



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

NILIM
NILIM

Research Institute that creates
the society of the future



2018



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

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

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



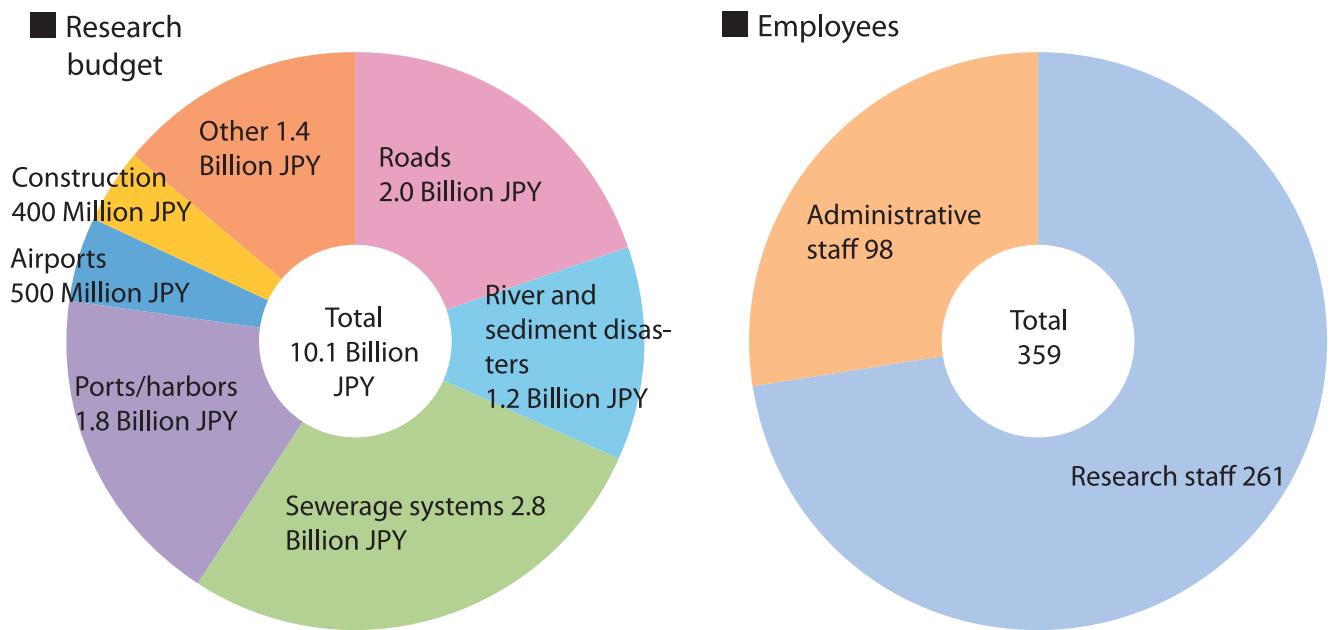
Basic stance

- Participate in policy development of the Ministry of Land, Infrastructure, Transport and Tourism as a technical specialist taking into account the administrative perspective
 - Participate as a party involved not only in forming and planning technical policy, but also in spreading and establishing that policy
 - Fulfill accountability through clarification of necessity and validity of technical policy using verified data
- Return advanced, comprehensive technical capabilities cultivated by research activities to practical work fields
 - Present solutions based on the situation in the field, and flexibly support advanced emergency response in the event of a disaster
 - Accumulate individual case examples, generalize and provide them widely, and reflect these lessons in research
- Connect to the creation of new policy by insight of the future image of national land/society and promotion of technology development
 - Take a larger view of national land/society, accurately understand the changes, and see into the future issues
 - Widely cooperate and fuse technology with industry, academia and government, and aim for new technology development

Activities forming basis

- Research and development that supports planning, drafting and spreading policy for land, infrastructure, transport and tourism
 - Systematically present, implement on-site, and continuously improve the technical standards and approaches that support important policy development to be faced
 - Identify issues to be addressed in the future and propose policy direction
 - Analyze trends of national land/society continuously and on a long-term basis, and accumulate knowledge
 - Support international expansion of Japanese technology through strategic international standardization and engineer cultivation in developing countries
- Advanced technical support for response to disasters/accidents and improvement of countermeasure techniques
 - Dispatch researchers immediately after disaster and support on-site response regarding secondary disaster prevention and emergency measures
 - Provide technical advice on investigation of the cause, consideration of recovery and reconstruction plans, and implementation of measures
 - Accumulate knowledge and lessons learned from disasters and reflect them in further research on disaster prevention and reduction measures
 - Technical support in case of large-scale disaster overseas as a country with developed disaster response
- Support for improvement of field technology of regional development bureaus
 - Transfer technological capabilities through guidance and advice from experts in the practice, regarding issues to be faced in the field
 - Host and train personnel to become local core engineers who have both administrative knowledge and specialization
- Collection, analysis and management of data forming technical basis of policy formation, and return to society
 - Collect and manage large amounts of field data as a State-run institute while ensuring objectivity, accuracy and reliability
 - The accumulated data is analyzed by us, reflected in research, and properly disclosed to society

Research budget and employees



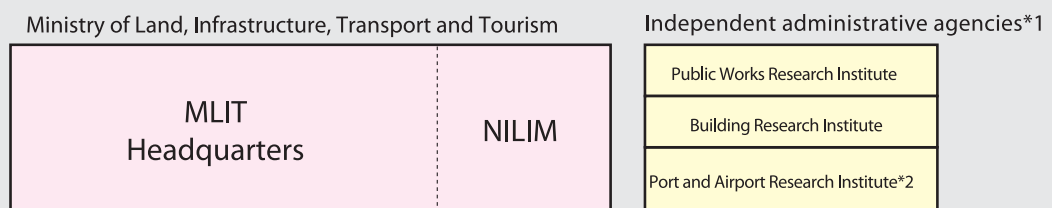
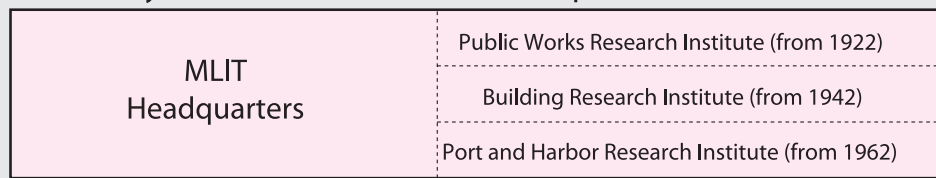
Structure of research budget (initial budget for FY2018)

Structure of employees (April 2018)

Establishment of the 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 united into one organization as of April 2001.

Ministry of Land, Infrastructure, Transport and Tourism



Under Article 194 of the Order for the Organization of the MLIT

Comprehensive surveying, testing, research, and development, technology guidance, dissemination of achievements, and collection, organization, and provision of information, regarding technologies related to the provision of public capital in order to utilize, develop, and preserve the national land and to the planning and proposal of policies which are under the jurisdiction of the Ministry of Land, Infrastructure, Transport and Tourism.

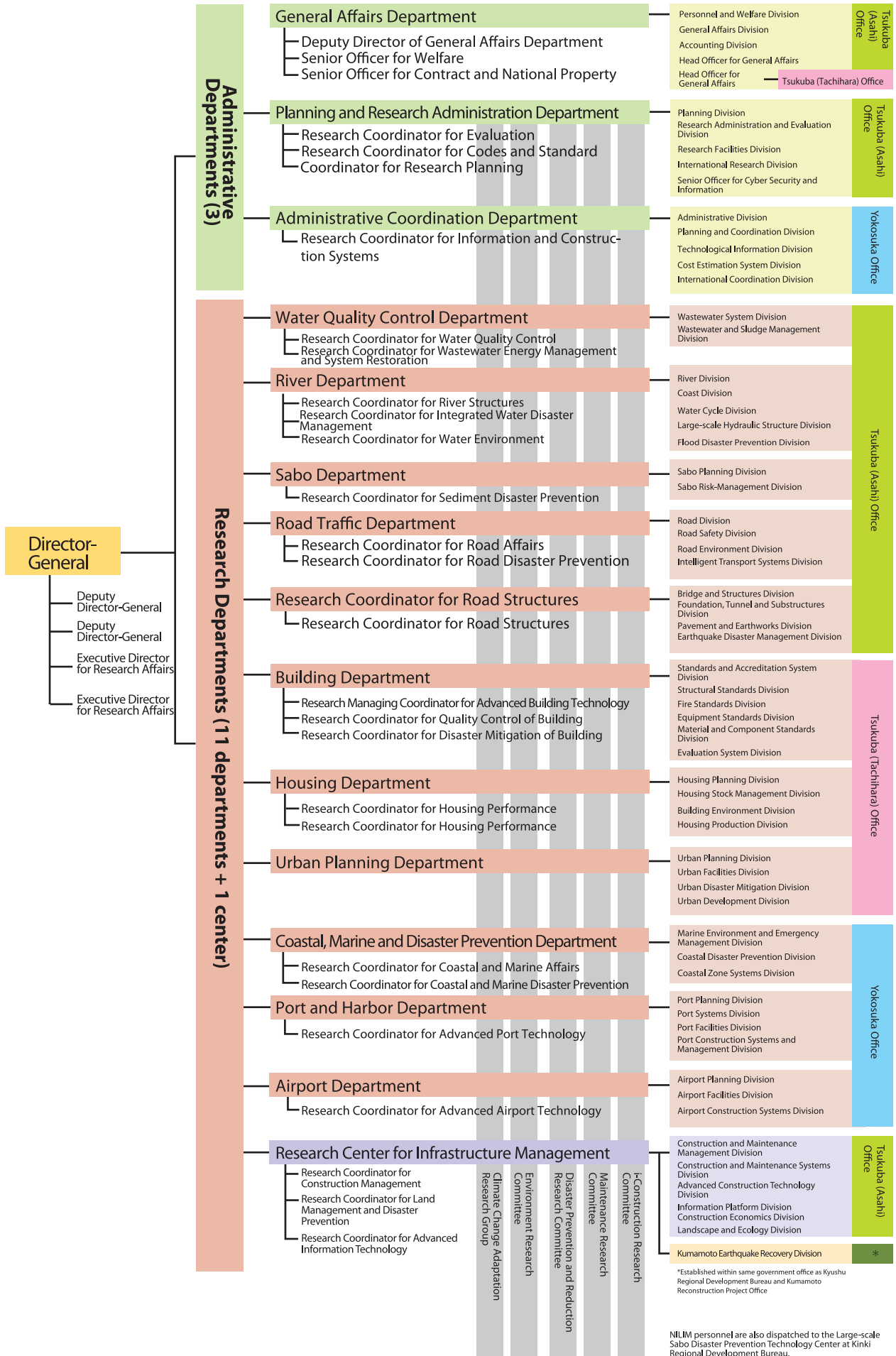
Under Article 2 of the Act on General Rules for Independent Administrative Agencies

Survey and research and technological development which might fail to be implemented if left up to the private sector from among those that must be implemented from the perspective of public service and which the national government need not implement directly.

*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 National Research and Development Agencies.

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

Organization



NIIM research policy

Research budget, Employees, Organization

Research & development

Support for accident and disaster response

Support for field technology improvement

Beneficial use of field data

International expansion/Public information activities

Introducing facilities and research departments, etc.

Conducting research and preparing technology start

Main research themes of the NILIM in FY2018

1. Preventing and mitigating disasters, and crisis management 07 ~ 08
2. Continuous management of infrastructure 09 ~ 10
3. Productivity revolution 11 ~ 12
4. Improvement of local creation/ease of living 13 ~ 14





1. Preventing and mitigating disasters, and crisis management

Increasingly severe disasters

Imminent large-scale earthquakes

- The Great East Japan Earthquake occurred in March 2011, and the Kumamoto Earthquake occurred in April 2016.
- There is a high likelihood*1 (70%) that an earthquake directly under Tokyo and the Nankai Trough Earthquake will occur within the next 30 years.

*1: Likelihood of occurrence is according to the Headquarters for Earthquake Research Promotion.

The new stage *2

- In the past 30 years, rainfall throughout Japan has become more localized, concentrated, and intense. (In September 2015 a severe flood disaster occurred due to heavy rain in Kanto and Tohoku, and in July 2017 a large-scale landslide disaster occurred due to heavy rain in Northern Kyushu.)
- There is fear of a super typhoon like Typhoon Haiyan that struck the Philippines in November 2013.
- There is also fear of disasters caused by volcanic eruptions, etc., like the Mt. Ontake eruption of September 2014.

*2: The Ministry of Land, Infrastructure, Transport and Tourism considers conditions such as “clear changes in the way that rain falls” and “nobody will be surprised by a large-scale eruption occurring at any time” as a “the new stage”. (See: <http://www.mlit.go.jp/saigai/newstage.html>).



1. Quick recognition of large-scale sediment disasters using remote sensing technology

Quickly recognize sediment disaster occurrences regardless of the time of day or weather, using Synthetic Aperture Radar (SAR*3), and make detailed investigation for emergency measures faster and more efficient.

○Background

- Necessary to identify and reduce the risk of secondary disasters caused by large-scale disasters at an early stage

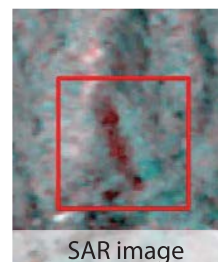
○Purpose

- To quickly recognize large-scale sediment disasters regardless of the time of day or weather
- To improve speed and efficiency of detailed investigation for secondary disaster prevention and emergency measures

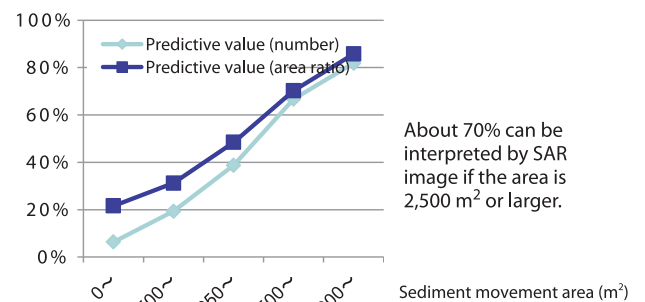
Research contents

1. Improving accuracy of interpretation using two images before and after, and consideration of evaluation method of probability of results
2. Human resource development of MLIT personnel for improvement of interpretation technology
3. Construction of systems for more efficient interpretation

*3: SAR: Synthetic Aperture Radar, a sensor that can observe in all weather conditions and even at night.



Landslide points of heavy rain in Northern Kyushu in July 2017 (area of about 6,000 m²)



(Sabo Department)

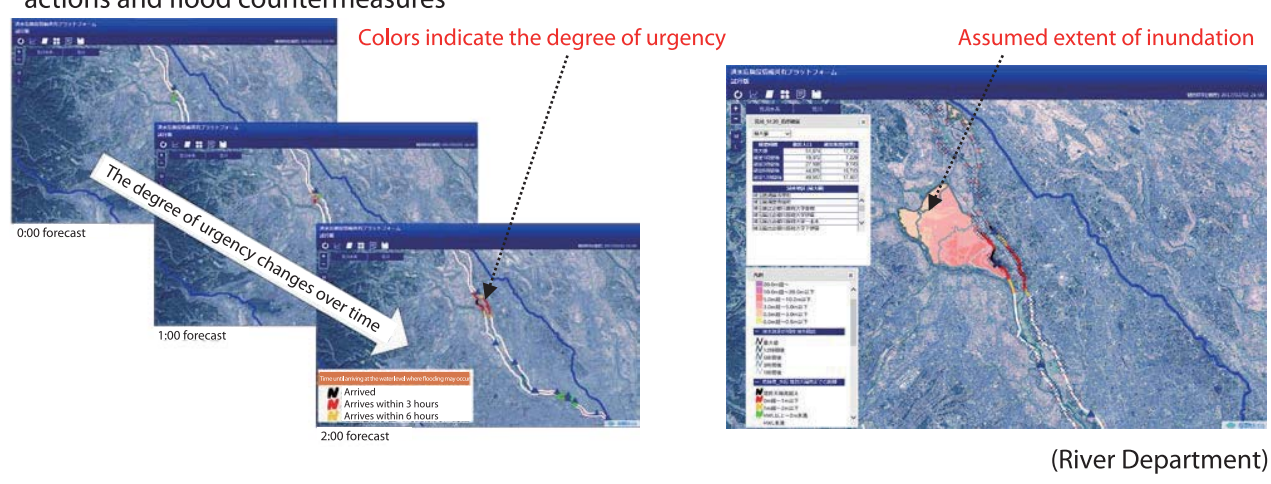
2. Flood risk visualization project

Using information on precipitation and river level etc., we visualize the urgency of flooding and the scale of damage potential, supporting proper evacuation and flood countermeasures.

- Background
 - Delays in municipalities' issuing of evacuation recommendations/orders
 - Delays in evacuation of residents
- Purpose
 - Grasping and predicting the flood risk of each site
 - Visualization of flood danger level – to support the municipalities' proper resident evacuation actions and flood countermeasures

Research contents

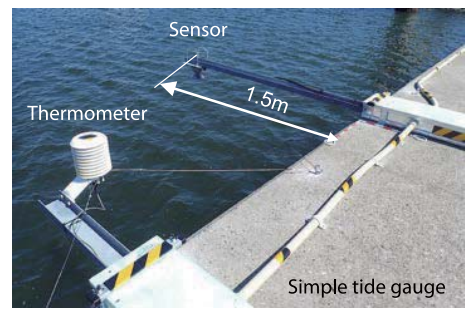
1. Development of highly accurate prediction technology for longitudinal water level of rivers
2. Development of representation method of flood danger level that promotes urgency



3. Tide level and wave prediction system for assessment of storm surge risk

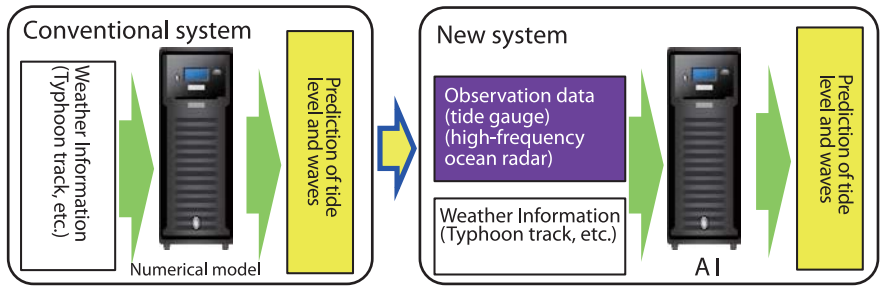
We are developing a system with AI to predict tide level and waves in a port from marine and weather information. The system can estimate storm surge risk to support preliminary measures such as early evacuation.

- Background
 - It is difficult to estimate temporal change and spatial distribution of storm surges and waves.
- Purpose
 - To develop tidal observation equipment at low cost and with easy installation and the required accuracy
 - To estimate storm surge risk from marine and weather observation data for preliminary measures



Research contents

1. Simple tide gauge
2. Tide level and wave prediction system with AI

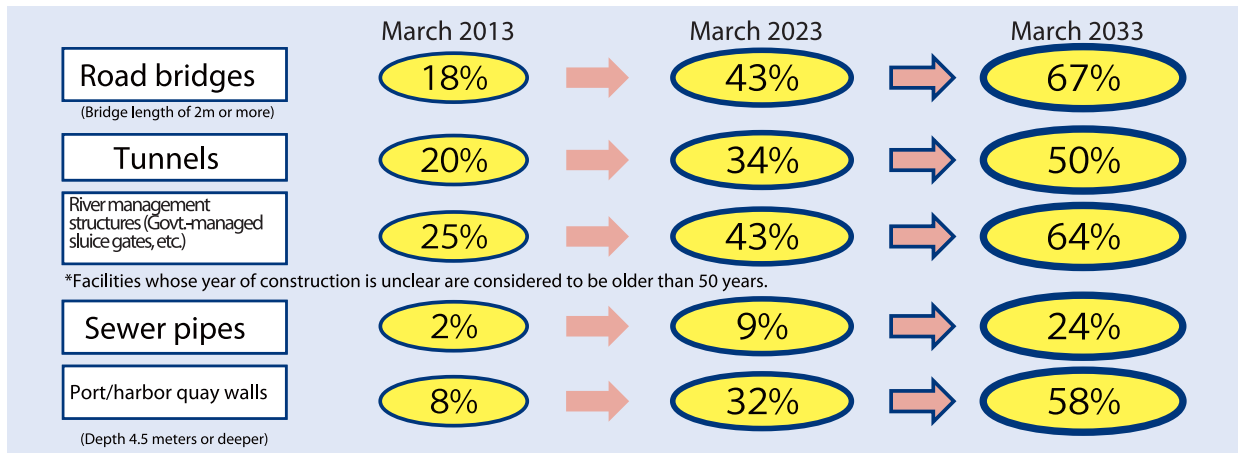


(Coastal, Marine, and Disaster Prevention Department)

2. Continuous management of infrastructure

Aging infrastructure (percentage of public capital constructed 50 or more years ago)

It is predicted that in 2033 more than half of various structures on roads, rivers, and in ports and harbors will be 50 years old or older, so maintenance and management countermeasures are matters of urgency.



Source: Land, Infrastructure, Transport and Tourism White Paper 2016

Obligation of inspections through legal reform

Inspections have been made obligatory, including close visual inspection of road bridges and tunnels once every 5 years (July 2014).

As infrastructure ages, it is necessary to continue with inspection and management and ensure that the results thereof are fed into a logical maintenance cycle.

1. Second stage maintenance of road structures

Analyze the results of the first round of inspection and develop technology required for each structure, as well as preparing revised guideline for the second round of inspection starting from FY2019 to effectively and efficiently promote the management cycle.

- Legal establishment of close visual inspection once every five years by road administrators
 - Demand from regional government bodies concerning deregulation of flexibility of inspection method and frequency, and simplification of administration
- ⇒ Consider obtaining early conclusion in order to be able to conduct sustainable and effective inspection



1. Optimization of inspection

① Consideration of inspection guidelines

- Analysis of inspection results
- Analysis of cases of damage due to deterioration

② Utilization of new technology

- Presentation of applicability evaluation method
- Support for field tests Drone, Monitoring Committee NETIS Theme Set Type

2. Reasonable measures

① Diagnosis, repair/reinforcement design methods

Damaged bridge

② Preventive maintenance technology

3. Individual facility plan formulation support

① Deterioration prediction technique

② Individual facility plan formulation support tool

Damage extent	a	b	c	d	e
Transition rate	1.00	0.75	0.50	0.25	0.00

(Road Structures Department)

2. Realization of appropriate maintenance and management of airport civil engineering facilities

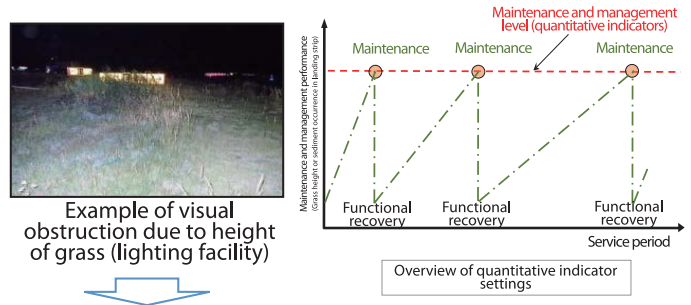
Establish maintenance and management level to be accomplished by reviewing the basic policy and frequency of maintenance and management in particular, and realize appropriate maintenance and management.

○Background

- Need for efficient and effective maintenance and management according to field conditions
- Occurrence of incidents affecting aircraft operation, etc

○Purpose

- To review the basic policy and frequency of maintenance and management, and realize appropriate maintenance and management
- To establish quantitative indicators of maintenance and management level that ensure the safety of airport functions



Example of visual obstruction due to height of grass (lighting facility)



Appropriate implementation reduces changes of obstruction

Research contents

1. Investigation of maintenance and management situation
2. Summarizing opinions, etc., of flight/operation-related parties
3. Consideration of quantitative indicators of maintenance and management level



Mowing the landing strip



Cleaning of paved surface of runway, etc.

(Airport Department)

3. Comprehensive management of sewer pipes that would circle the globe 12 times over

The NILIM is developing methods of selecting inspection technology according to circumstances such as laying conditions and types of pipe material, etc., support efficient checks and inspections of sewer pipes, which cover about 470,000 km throughout Japan.

○Background

- Road collapse caused by deterioration, etc.
- Decrease of engineering personnel

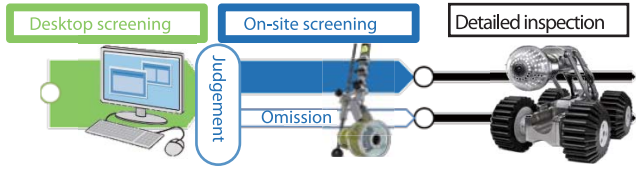
○Purpose

- Continuous functional maintenance of sewer system and cost optimization

Current: Only detailed inspections are performed



Target: Extraction of important surveillance lines by "desktop screening"



Research contents

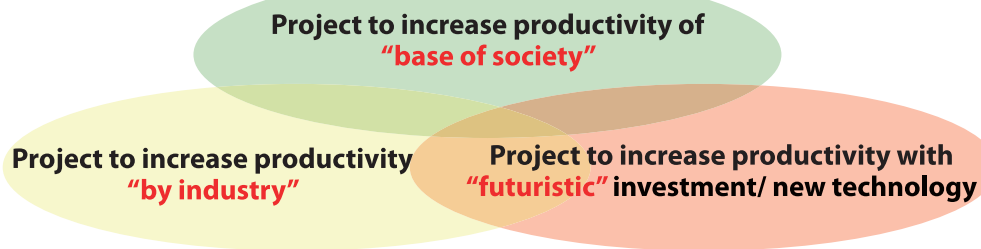
1. Analysis of judgment criteria from "desktop screening", which does not require detailed inspection or on-site screening
2. Verification of validity of judgment criteria

(Water Quality Control Department)

3. Productivity revolution (Application of ICT and effective use of existing infrastructure)

MLIT Productivity Revolution Project*

- In order for Japan to achieve continuous economic growth despite the population decrease, it is necessary to increase latent growth capability by improving productivity, etc., to exceed the reduction of workers, as well as generating new demand.
- The MLIT set 2016 as the “first year of the productivity revolution”, with 20 “Productivity Revolution Projects” selected as leading examples by the MLIT Productivity Revolution Office within the Ministry.
- With 2018 set as a “year of deepening the productivity revolution”, the NILIM is promoting technology development in cooperation with the MLIT, and going forwards it will carry out research based on the core viewpoints of productivity revolution.



*:MLIT Productivity Revolution Project
http://www.mlit.go.jp/sogoseisaku/point/sosei_point_tk_000021.html

1. Linkage and efficiency improvement of construction production processes using 3D models

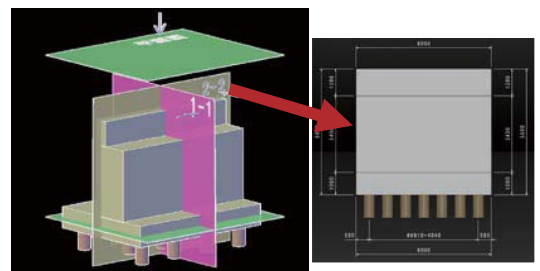
In view of the lack of leaders, which is a matter of concern, we utilize 3D models for investigation, measurement, design, construction, and continuous management.

- Background
 - Initiatives of i-Construction and CIM are promoted, but consideration on delivery and information registration of 3D models in the construction production processes is insufficient
- Purpose
 - To link information between each process using 3D models and develop effective method of utilizing 3D models

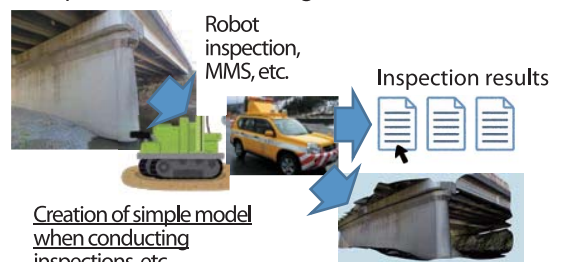
Research contents

1. 3D models that can be used as contract books
 Develop a method of creating 3D models that can be used as contract books and a method of giving necessary information at each stage of the construction production process
2. Method of giving construction record to 3D models
 Identify information to be utilized in continuous management from attribute information at the time of construction, and develop a method to give it to 3D models
3. Simple method of creating 3D models
 Develop a simple method of creating 3D models and a method of giving inspection information for existing structures.

1. 3D models that can be used as contract books



3. Simple method of creating 3D models



(Research Center for Infrastructure Management)

2. Productivity improvement by introducing ICT in the port field

In the Port field, improve productivity by promoting the use of ICT tools such as CIM and simplifying construction documents, etc.

○Background

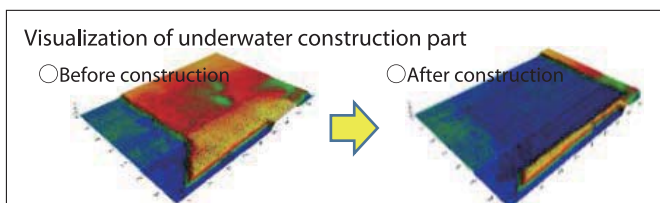
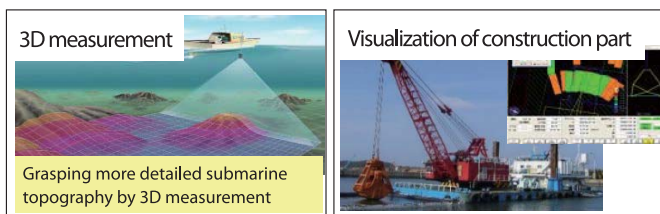
- Increased use of 3D data and growing needs for computerized construction
- Need to shorten work time by simplifying construction documents, etc.

○Purpose

- To improve work efficiency by expanding types of work applying 3D data and digitizing construction documents

Research contents

1. Evaluation of results of productivity improvement in ICT dredging
Based on the past results of ICT dredging, evaluate calculation of quantitative productivity improvement results
2. Consideration of CIM introduction guideline (ports and harbors)
Organize issues and challenges concerning attribute information and setting necessary detail of each member for introducing CIM models
3. Consideration of systems for simplification of construction documents
Consideration of expansion of electronic inspection using existing systems



(Port and Harbor Department)

3. Support for realization of automatic driving

Develop information provision systems to support automated driving:
- Information of position and velocity of mainline vehicles for smooth merging,
- Information of obstacles on the road ahead.

○Background

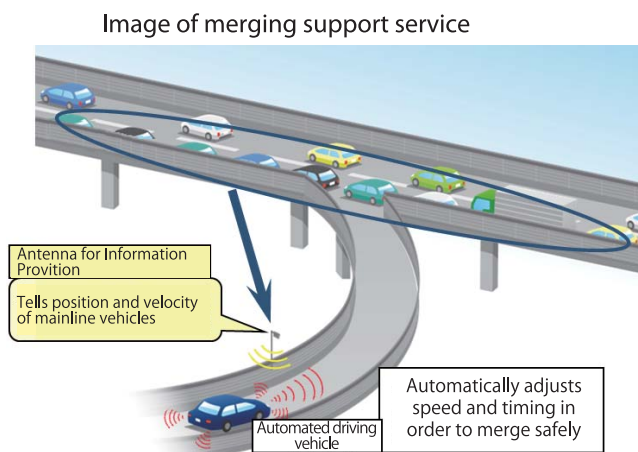
- Automobile sensors cannot detect obstacles (e.g., broken-down vehicles, falling objects) on the road ahead, and position of mainline vehicles necessary for merging.

○Purpose

- To mutually cooperate and complement information owned by automobile and road administrators
- To realize cooperative vehicle-infrastructure systems that will contribute to smooth automated driving as well as efficient road management.

Research contents

Development of a prototype system that provides merging support service, etc.



(Road Traffic Department)

3. Improvement of local creations/ease of living

1. Appropriate management of vacant houses based on local circumstances and development of prediction method of housing supply and demand

Evaluate and determine the state of management insufficiency of vacant houses, develop prediction method of housing supply and demand for each region, help to prevent inadequate management of vacant houses, and secure housing demand and supply balance.

○Background

- Rapidly increasing initiatives for vacant houses in municipalities
- Various vacant house issue depending on the region
- Insufficient technical materials related to defining plans for municipalities

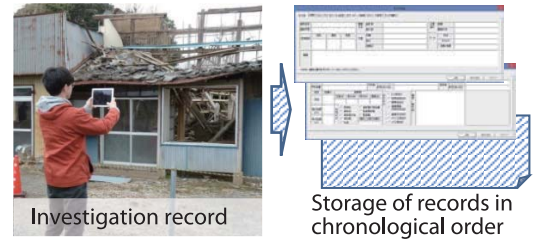
○Purpose

- To prevent an increase of unmanaged vacant houses
- To maintain housing supply and demand balance

Research contents

1. Specify technical standards relating to determination of measures against inadequate management of vacant housing
2. Develop support tool for database maintenance including changes to condition of vacant houses
3. Develop prediction method of housing supply and demand based on local circumstances

Compilation of a database of vacant house information



Example of inadequately managed vacant housing



(Housing Department)

2. Planning of an introduction scenario of two-stage crossing utilizing a traffic island

Support the introduction by creating drafts of technology standards including application setting, usage, and applicable traffic conditions and geometric structures of two-stage crossing.

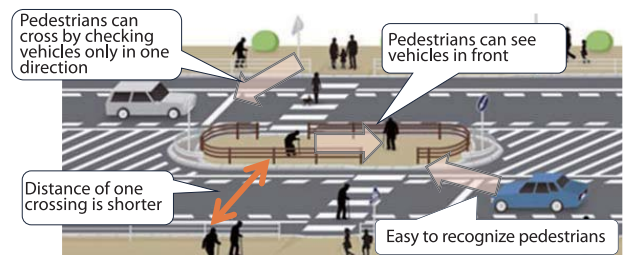
○Background

- About half of pedestrian-related fatal accidents occur while pedestrians are crossing roads
- Among the pedestrian crossing accidents, the ratio of elderly people is particularly high

○Purpose

- To reduce accidents of crossing pedestrians by introducing two-stage crossings that can be crossed over more safely

Image of two-stage crossing using a traffic island



(Road Traffic Department)

3. Development of method for quantifying tidal flat ecosystem services

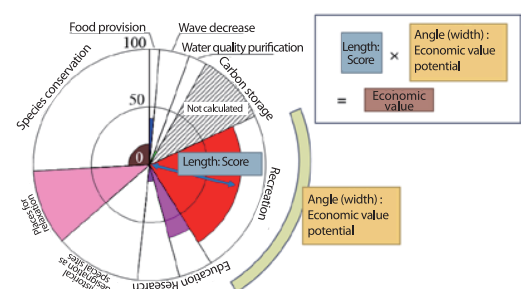
Develop a method that can properly qualify tidal flat ecosystem services and identify environmental factors in order to improve services.

○Background

- Waterfronts in port areas and coastal areas, where people can feel familiarity with the sea, have attracted attention from perspective of ecosystem services
- However, ecosystem services are often underestimated in daily decision-making
- Need to develop a method for quantifying ecosystem services

○Purpose

- To develop a method for quantification (visualization) of ecosystem services of tidal flats



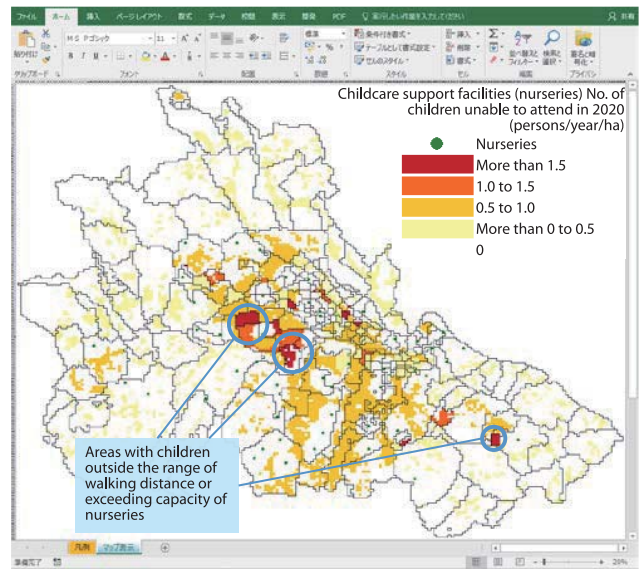
(Coastal, Marine and Disaster Prevention Department)

4. Development of management methods such as optimal placement of community living support function

Development of planning and evaluation technologies related to optimal placement of medical and welfare facilities, etc., that support community living, and aim to realize a city where people from child-raising generation to elderly generation can live with peace of mind.

- Background
 - Need to create urban structure where people from child-raising generation to elderly generation can live and comfortably without a car with peace of mind
 - Need for optimal placement of medical and welfare facilities, etc.
- Purpose
 - To support cooperation of urban, housing, and welfare departments of local government in order to create a city where people can live and comfortably without a car with peace of mind
 - To eliminate excess or shortage of medical and welfare facilities, etc., in the area

Research contents
 Finalization of the "Program to forecast the optimal placement of community living support functions" and manual for spatial/chronological estimation of excess/deficiency and optimal placement (cost- effectiveness) of medical care, childcare, and elderly care facilities (Published as complementary tool of national guidelines)



Output example of "Program to forecast the optimal placement of community living support functions" (No. of children outside range of walking distance or over capacity of nursery)

(Urban Planning Department)

5. Design and construction technology of mixed structures utilizing newly developed wood-based materials

Towards expansion of new demand and promotion of the use of wood, the technical design guidelines for structural design, fire safety design, maintenance, etc. of mid-rise wood mixed structures are developed.

- Background
 - Further promotion of wood use is necessary
 - Fireproof performance is necessary for wood mixed structures
 - Combination with RC construction, etc., is effective for ensuring fireproof performance
- Purpose
 - To develop structural design methods and fireproof design methods etc. for wood mixed structures based on wood and other construction methods
 - To improve design guidelines for timber structure materials in government office facilities
 - To improve design/construction methods, etc. for durability of wood mixed structures

Research contents
 1. Structural performance
 2. Fireproof performance
 3. Maintenance or durability

Design of prototypes for consideration



Merits of each material in mixed structures

Timber	Steel	RC
Saves CO ₂ Lightweight Flexible	High-Strength High-Ductility	High-Strength Fireproof

(Building Department)

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

When a disaster occurs, in response to requests from the disaster region, the 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 experts have been dispatched to disaster sites such as in the cases of the heavy rain in Kanto and Tohoku in FY2015, the Kumamoto Earthquake in FY2016, and the heavy rain in Northern Kyushu in FY2017.

*Technical Emergency Control Force: Team dispatch system established in 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 regional governments, etc., in the disaster regions with technical assistance.

● Dispatch history

2017: 4 disasters, 59 person-days
 2016: 6 disasters, 281 person-days
 2015: 3 disasters, 31 person-days

Itoigawa City large-scale fire (Dec. 2016)
 Itoigawa City, Niigata Prefecture



Large-scale disaster survey

Heavy rain in Northern Kyushu (Jul. 2017)
 Asakura City, Fukuoka Prefecture, etc.




Survey of Kagetsu River

Kumamoto Earthquake (Apr. 2016)
 Minamiaso Village, Mashiki Town, Kumamoto City, Kumamoto Prefecture, Oita City, Oita Prefecture, etc.



Explanation of emergency inspection results to municipality

Typhoon disasters (Aug. 2016)
 (Typhoon nos. 9, 11, 10, 13)
 Hokkaido: Biei, Kamikawa, Iburi coast Takase River, Aomori Prefecture.
 Omoto River, Iwate Prefecture.
 Tone Town, Numata City, Gunma Prefecture.
 Saitama City, Saitama Prefecture, etc.



Survey of Omoto River

Heavy rain in Kanto and Tohoku (Sept. 2015)
 Joso City, Ibaraki Prefecture, etc.



Field survey of damaged site

Initiatives of the Kumamoto Earthquake Recovery Division

The Kumamoto Earthquake Recovery Division was established in April 2017 as the NILIM's first such division at a disaster recovery site in order to accelerate restoration and recovery projects in the wake of the Kumamoto Earthquake.

This Division aims to ensure quick progress of restoration and recovery projects by giving technical advice/guidance with advanced specialist expertise in each process, from site surveys and design through to construction, as well as carrying out research aimed at reform of technical standards, etc., based on the Kumamoto Earthquake.



improvement of countermeasure techniques

Activity introduction: Technical support in response to April 2016 Kumamoto Earthquake disaster

On April 14th and 16th, 2016, earthquakes measuring up to 7 on the Japanese earthquake scale occurred in the Kumamoto District of Kumamoto Prefecture. Immediately after the earthquakes, the NILIM cooperated with relevant research organizations and took part in planning local support in each field through the MLIT's Technical Emergency Control Force (TEC-FORCE), formed an independent survey team, and dispatched a total of 323 personnel to the locality.

Dispatched personnel gave technical guidance on points of attention for disaster surveys and securing technical uniformity and consistency of emergency inspection results and explained the survey results to the leader of local government bodies, etc.

Afterwards, while restoration and recovery in the disaster stricken area is fully underway, the Director General for Technology Management and specialists of Roads, Sabo and Rivers from the NILIM participated in the "Kumamoto Earthquake Disaster Countermeasure Promotion Office", which was established on July 1st, 2016 by the Kyushu Regional Development Bureau to quickly and powerfully promote the project. In addition, specialists in different fields participated in various committees related to disaster recovery.

In order to strengthen the system, the "Kumamoto Earthquake Recovery Division (p. 15)" was established in April 2017.



Participating committees, etc.

Name of committees
Midorikawa River and Shirakawa River Embankment Investigation Committee
Technical Committee regarding Tateno Dam Construction
Restoration Technology Examination Meeting for Aso Ohashi area
Road Restoration Coordinating Meeting for Kumamoto Aso surrounding Area
Technical Committee on the Route and Structure of Route 325
Project Team for the Examination of Restoration Techniques (bridges, tunnels, earthwork)
Kumamoto Earthquake Building Damage Cause Analyzing Committee

Case introduction: Advancement of measures (Minimize information gap immediately after an earthquake)

The NILIM has been developing a system to share information necessary for disaster response, which changes at each moment, to infrastructure administrators at the right time. This technology development is promoted based on the results of the investigation into disaster response at the time of the 2016 Kumamoto Earthquake.

(1) Automatic information distribution at the time of earthquake

- Create "Spectrum analysis information" that makes it possible to grasp the damage scale of infrastructure facilities (Fig. 1)
- Automatically distribute to disaster management sectors of the MLIT

(2) Efficient use of SAR images

- Support planning of efficient observation plans combining satellite SAR, aircraft SAR, etc., and develop technology to improve efficiency of SAR image interpretation work
- Conduct interpretation training at Regional Development Bureaus

(3) Automatic rendering of panoramic images

- Develop technology to automatically pan CCTV cameras and render panoramic images in order to grasp the broad situation of areas with large tremors (Fig. 2)
- Trial operation is being conducted in actual environment using wide area surveillance cameras of the Regional Development Bureau

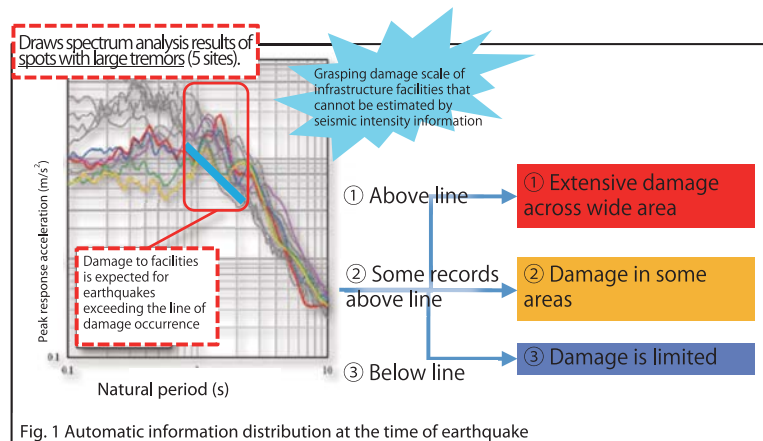


Fig. 1 Automatic information distribution at the time of earthquake

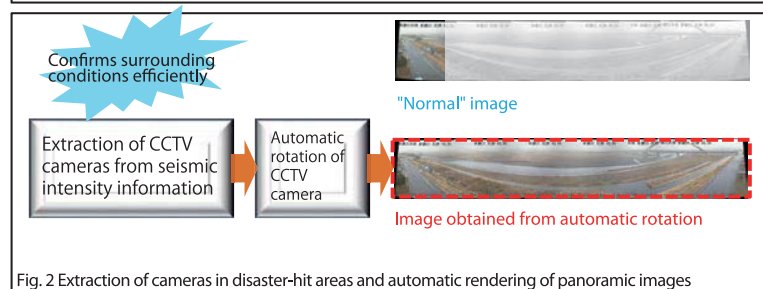


Fig. 2 Extraction of cameras in disaster-hit areas and automatic rendering of panoramic images

Hosting of personnel

- Improving technological capabilities of regional government bodies and private enterprises
The NILIM is aiming to improve technological capabilities through acceptance of exchange researchers from regional government bodies and private enterprises, experience of research activities, and lectures, etc. (44 exchange researchers have been accepted as of April 2018.)
- Hosting personnel from regional development bureaus
In order to improve the technological capabilities of personnel belonging to regional development bureaus with local issues through their professional duties, opportunities are established for them to enroll for a fixed period of time as researchers or research associates. Personnel who have acquired technical skills are active as core technicians in each region after returning to their regional development bureaus.



Understanding failure phenomena by performing load tests



Participation in field surveys and technical consulting



Technical support for the Kumamoto Earthquake with participation from hosted personnel

Support for local issues

In order for NILIM researchers to work together with the Regional Development Bureau to resolve issues that occur locally, the Kumamoto Earthquake Recovery Division was established in the area affected by the Kumamoto Earthquake disaster. Personnel are also being dispatched to the Large-scale Sabo Disaster Prevention Technology Center at Kinki Regional Development Bureau.

Completing and strengthening training

The 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.

(481 lecturers dispatched in FY2017, as of end of March 2018)
(39 training courses with 721 participants held in FY2017 (Yokosuka Office No. 2))

From FY2014, it started giving centralized maintenance training for all the regional development bureaus, and its goal for the five year period from FY2014 to FY2018 is to train a total of 7,700 people jointly with other organizations in three fields: roads, rivers, and ports and harbors. To do so, the NILIM assigns teachers to representative courses and at the same time helps with the preparation of common national lecture documents and textbooks.



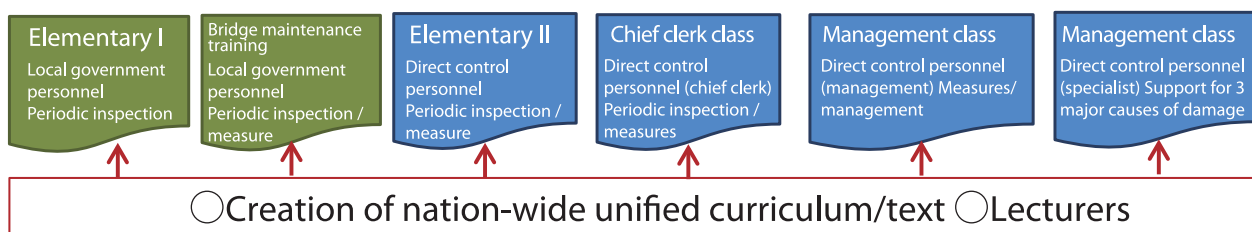
Training in maintenance



Technical training in bridge maintenance

Case study: Bridge maintenance and management training

The training system is constructed by arranging the necessary knowledge and skills at each level in order to carry out maintenance and management work ranging from periodic inspections to repair and reinforcement. Training is also supported through the creation of unified curriculum and texts, dispatch of lecturers, and so on.



Technology consultation

The NILIM constantly provides national government agencies and regional government bodies, etc., with technical support of various kinds for policy implementation and project execution. For example, the Coastal Disaster Prevention Division looks after a technical support counter for high-tide flooding simulation necessary for preparation of maps, which show areas likely to be affected by high-tide flooding as created by prefectural governors based on the Flood Control Act.

● Technical Consultation Office

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



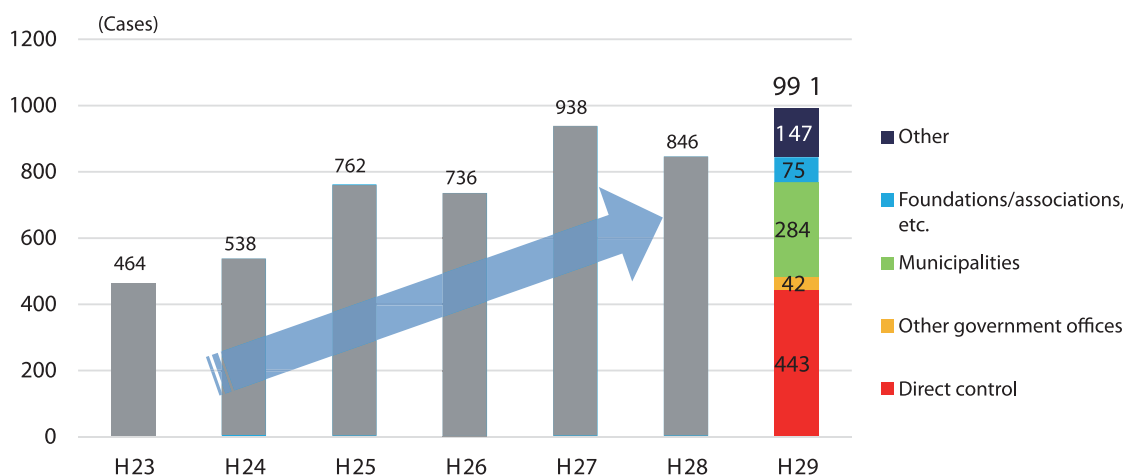
■ Contact (E-mail: nil-soudan@ml.mlit.go.jp)
 Coordinator for Research Planning, Planning and Research Administration Department (TEL: 029-864-8067)
 Senior Researcher, Planning Division, Planning and Research Administration Department (TEL: 029-864-4090)

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



● Technical Consultation Office

Consultations regarding advice for inspection of deteriorated bridges and on-site issues, such as consideration of river maintenance plans, are accepted at any time (there were 991 cases in FY2017).



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

Support for promoting stock management and earthquake resistance of sewers

● Sewer pipe deterioration database

- Database that collects survey results of local governments' information on deterioration judgment results such as type of pipe, elapsed years, corrosion and slacking
- Data of about 250,000 spans of 56 local governments has been disclosed (as of June 2017)

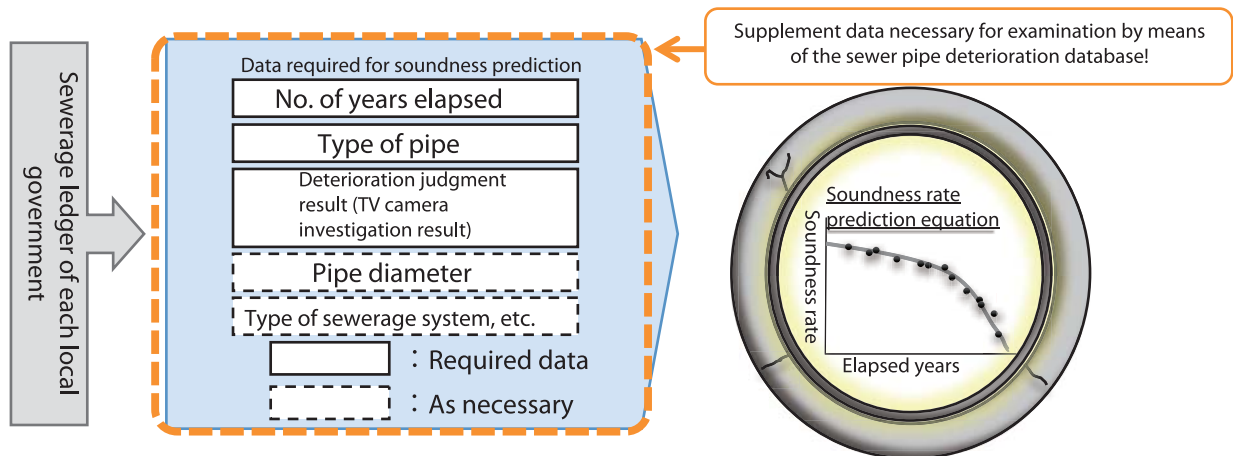


Fig. Utilization of sewer pipe deterioration database

● Sewer pipe earthquake damage database

- Organizes information on sewer pipe damage for earthquakes measuring more than 6 on the Japanese earthquake scale that occurred from 1993 to 2016.
- Organizes earthquake information, ground information, sewer information, and damage information by span.

Forecasting the future of cities and promotion of compact city formation

● Future population and household forecast tool based on small areas (national census data zones)

- A Microsoft Excel-based program that allows easy forecast of population and number of households for five-year age groups and gender based on small areas (national census data zones), which could only be forecasted based on municipalities until now.
- It can be used to analyze the future prospects of population and households at the regional level in formulation of location optimization plan, municipal master plan, and vacant housing measure plan in order to promote compact city formation.

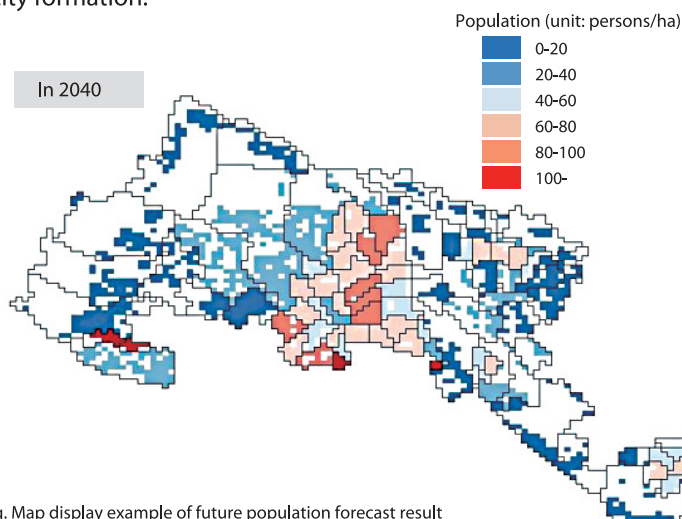


Fig. Map display example of future population forecast result

Features of this tool

- Easy operation simply by selecting options on the screen.
- Population database required for forecasting is included.
- It is possible to forecast all the small areas (national census data zones) in the municipality with one operation.
- Forecasted values are consistent with the estimate of the population based on municipalities by the National Institute of Population and Social Security Research.
- The forecast results can be displayed on a map with the attached simple drawing tool.

International research activities

The NILIM is promoting international research activities based on the following three perspectives.

Perspective 1: Improvement of the quality of research results

In order to deliver valuable research results, we reinforce understanding of foreign technical policy trends related to "disaster prevention and disaster mitigation, and crisis management," "infrastructure maintenance," "productivity revolution," and "improvement of local creations/ease of living," which are important research themes of the NILIM. For this reason, we are gathering extensive information by actively participating in international conferences. Regarding particularly important fields, we utilize bilateral conferences and multinational cooperation research frameworks to understand the detailed situation.

Research agreement made with Sri Lanka

- The NILIM concluded a memorandum for research collaboration with the National Building Research Organization (NBRO) of Sri Lanka in January 2018 in order to implement and promote exchange of information in the field of risk management against sediment-related disasters.



Scene of agreement

International Maritime Organization/Facilitation Committee

- The NILIM decided to fully revise the "Guideline for constructing port administrative procedure processing system", which is the digitalization guideline for each government of contracting countries due to the revision of the Annex of the Convention on Facilitation of International Maritime Traffic and obligation of digitalization of port administrative procedure.
- Senior researcher of the Administrative Coordination Department is serving as the Coordinator of the Correspondence Group.

Perspective 2: Exportation of infrastructures and systems

The NILIM carries out activities according to the export policy of high-quality infrastructures as one of the governmental institutions and contribute to the benefit of Japanese companies and the revitalization of domestic industry. Activities are carried out through participation and information dissemination from the conceptual stage of the project, development of software infrastructure, support for companies engaged in exporting infrastructure, and bilateral research collaboration with developing countries. We conduct cooperative activities particularly in Indonesia as a focused country.

Joint research with Indonesia

- The NILIM concluded a research agreement with the Institute of Road Engineering (IRE) of Indonesia in the road sector in 2009 as part of its reinforcement of relationships with Asian countries, where demand for infrastructure is strong.
- A joint research interim report meeting was held in October 2017 and results were shared.



Interim report meeting

International standardization activities

- The NILIM strategically responds to the international standardization activities that are effective in encouraging the industrial world to enter the international market.
- The NILIM participates in the ISO Domestic Screening Committees of 26 fields such as water and sewage, fire safety, building environment design, and building acoustics (as of June 2016).

Perspective 3: International contribution

The NILIM dispatches experts to technical cooperation projects, which are implemented by JICA in developing countries, and dispatches researchers overseas for reconstruction assistance surveys after large-scale natural disasters. Furthermore, we accept trainees for engineers and administrative officials in developing countries related to land, infrastructure, and transport.

Dispatch of experts to the Disaster Risk Reduction Training Program for Latin America and the Caribbean

- The NILIM cooperates in human resource development training for Latin America and the Caribbean based on the requests of JICA.
- Three researchers in the road structure field and construction field were dispatched in FY2017, and gave a lecture in training conducted at the Ministry of Public Works in Chile.



Scene of lecture

Disclosure of English materials on the NILIM website

- In order to return the knowledge of the NILIM to the international community and promote exchange of information and opinions, the NILIM publishes technical data used for international consultation, etc. on its website.



<http://www.nilim.go.jp/english/hottopics/index.htm>

Management initiatives supporting high-quality research

Cooperation with external organizations

In addition to joint research, contract research and concluding agreements, etc., the NILIM effectively utilizes technologies provided by industry and academia, as well as knowledge of different fields such as social science and humanities, in order to improve the efficiency and quality of its research.

Contract research

Research aiming to get better results efficiently by entrusting to other organizations

55 organizations including Tokyo University and Japan Sewage Works Agency

Joint research

Research aiming to get better results by collaborating with other organizations

16 organizations including Kyoto University, JAXA, Toyota Motor Corporation

Domestic cooperation

The aim is to develop education and research on the university side and to contribute to the activities of the NILIM through coordination and cooperation between universities and the NILIM. Tsukuba University, Kansai University, etc.

International cooperation

The aim is to improve the quality of research results of the 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 the NILIM.

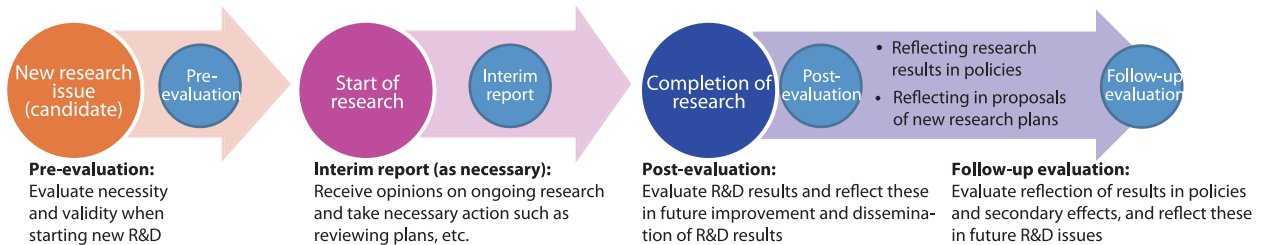
Indonesia Department of Public Works and Department of Citizen Housing Road Research Institute, Korean Research Institute for Human Settlement, Sri Lanka Ministry of Disaster Management National Building Research Organization, etc.

Research evaluation

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

External evaluation of individual research challenges

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



External evaluation of R&D organization

Outside experts evaluate research activities as a whole at the NILIM, as well as environment improvement initiatives that support the research activities, and the 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. The NILIM holds internal presentation meetings for young researchers who have little presentation experience and a study group by young personnel aimed at enhancing development.

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



Internal presentation meeting for young researchers

Compliance

The NILIM has established the Compliance Promotion Headquarters to enact an Annual Promotion Plan, and based on monitoring and advisory opinions by the Compliance Advisory Committee (committee of outside academic experts), to undertake initiatives under the compliance promotion plan.

Response to misconduct in research

In addition to establishing “NILIM Guidelines for Responding to Misconduct in Research”, the NILIM makes efforts to prevent misconduct (fabrication, falsification, and plagiarizing).

To create deeper understanding of civil engineering and building construction

Website

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

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



Mail service

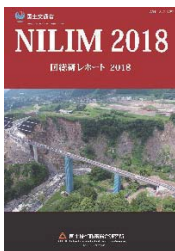
We make simple and timely introductions of the activities and research achievements of the NILIM. We normally send it out twice a month. You can register to receive mail service from the QR code on the right.



Publications

NILIM Report

NILIM Report is published annually, introducing and explaining research trends and the reflection of research results in policy, and presenting recommendations concerning technology policy challenges (the full report is published on the NILIM website at the beginning of each fiscal year.)



Comprehensive Research Report of NILIM

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



Presenting papers

The NILIM announces approximately 700 papers per year, and receives awards for papers in many fields, both from inside and outside of Japan.



15th PIARC International Winter Road Congress Award for Best Paper received in Feb. 2018

Lectures

NILIM Lectures

The NILIM holds a "NILIM Lecture Meeting" every year and introduces its activities, announces research results and makes recommendations for resolution of technical policy issues. Approximately 600 people attend every year. It also holds specialist lecture meetings and symposiums in each field whenever necessary.

The 2018 NILIM Lectures will be held on December 4th at Japan Education Center.



NILIM Lecture Meeting (Dec. 2017)



Construction Management Research Panel Discussion

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. (52 lectures on demand were held in FY2017.)



View of a lecture on demand at an elementary school in Tsukuba City

Open house

Open house is provided to introduce research facilities while explaining the NILIM's research contents. 3,678 people visited in FY2017, and the event will be carried out in FY2018 as well.

Tsukuba Office

Science & Technology Week: Apr. 20th
Tsukuba Young Doctors: Aug. 3rd
Public Works Day: Nov. 17th

Yokosuka Office

Open house: July 21st

Private facility tours for groups are also possible whenever asked for.



Contest for making bridges out of cardboard (productions on display at open house)



Tour of a testing facility

Publicizing experiments

Representatives of the mass media and members of the general public view important experiments normally conducted in private. And videos of experiments are also released to public view on the website.



View of full-scale vehicle collision test of guard fences for residential roads

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 and Research Administration Department

- Research Coordinator for Evaluation ● Research Coordinator for Codes and Standards
- Coordinator for Research Planning

Planning Division Research Administration and Evaluation Division Research Facilities Division
International Research Division Senior Officer for Cyber Security 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, to 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 stormwater 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, building a sound water cycle and conserving the water environment through wastewater treatment, and improving 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 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 researches river management for socially safer and environmentally better rivers, and to systematize and standardize technologies that promote policies based on these researches.

■ Coast Division

The Coast Division is involved in research initiatives that have to do with preservation of the coast in order to protect the coastal areas from high tides, tsunamis and erosion with consideration given to the environment and use.

■ 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 at normal times, and ways to link these to disaster prevention, environmental conservation, and ensuring water resources.

■ Large-scale Hydraulic Structure Division

The Large-scale Hydraulic Structure Division conducts research to systemize and standardize technologies to clarify the state of, improve the functions of, and maintain, manage, and renew large structures such as dam reservoirs which play key roles on a river basin scale.

■ Flood Disaster Prevention Division

The Flood Disaster Prevention Division conducts research on flood risk evaluation technologies and methods of reflecting them in disaster prevention planning, the use of hazard maps or information sign boards, and flood mitigation countermeasures integrating hard and soft measures by establishing both self-help and mutual assistance.

Sabo Department

- Research Coordinator for Sediment Disaster Prevention

In order to protect human lives and property from sediment disasters in the face of the frequent occurrence of large-scale sediment disasters caused by torrential rain, earthquakes, and so on, the Sabo Department's mission is to study ways to monitor the occurrence of large-scale sediment disasters and predict their damage, and to more quickly and more effectively issue sediment disaster warnings and carry out evacuations.

■ Sabo Planning Division

The Sabo Planning Division's mission is to study the establishment of high precision sediment disaster occurrence prediction methods, and methods of estimating and responding to damage caused by deep layer failures. It also prepares drafts of technology standards for debris flow countermeasures.

■ Sabo Risk-Management Division

The Sabo Risk Management Division's mission is to study methods of applying remote sensing to monitor large-scale sediment disasters and more advanced disaster information systems to support warnings and evacuation.

(11 research departments, 1 research center, and 3 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 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, analysis of effects of road network maintenance, and road geometry construction for smooth road traffic, etc.

■ Road Safety Division

The Road Safety Division conducts research into acceleration of road traffics safety measures 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 research in order to realize better road spaces/road environments through research into cost reduction for removal of electricity poles, road scenery improvement, roadside environment conservation such as atmosphere/noise pollution countermeasures, natural environment conservation such as protection of rare plants and animals/soil pollution countermeasures, etc.

■ 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 maintenance 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 etc.

■ Bridge and Structures Division

The Bridge and Structures Division conducts research on design standards and ensuring 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, execution and management methods of road structures such as road bridge substructures and foundations in particular, and also tunnels, large culverts, retaining walls and others structures that are greatly impacted by the action 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 soft ground countermeasures and others that ensure safe road functions.

■ Earthquake Disaster Management Division

The Earthquake Disaster Management Division conducts researches on improvement of disaster management plans and disaster information systems as well as earthquake ground motions and tsunami actions for design of road structures.

Building Department

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

The Building Department ensures that buildings, in which people live and conduct economic activities, may be used in a safe and comfortable manner by researching standards for such factors as structures, fire prevention, environment and facilities, systems to verify such standards, and performance evaluations of buildings.

■ Standards and Accreditation System Division

The Standards and Accreditation System Division is involved in research initiatives that have to do with the construction standards system oriented to performance and trends in international construction standards.

■ Structural Standards Division

The Structural Standards Division researches technologies and performance evaluation methods for building structures, ground, materials and members, and seismic force, in order to ensure and improve the safety and durability of buildings.

■ Fire Standards Division

The Fire Standards Division is involved in research initiatives that have to do with evaluating the safety performance of evacuation from a construction structure in the event of a fire, limiting the spread of fire and ensuring structural fire resistant performance.

■ Equipment Standards Division

The Equipment Standards Division surveys, tests, and studies maintenance of building construction equipment and building equipment.

■ Material and Component Standards Division

The Material and Component Standards Division studies and develops materials and components for buildings.

■ 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

Aiming to realize quality residential living for the people, it is necessary to take measures such as the formation of good housing and housing environments, adjustment of the condition of the housing market and provision of residential stability for the people. The Housing Department is involved in research concerning technology and methods for 1) extending the useful lives of houses, 2) renewal/utilization of existing housing stock, 3) housing for the aged and a residential safety-net and 4) measures for environmental performance and energy conservation.

Housing Planning Division

The Housing Planning Division is involved in the analysis of trends in residential living and housing construction, and in research concerning the proposal of national housing plans etc. based on such analysis, and measures to secure safety and security of housing, and a residential safety-net.

Housing Stock Management Division

Housing Stock Management Division is involved in research initiatives that have to do with the rationalization and improvement of the management and circulation of housing that are useful in the formation of a high quality housing stock.

Building Environment Division

The Residential Environment Planning Division conducts research on evaluation and management methods for residential environments, and research to improve thermal environments and to reduce environmental loads surrounding housing.

Housing Production Division

The Housing Production Division is involved in research initiatives that have to do with the improvement of the reliability and transparency of the total production process upon housing production from design to construction, administration and demolition.

Urban Planning Department

The Urban Planning Department researches evaluation methods and technologies for the reconstruction of urban structures, improving the safety of cities, and forming 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 and aging of society, and spreading 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 compatible with functional activities and sound residential environment.

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 of spreading fire, planning of disaster prevention programs in urban areas, and evaluation measures of greenery and open space planning in terms of disaster prevention performance.

Urban Development Division

The Urban Development Division researches methods of developing urban districts that form safe and pleasant urban environments and appropriately locate urban functions by, for example, promoting the restructuring and renewal of built-up areas including densely built-up areas and taking measures to contribute to the creation of low carbon 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 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, regeneration and creation of marine environment ecosystems, research into the implementation and value of environmental monitoring, and research regarding how to perform crisis management and continuous functioning in harbors.

Coastal Disaster Prevention Division

The Coastal Disaster Prevention Division conducts researches on evaluation of damage by tsunamis and storm surges, prevention and mitigation based on both measures with structural protection facilities and non-structural measures, evaluation of evacuation safety, measures for global warming, and maintenance of coastal facilities.

Coastal Zone Systems Division

The Coastal Zone Systems Division conducts support and research on regional revitalization using local resources in coastal regions, facility maintenance techniques harmonizing with disaster prevention, convenience and scenery, etc., and maintenance of marine environments.

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, ensuring the quality of and maintaining public works projects.

Port Planning Division

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

Port Systems Division

The Port Systems Division conducts research on the analysis of the flow of port cargo, the development of international maritime container cargo flow models, and port cargo and passenger ship demand trends, etc.

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 relating to improvement of 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 policy-making to strengthen Japan's international competitiveness and revitalize local economies, standards to ensure risk management, safety, and security, and efficient maintenance methods etc. in the midst of the process of deregulation of aviation.

Airport Planning Division

The Airport Planning Division conducts research on demand forecasting methods and other policy simulations, the analysis of aviation networks and demand trends, airport risk management, and the local effects of airports.

Airport Facilities Division

Research relating to formulation of outlines for design and repair of runways and taxiways, etc., in order to contribute to good airport operation that ensures safety and on-time air transport.

Airport Construction Systems Division

The Airport Construction Systems Division conducts research on estimation, execution standards, facility inspections and maintenance support systems in order to rationalize and improve the construction 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 social capital maintenance through to design/construction/inspection/maintenance and management/renovation, and the way in which these are to be supported by information bases, 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 policy-making and guideline maintenance, etc. relating to suitable and efficient service of public utilities, including consideration of optimum bidding contract formats and business execution format in survey/design work and supply of public works.

Construction and Maintenance Systems Division

The Construction and Maintenance Systems Division conducts research into optimization/acceleration of standards and systems relating 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 cost, etc.

Advanced Construction Technology Division

The Advanced Construction Technology Division conducts research into acceleration of the building of construction machinery and other construction in order to achieve labor-saving, optimization and precision improvement of construction production systems, focusing on the construction stage in the construction production processes necessary for social capital maintenance.

Information Platform Division

The Information Platform Division conducts research into base technology relating to information compilation, processing and application through survey, design, construction and inspection towards optimization and acceleration of social capital maintenance and management.

Construction Economics Division

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

Landscape and Ecology Division

The Landscape and Ecology Division conducts research into environmental fields, etc. for realization of society in harmony with the environment, from dealing with global environmental problems such as global warming countermeasures and conservation of biodiversity, through to qualitative enrichment of familiar societal foundations and conservation/creation of greenery to produce rich living for citizens.

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 recovery/restoration in the wake of the Kumamoto Earthquake

Inter-departmental Organizations

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

Climate Change Adaptation Research Group

The Climate Change Adaptation Research Committee conducts crossover research from the perspectives of flood control, irrigation and environment in relation to plans for adaptation, in order to deal with changes such as floods and water shortages, etc. resulting from future climate change.

Environmental Research Committee

The Environmental Research Committee conducts interdisciplinary environmental research concerning information sharing of research on the environment.

Disaster Prevention and Reduction Research Committee

The Disaster Prevention and Reduction Research Committee conducts interdisciplinary disaster prevention and mitigation research concerning information sharing of research on disaster prevention and mitigation.

Maintenance Research Committee

The Maintenance Research Committee conducts interdisciplinary maintenance research concerning information sharing of research on maintenance.

i-Construction Research Committee

The i-Construction Research Committee aims to promote research/development, etc. regarding i-Construction and spread i-Construction in the construction 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.

1 Tachihara Office

2 Asahi Office

3 Test course

This is a test course 6,152m in length. Tests are carried out in relation to road running, safety, and road-to-vehicle coordination technology, etc., and these are reflected in road-related technical standards such as the Road Structure Ordinance.

4 Collision experiment facility

This is an experimental facility that develops, improves and confirms the performance of protective fences, buffer facilities and other traffic safety facilities. Vehicles can accelerate unmanned thanks to the power of winches. This is used in experiments necessary for reform of technical standards, such as experiments to establish protective fence specifications and performance. It is also used in experiments for development/reform of new types of protective fences, etc., taking into consideration the scenery for residents and others.

5 Shared hydraulic experimental laboratory

Water conduits with various accessory facilities are installed and are used in designing river structures, research on the fluctuation of the river bed, experiments on hydraulic models in order to conduct fundamental experiments required to make improvements.

6 Sanitary engineering and hydrology laboratory

Experimental facilities for development and improving the water treatment process, experimental laboratories for testing bacteria and protozoa in waste water, various chemical analysis equipment for analyzing hazardous materials and hazardous elements in waste water are installed in this laboratory.

7 Dismantled bridge members

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

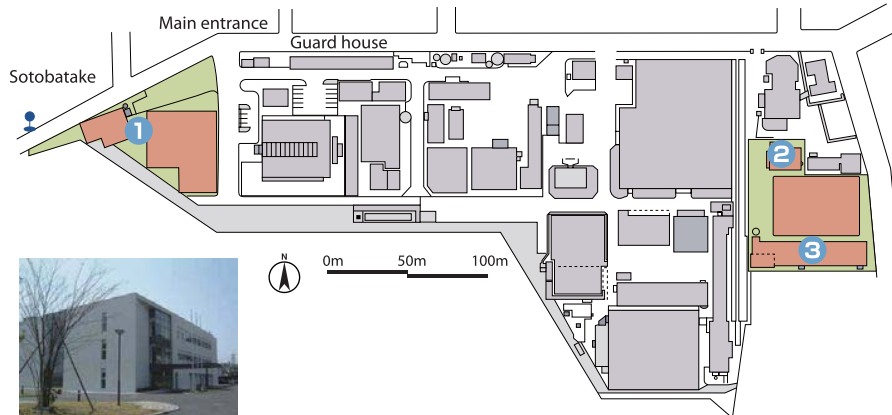
Rental of research facilities at the Asahi Office

Research facilities of the NILIM can be rented for a fee by outside organizations within a range that does not obstruct the operations of the NILIM.

Inquiries: Planning and Research Administration Department, Research Facilities Division TEL: 029-864-2674

Reference website: <http://www.nilim.go.jp/japanese/nilim-pr/sisetuinfo/labo/index.html>

Yokosuka Office



1 Yokosuka Office

The main building that was completed in April 2004, is installed with 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

Aircraft load simulator which has one set of 4-wheeled landing gear as same size as that of B747-400 aircraft is an apparatus for evaluation of bearing capacity and durability of airport pavements such as runway, taxiway and apron.



3 Typhoon experiment wind wave channel

This is one of the Japan's largest wind wave channels applied to hydraulic model experiments of storm surges etc. Equipped with a blower to produce the wind of a typhoon, a pipeline system to create the circuit flow, and a wave generator, it is used for researches on ways to protect large cities from storm surges, high waves, and tsunamis.



8 Oceanic and coastal experiment facility

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



9 Full-scale tunnel experiment facility

Full-scale tunnel experiment 700 meters in length and with a sectional area of 45.5 m², which is an unprecedented scale in the world, is used to perform a variety of experiments.



10 River hydraulic model test facility

This 50 m wide and 200 m long indoor facility is used for river hydraulic model tests requiring precise measurements using a variety of instruments, by taking advantage of its characteristics as an indoor structure to prevent any change of the flow patterns of water in the channel or of the shape of its bottom surface under the impact of wind or rain.



11 River model experiment facility

This is an enormous facility with area of 15 ha that is outdoors. In the site, it is possible to install a maximum of 15 models of rivers.



13 High flow velocity test channel

A closed square channel capable of carrying water at a flow velocity equal to that during a flood discharge on an actual river, it is used for experiments in erosion resistance during flood discharge flow by placing large specimens obtained from the actual slope of a levees or from the actual flat plane of high water channels in the closed channel.



15 Pipe model to evaluate TV camera performance

A pipe model that can reproduce deterioration of sewage pipelines, it is used to test the performance of mobile TV cameras and other inspection devices used for pipeline maintenance.



12 Full-size overflow channel



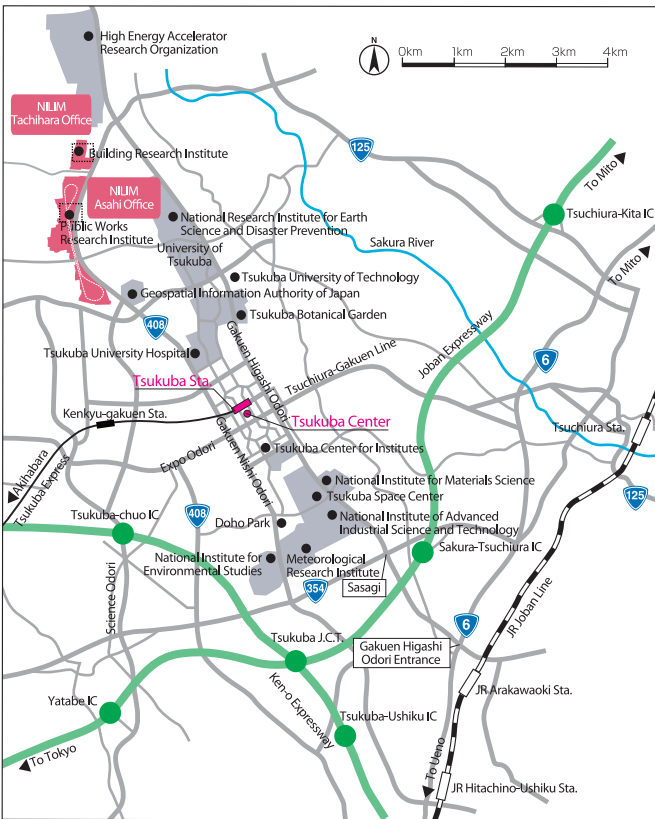
The high head test channel uses models close to actual size to study the external forces acting on river structures such as levees and their failure mechanisms to study rational design methods for river structures. "Crisis-management hard countermeasures" (riverbank construction that slightly extends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

14 Actual-size aeration test system

This system is actual size, and used to investigate the properties of aerators such as the oxygen solubility and water flow in an aeration tank. This system consists of two aeration tanks, one standard type (length 6 m x width 6 m x depth 5.5 m) and one deep-tank type (length 10 m x width 3 m x depth 10 m).

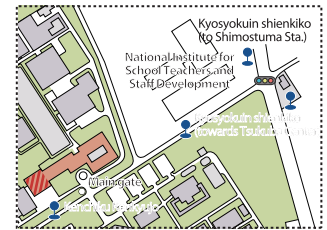
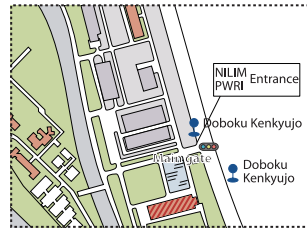


National Institute for Land and Infrastructure Management (Tsukuba)

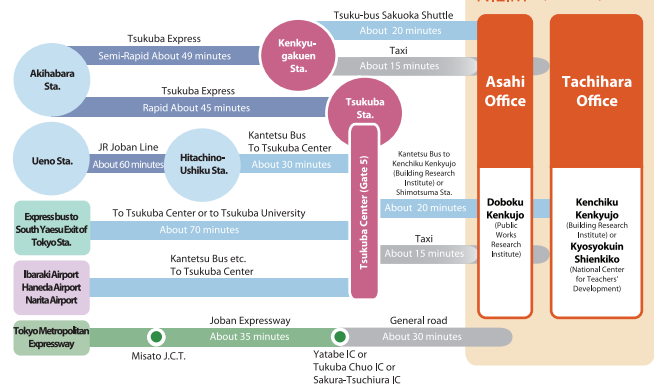


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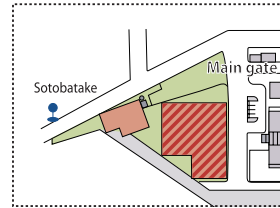
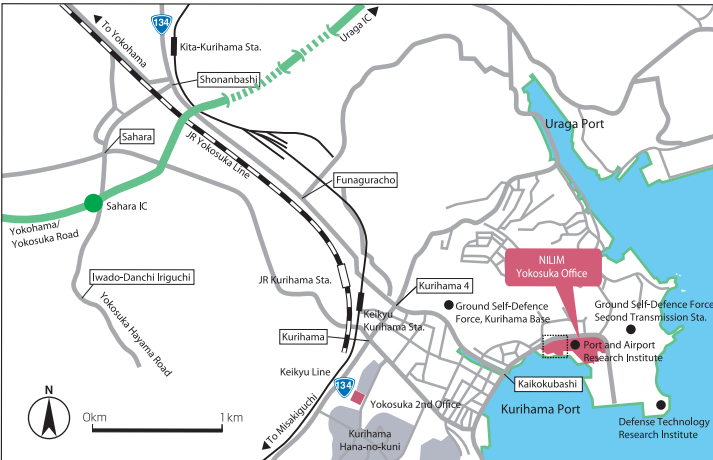


Transportation guide to NILIM (Tsukuba)



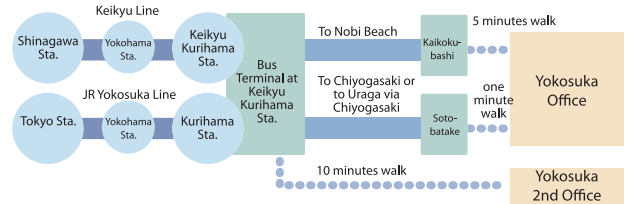
Timetable for the Tsukuba Express: <http://www.mir.co.jp>
 Timetable for the Kanto Railway: <http://www.kantetsu.co.jp>
 Tsukuba-bus (Tsukuba City): <http://www.city.tsukuba.lg.jp>

National Institute for Land and Infrastructure Management (Yokosuka)

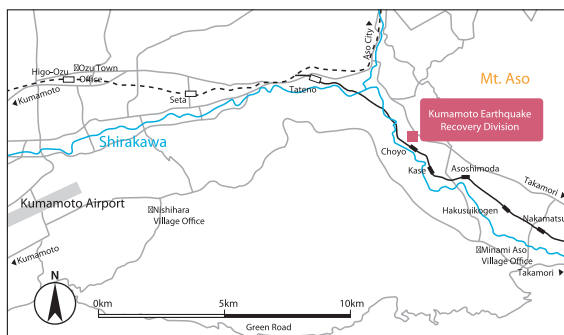


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Transportation guide to NILIM (Yokosuka)



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



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How to get to the NILIM (Kumamoto Earthquake Recovery Division)

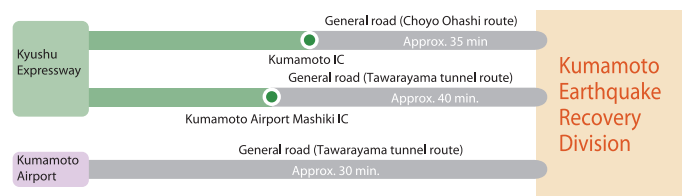


Photo on front cover:

Naha Port cruise terminal	Verification experiment relating to measurement standard for stairs
Proof-of-concept of automatic driving service	
Survey of disaster conditions after heavy rain in Northern Kyushu	

NILIM's Emblem

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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, airports and related fields are linked to bear integrated, housing and public capital 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.