hydraulic model experiment facility, a high flow velocity test channel, and a full-scale aeration test system.

National Institute for Land and Infrastructure Management (Tsukuba)



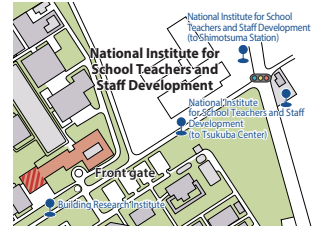
Asahi Office

1 Asahi, Tsukuba City,
Ibaraki 305-0804 Japan
Tel: 029-864-2211

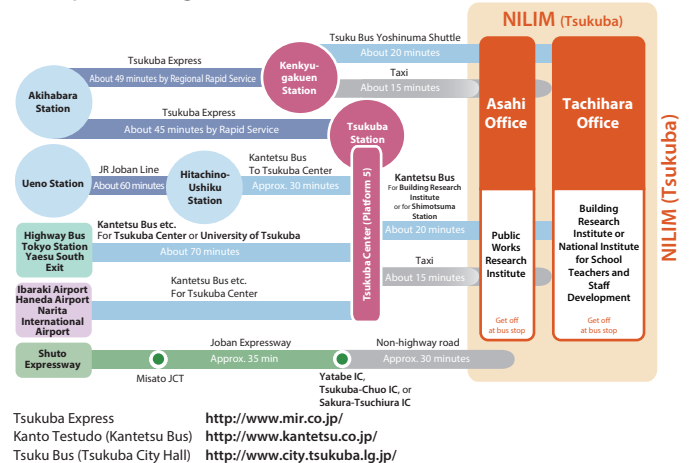


Tachihara Office

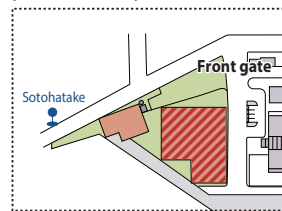
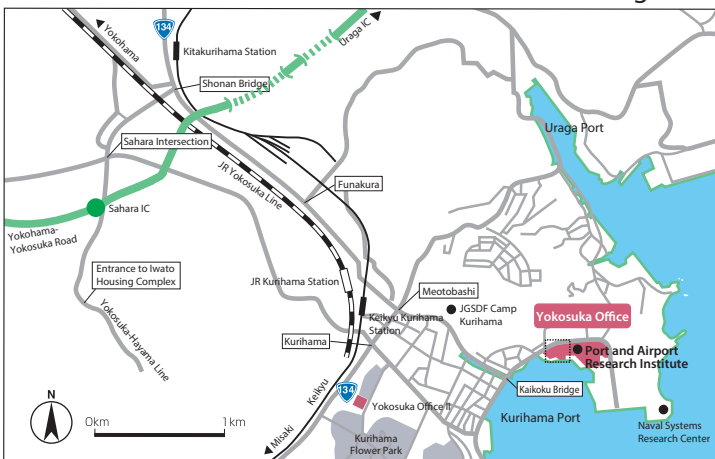
1 Tachihara, Tsukuba City,
Ibaraki 305-0802 Japan
Tel: 029-864-3742



Transportation guide to NILIM (Tsukuba)



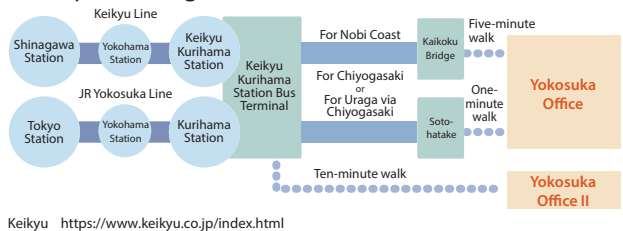
National Institute for Land and Infrastructure Management (Yokosuka)



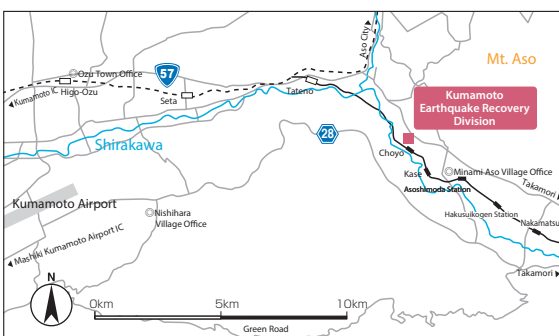
Yokosuka Office

3-1-1 Nagase, Yokosuka City,
Kanagawa, Japan 239-0826
Tel: 046-844-5006

Transportation guide to NILIM (Yokosuka)

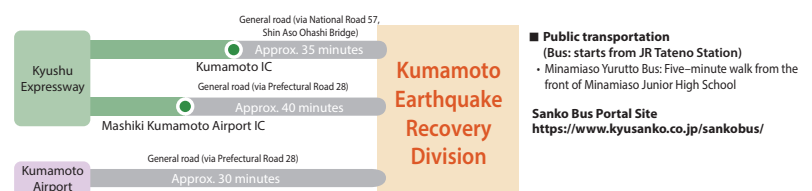


National Institute for Land and Infrastructure Management (Kumamoto Earthquake Recovery Division)



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Tel: 0967-67-2039

How to get to NILIM (Kumamoto Earthquake Recovery Division)



NILIM logos



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National Institute for Land and Infrastructure Management

NILIM is the English acronym for the National Institute for Land and Infrastructure Management.

The triangle indicates that the former rivers, roads and related fields, the city, housing etc. and related fields, and ports, and airports and related fields are linked to bear integrated housing and social infrastructure provision.

The orange color represents our expectations that the National Institute for Land and Infrastructure Management will make many contributions to national land policy and create a bright Japan in preparation for the coming age of the 21st century.