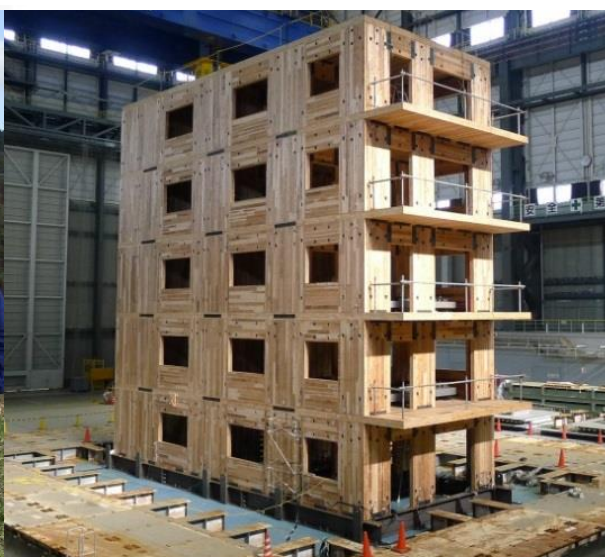




Ministry of Land, Infrastructure, Transport and Tourism

National Institute for Land and Infrastructure Management

NILIM



Research Institute that creates the society of the future

2017



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

The National Institute for Land and Infrastructure Management (NILIM);

As the only national research organization in the public capital/housing field, works to create an attractive society that is safer, more secure, and more vigorous, by conducting research and disseminating and developing the results of its research so it can contribute to society now and in the future, by preventing and mitigating disasters, forming favorable environments, and by utilizing, maintaining, and improving roads, rivers and harbors, etc.



Yokosuka Office

Asahi and Tachihara Offices

Roles of the NILIM

Conducting surveys and research etc. to support planning, proposing, and execution of technology policies

Providing technology guidance, disseminating achievements, and collecting, organizing and supplying information

Four types of work in order to fulfill its roles

1. Conducting research and preparing technology standards

Surveys and research in close cooperation with MLIT for drafting policies and regional maintenance bureaus locally implementing infrastructure maintenance and management

- Preparation of draft technology standards required locally for infrastructure maintenance/management, etc.
- Drafting of policies and carrying out research with awareness of local implementation

2. Support for disaster response

- Technical advice/suggestions for facility managers, etc.
- Dispatching experts to localities in the form of TEC-FORCE (Technical Emergency Control Force), etc.
 - Secondary disaster prevention and advanced technology guidance for reconstruction
 - Support from experts for important decisions to be made by chiefs, etc.

3. Technology consulting and technology transfer

- Constant provision of technology consulting by, for example, sending experts to the field to resolve problems
- Active training programs and lecture series, etc. to inform of research achievements and technical standards

4. Research coordinator

- “Pivot of a folding fan”: government (policy formation and local implementation), people (diverse industries), and academia
 - Joint research with extensive range of organizations in order to optimize research and improve quality
 - Promotion of technology development through instruction of technological requirements based on needs of society and the fields

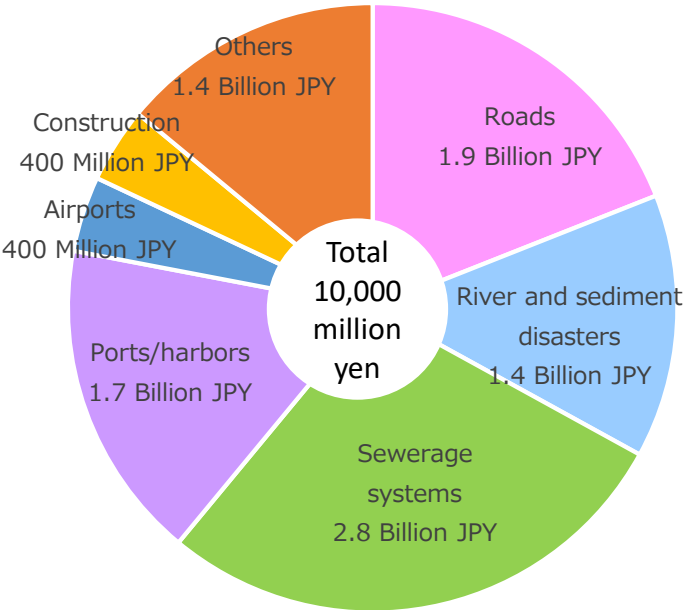
Technology handled by the NILIM expands locally and in society

Important research fields

1. Preventing and mitigating disasters, and crisis management
2. Continuous management of infrastructure
3. Productivity revolution
(i-Construction promotion and smart use, and improvement of ease of living)

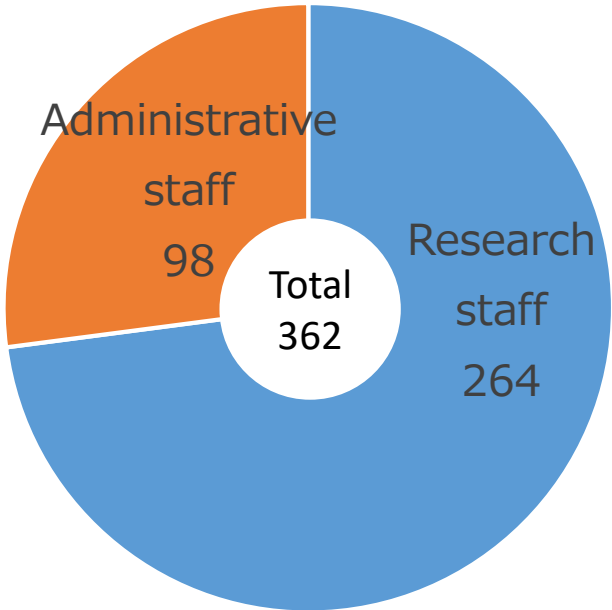
Research budget and employees

Research budget



Structure of research budget
(initial budget for FY2017)

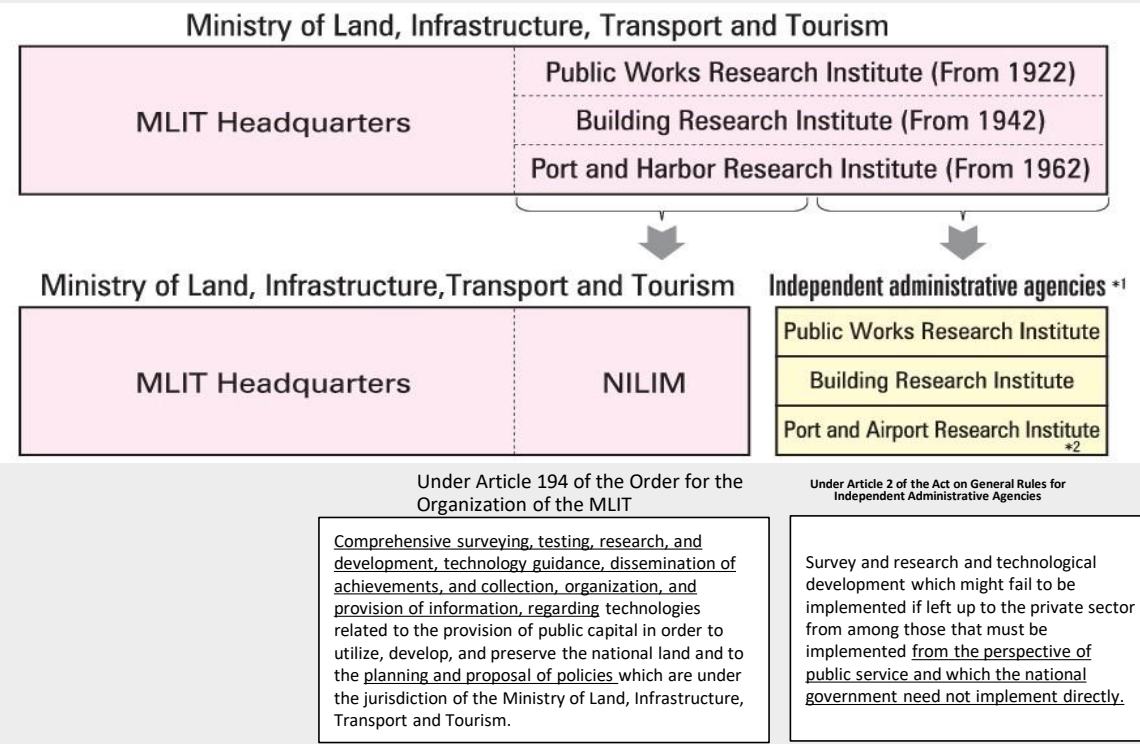
Employees



Structure of employees (April 2017)

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.



* 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.

Conducting research and preparing technology standards

Main research themes of the NILIM in FY2017

1. Preventing and mitigating disasters, and crisis management

2. Continuous management of infrastructure

3. Productivity revolution

(i-Construction promotion and smart use, and improvement of ease of living)

07 ~ 10

11 ~ 12

13 ~ 16

P.14 Construction productivity improvement through extensive application of ICT

P.16 Effective use of historical buildings, etc. by making logical fire prevention/evacuation regulations, etc.

P.12 Improvement of maintenance and management efficiency of sanitary sewer conduits that would circle the globe 12 times over

P.8 Flood risk visualization project

P.12 Establishment of practical evaluation methods for long service life and efficient use of existing port facilities

P.10 Ensuring safety of harbors areas against storm surge disasters



P.9 Early detection of sediment disaster signs by "periodical health examination" of the ground

P.15 Design and construction technology of mixed structure buildings utilizing new woody material

P.15 Support for smooth automated driving with cooperation of public and private companies

P.16 Project for Housing with Peace of Mind – Planning and evaluation technology for strengthening safety net of housing

P.10 Establishment of prompt inspection and restoration methods for airport pavement when earthquake occurs

P.9 Reduction of time without information availability immediately after occurrence of an earthquake

1. Disaster prevention and disaster mitigation, 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.
- It is feared that in the future, large-scale earthquakes such as an earthquake directly under Tokyo and the Nankai Trough Earthquake will occur.

The new stage *1

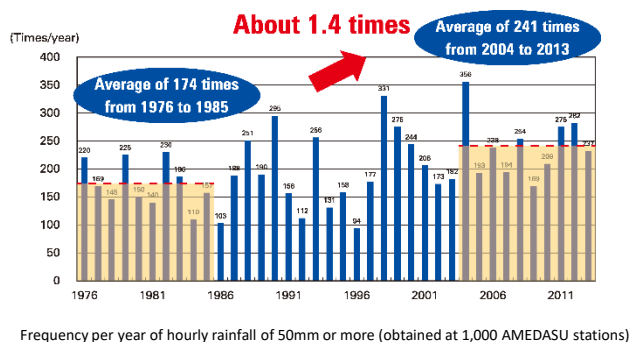
- In the past 30 years, rainfall throughout Japan has become more localized, concentrated, and more intense. (In August 2014 massive sediment disasters occurred in Hiroshima City, and in September 2015 a severe flood disaster occurred due to the rain in Kanto and Tohoku)
- There is fear of a super typhoon like typhoon 30 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.

*1: 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>).

Vision for Reconstruction of Society with Awareness of Flood and Disaster Prevention*2

- The aim is to switch to soft measures with greater effectiveness from residents' perspective to ensure that residents can sense risk by themselves and take refuge.
- In addition to precautionary measures against flooding, crisis management-type hard measures are introduced to reduce damage when disasters do occur.
- Conferences are established at national, prefectural and municipal levels, with hard and soft measures promoted uniformly and systematically.

*2: Based on heavy rain in Kanto and Tohoku, etc., the MLIT established a new “Vision for Reconstruction of Society with Awareness of Flood and Disaster Prevention”, making changes to ensure awareness of “the fact that facilities have limited capacity and that there will certainly be heavy floods that exceed the capacity of facilities to provide protection”, with society as a whole needing to be prepared for floods. (See: <http://www.mlit.go.jp/river/mizubousaivision/index.html>)



Source: (First) Report by the Colloquium on Effective Disaster Prevention and Disaster Mitigation Measures for the New Stage



Photograph: Yamadamachi Town



Photo provided by: GSI

1. Flood risk visualization project

The aim is to appropriately connect the information on precipitation and river level, etc., with evacuation of residents by translating the information to the urgency of flooding of each site and the scale of the suffering that could result (flood risk) and expressing it in an easily understandable manner.

*Background

- Frequent serious flood damages throughout Japan
- Human damage due to delays in evacuation

*Purpose

- Realization of appropriate evacuation measures in case of flood by grasping the flood risk of each site from the river level on the whole from upstream to downstream

*Research contents

Method of accurately estimating river level on the whole from upstream to downstream

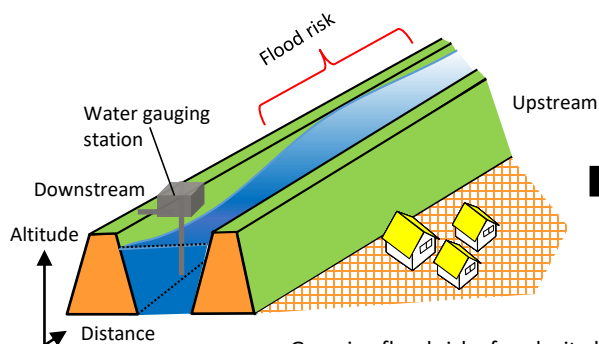
- Development of a calculation method to accurately estimate the river level on the whole from upstream to downstream, which changes every moment, by bringing in observation data of water level and rainfall



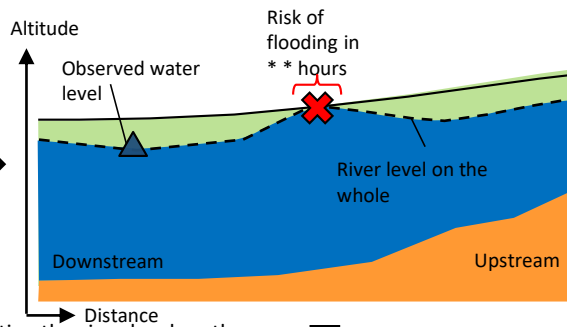
Flood of Kinugawa River
(Kanto-Tohoku heavy rain)



Flood of Sorachi River (August 2016)

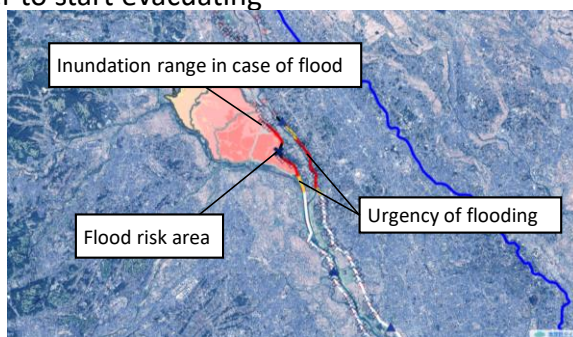


Grasping flood risk of each site by estimating the river level on the whole from upstream to downstream with high accuracy and comparing it with the levee height



Expression that conveys the urgency of flooding in order to start evacuating

- Consideration of how to express in an easily understandable manner the information regarding flood risk, such as relationship between the river level and the levee height, the expansion of inundation range in case of flood, etc., and development of a "Flood Risk Information Platform" in order to provide this information



Grasping the urgency of flooding and scale of damage in case of flooding

Mitigation of human damage due to delay in evacuation
by performing evacuation appropriately

2. Early detection of sediment disaster signs by “periodical health examination” of the ground

Research and development are carried out in order to mitigate damage by detecting the sings of sediment disaster early and taking prompt prevention or emergency measures with regular observation of the ground using remote sensing data such as Synthetic Aperture Radar (SAR), which can be used regardless of the time of day or the weather.

* Background

- In order to prevent and mitigate the damage from occurrence of deep-seated landslides or secondary disasters, technology to regularly and widely monitor high risk areas is required.

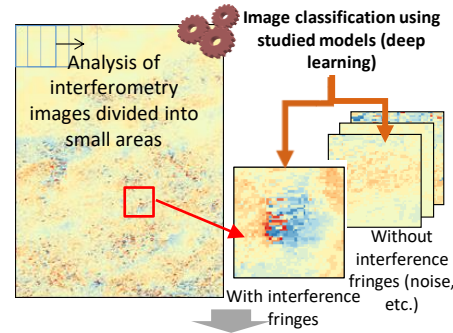
* Purpose

- Development of a method of extracting areas with high risk of slope movement by using SAR interferometry analysis

* Research contents

- Development of an algorithm in order to extract slope movement areas automatically from remote sensing data including noise
- Development of technique for extracting areas where there is concern regarding possible large-scale sediment movement
- In FY2017, the accuracy of automatic extraction of interference fringes was improved and applicability in practical use was verified.

Extraction of areas with slope movement possibility



Analysis of topographical and geology characteristics

Application to early implementation of countermeasures according to sediment disaster risk

3. Filling information void immediately after an earthquake

The NILIM supports prompt and appropriate disaster response by developing an information sharing system that can provide information necessary for disaster response, which changes at every moment, to infrastructure administrators at the right time.

* Features

- System developed according to real needs at the actual point of use

* Research contents

- Clarification of the priority of development goals of information sharing system by organizing the information needs in times of actual disasters, such as the Kumamoto Earthquake, and identifying the technology of determining the damage quickly to be incorporated into the system.
- Development of technology that contributes to determining infrastructure damage quickly

Detecting or estimating damage technology, SAR image interpretation support technology, panoramic image creating technology using remote camera, etc.

- In FY2017, the information sharing system under development was applied in emergency drills
- Installable technology is also being gradually introduced

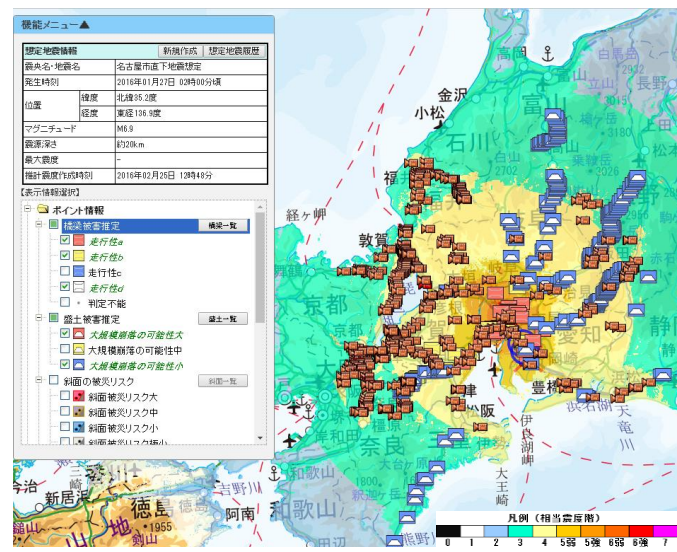


Image of system that gathers and shares damage information

Support for decision-making of infrastructure administrators in disaster response

4. Ensures safety of harbor areas against storm surge disasters

The NILIM is developing technology to grasp and evaluate storm surge risk information by advancing observation of tide level and waves in order to increase the safety of harbor areas and secure sustainable basis of economies and societies.

* Purpose

- To improve quality and quantity of information about observation of storm surge, inundation prediction and yield strength, and support disaster prevention and mitigation measures against storm surge of coastal and port administrators.

* Research contents

- 1) Improvement of observation technology of tide level and waves
 - 2) Improvement of the precision of storm surge inundation simulation
 - 3) Grasps the effect of storm surge external force on tide embankments
- In FY2017 the technology to grasp the status of storm surge in extensive areas was developed by carrying out a field test of tide level and waves and creating a storm surge inundation prediction model.
 - The storm surge risk in consideration of local water level rising was understood from model experiment and analysis of applying wind waves to tide embankments.



Ensures active socio-economic activities at harbor areas

5. Establishment of prompt inspection and restoration methods for airport pavement when earthquake occurs

The NILIM is establishing a method for airport authorities to inspect pavement damages promptly in order to restore airports as a base of emergency transportation. Criteria for choosing the method of restoration will also be established.

* Purpose

- Establishment of standards with which each airport authority can appropriately judge the method of damage inspection and restoration of airport pavement when earthquake occurs without highly skilled experts and equipment

* Research contents

- 1) Examine the standard of visual inspection and the method of detailed inspection for pavement damage
 - 2) Examine the method of restoration for asphalt pavements (runways, taxiways) and concrete pavements (apron)
 - 3) Prepare the manual of inspection and restoration when earthquake occurs
- In FY2017, the methods of prompt inspection were listed up and the criteria for choosing the methods of restoration were examined.



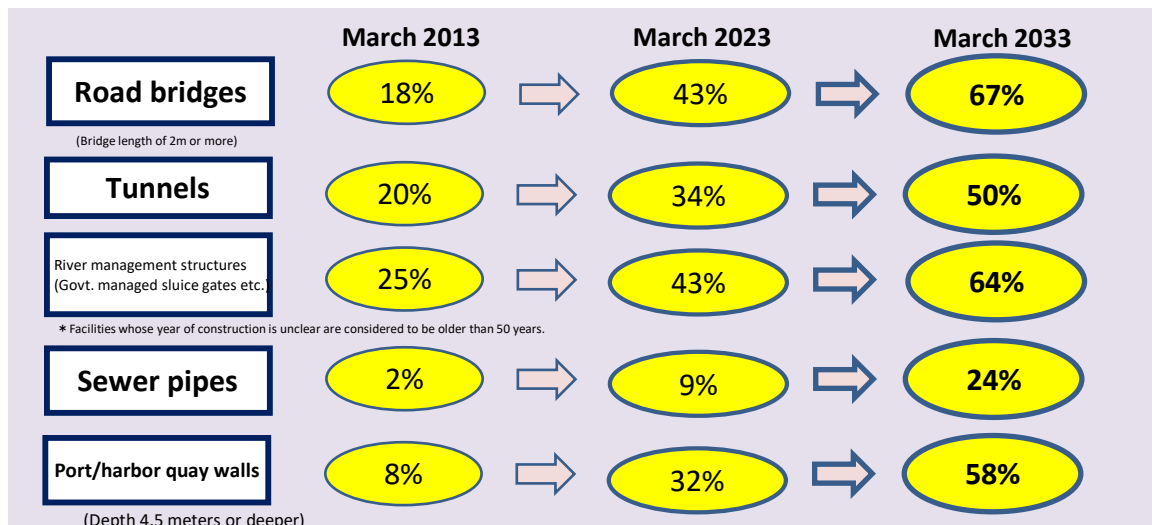
Local subsidence of taxiway (asphalt pavement) by liquefaction

Enable the airport to function instantaneously as a base of emergency transportation.

2. Infrastructure maintenance

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

In 20 years, more than half of various structures on roads, rivers, and in ports and harbors will be 50 years old or older.

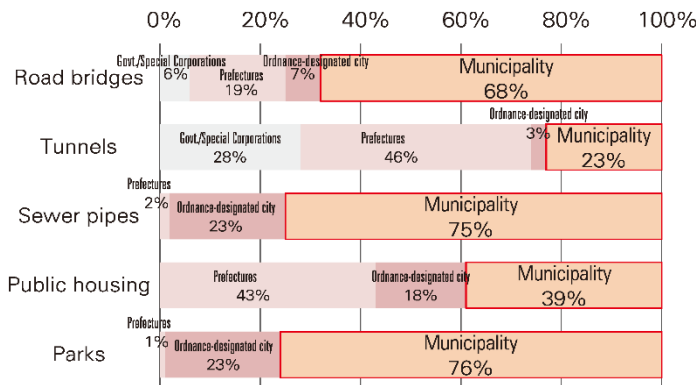


Source: Land, Infrastructure, Transport and Tourism White Paper 2016

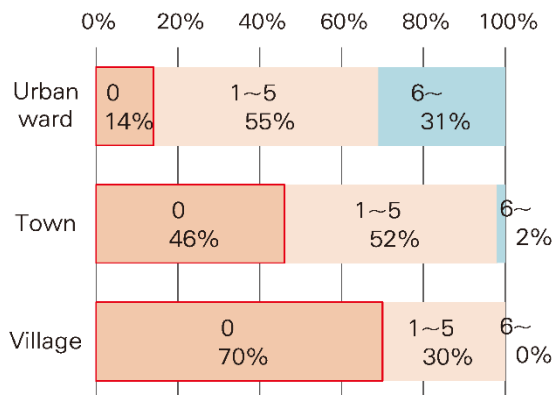
Many infrastructures are managed by regional government bodies.

Limited number of public works engineers in municipal governments.

Most road bridges and sewerage treatment facilities are managed by municipalities, and it is becoming difficult to secure public works engineers.



•Source: Committee meeting material from the Thirteenth Maintenance Strategy Subcommittee (4th colloquium in the 2nd term) (Sept. 2014)



•Source: Proposal for full implementation of road deterioration countermeasures (April 2014)

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) and road surface characteristic inspection of airports once every 3 years (April 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.

NILIM initiatives for maintenance and management of road structures

- Analysis of road structure inspection results, and research in order to optimize and improve reliability of inspections
- Research into performance evaluation technique and repair/reinforcement design methods for structures where damage has been observed
- Technology transfer through technical advice regarding damaged structures and training for maintenance and management, etc.

1. Improvement of maintenance and management efficiency of sanitary sewer conduits that would circle the globe 12 times over

The NILIM is aiming to verify in actual fields and disseminate technology to detect abnormalities in sanitary sewer conduits, which cover about 470,000 km throughout Japan, quickly and efficiently.

* Background

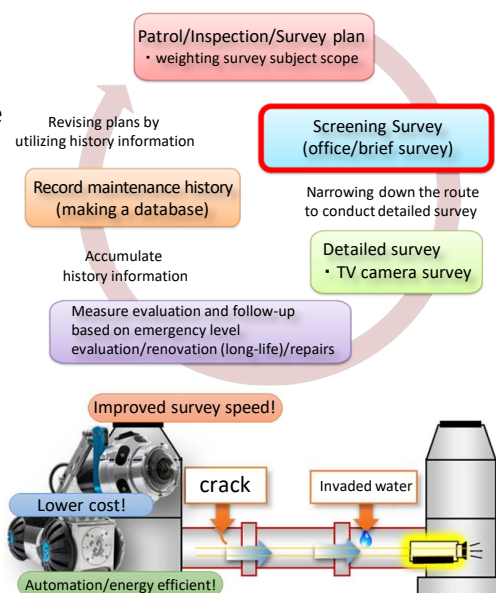
- Approximately 3,300 cases of road cave-ins caused by sanitary sewer conduit occur annually
 - Sewers that exceed the standard service life of 50 years will rapidly increase in the future
- However, existing survey technology has issues such as insufficient survey speed

* Purpose

- To establish and disseminate technology that significantly improves efficiency of inspection and survey by improving screening accuracy and survey speed

* Research contents

- Analysis of deterioration survey data from all over Japan, and extraction of valid parameters for desk screening
- Verification in actual field for speeding up, automation, and cost reduction of survey technology to detect abnormalities in sewers
- In FY2017, the possibility of introducing technology and business profitability were confirmed while further accumulating verification data



Suppress the influence of malfunction of sanitary sewer conduits, road cave-ins, etc. by maintaining and managing efficiently

2. Establishment of practical evaluation methods for efficient use of existing port and harbor facilities

The NILIM is developing methods to support judgment for timing and extent for inspection, repairing, utilization restriction, etc. by evaluating the present condition of facilities using inspection diagnosis results based on the maintenance and management plans.

* Background

- Facing personnel shortage and weak technical capabilities of port administrators while aging facilities are increasing rapidly

* Purpose

- Realization of efficient use of existing port and harbor facilities for a long time

* Research contents

- Summarizing issues by collecting and analyzing cases of damage, such as accidents at port and harbor facilities caused by deterioration
- Extraction of elemental technology candidates that enable performance evaluation of existing port and harbor facilities
- Development of an information providing system to support judgment for repairing, utilization restriction, etc.
- In FY2017, information providing system configurations that contribute to judge timing and extent for repairs, etc., and method, type and details of providing information were considered



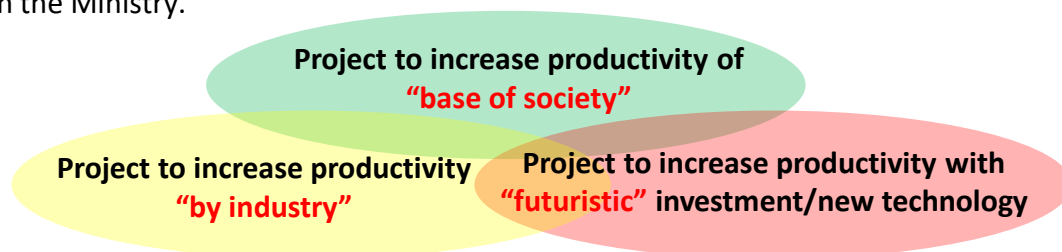
Realize long service life and efficient use of existing port and harbor facilities using practical method for proper maintenance

3. Productivity revolution

(i-Construction promotion and smart use, and improvement of ease of living)

MLIT Productivity Revolution Project*

- In order for Japan to achieve continuous economic growth as the population decreases, it is necessary to increase latent growth capability by increasing 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.



- 01 Pinpoint congestion countermeasures
- 02 Fees for smart use of expressways
- 03 Realization of new cruise period - Targeting 5 million cruise passengers to visit Japan
- 04 Compact Plus Network - Improvement of productivity in dense economy
- 05 Promotion of optimum use of real estate - Investment in regeneration into land/real estate and market expansion
- 06 Infrastructure maintenance revolution - Promotion of reliable and efficient infrastructure maintenance
- 07 Dam regeneration - Early stage improvement of irrigation/flood control capacity supporting local economies
- 08 Aviation infrastructure revolution - Best mix of airports and controls
- 09 Promotion of i-Construction
- 10 New development of housing industry - Existing housing distribution/reform market activation
- 11 i-Shipping and j-Ocean - “Maritime Business Productivity Revolution” for strong industry, excellent growth and regional enrichment
- 12 Distribution Productivity Revolution – Smart distribution that is efficient and has excellent added value
- 13 Road distribution innovation – Improvement of productivity of truck transportation
- 14 Tourism industry reform - Turning tourism industry into a key industry for Japan (accommodation business reform)
- 15 Waterworks innovation – “Japanese industrial resource” creation strategy
- 16 Railroad Productivity Revolution – Productivity improvement through development of next-generation technology
- 17 Traffic safety measures using big data
- 18 Overseas development of “high-quality infrastructure” – Establishing a huge market to boost Japan
- 19 Car ICT revolution – automatic operation x social experiments
- 20 Creation of climate business market

* : MLIT Productivity Revolution Project

(http://www.mlit.go.jp/sogoseisaku/point/sosei_point_tk_000021.html)

- The MLIT has set 2017 as a “year of progress” for the productivity revolution, with the perspective of “producing as large an output as possible with small input” providing the foundation of productivity revolution to permeate MLIT’s various policy areas.
- The NILIM is also promoting technology development in cooperation with the MLIT through various projects such as “Promotion of i-Construction”, and will continue to carry out research based on a perspective that provides the foundation of productivity revolution.

1. Construction productivity improvement through extensive application of ICT

In order to deal with the feared lack of people to take charge in future, “i-Construction” is being promoted to apply ICT, etc. to all construction production processes, with the aim of boosting the productivity of construction sites by 20% by the year 2025.

★Background

- It is feared that 10 years from now the construction industry will face a greater lack of workers due to advanced age, etc., with approximately 1/3 of the 3.4 million skilled laborers no longer in employment

★Purpose

- Promotion of initiatives such as extensive application of ICT, implementing the following points:

Design

- Sharing of complete overview (making for smoother discussions with related parties and briefings for residents, etc.)
- Improved certainty of interference checks with iron reinforcing bars and objects laid underground, etc.
- Optimization of construction work estimates

Construction

- Optimization through introduction of computerized construction
- Speedup of work amount and as-build management
- Optimization of supervised inspections

Continuous management

Walkthrough simulation, etc. for

- Visualization of invisible parts
- Acceleration of information-sharing/information retrieval

★Technical challenges

- Inadequate support for technical standards of 3D design technology, etc.

★Research contents

- Preparation of draft standards for promotion of i-Construction
- Study of application methods/effects of 3D models in construction processes

In FY2017 and beyond, the aim is to implement...

- Preparation of standards for expansion of types of work applying ICT
- Preparation of standards distributing 3D models as contract books
- Preparation of operating procedures for technologies optimizing inspection recording work, etc.

...and apply ICT in all construction production processes



Walkthrough simulation
(confirmation of “ease of inspection”, etc.
when designing)



Earthwork measurement by means of UAV
(optimization of construction/construction
management)



Construction site without need for
finishing stakes
(optimization of
construction/construction management)

Construction productivity improvement and realization of appealing construction scenes

2. Support for smooth automated driving with cooperation of public and private companies – Smart use

The NILIM is developing an ITS system in which vehicles and highways cooperate to provide information from the roadside for driving support at locations where smooth running is difficult for autonomous type automatic driving only with automotive sensors.

* Background

- Smooth running is difficult for “autonomous type” automatic driving at locations where there are many blind spots for automotive sensors, such as diverging and confluent sections

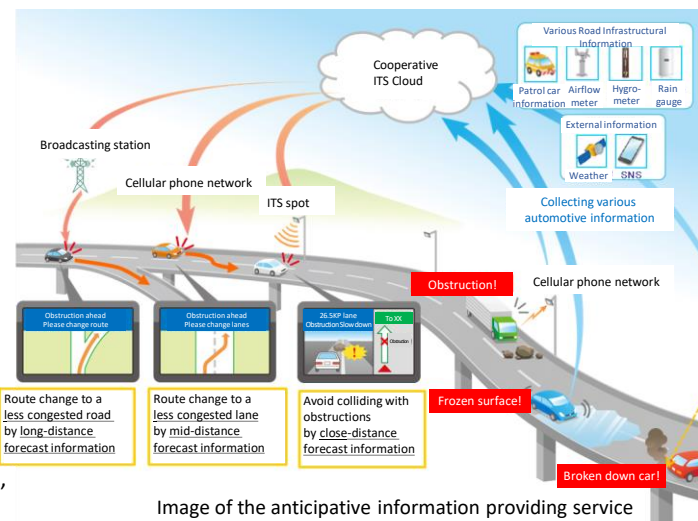
* Purpose

- New cooperative vehicle-highway system was required, providing information from the roadside, etc.

* Research contents

With cooperation of public and private companies...

- Consideration of generating information on the distant in the traveling direction such as falling objects (anticipative information) using probe information, etc.
- Building a concept plan of diverging/merging support system
- Confirmation of effectiveness of the cooperative ITS service using simulations and traffic accident data
- Creating draft standards for in-vehicle devices, communication, etc.



Use roads “smartly” through cooperation of vehicles and highways to improve productivity

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

Develop technology related to design and construction that ensures fireproof performance for mixed structures that combines timber structures using CLT*, etc. with reinforced concrete or steel structures in order to further promote the utilization of wood-based materials.

*CLT: Cross-laminated timber; a panel of wood boards stacked and glued in alternating directions

* Background

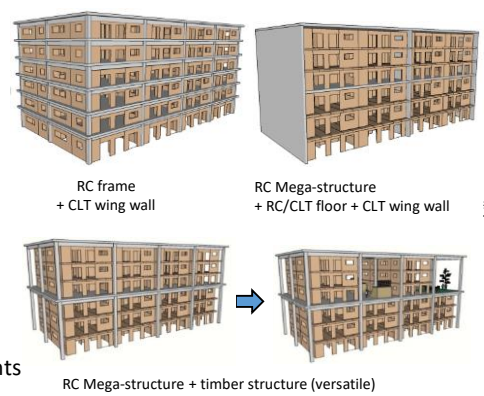
- Further promotion of wood use is necessary
- Fireproof performance is necessary for mixed structures
- Combination with RC construction etc is effective for improving fireproof performance

* Purpose

- To develop technology related to design and construction of buildings combining timber structure using wood-based large panels such as CLT with RC or steel structure, or other wooden construction, and disseminate it as general technology

* Research contents

- Consideration of fire spread prevention elements and fireproof performance of joints
- Consideration of structural design method for mixed structure buildings
- Consideration of structural calculation model of components or joints and construction guidelines
- Consideration of standardization of design load and improvement durability for large-scale or mid-rise buildings



Examples of mixed structure of timber and reinforced concrete

Promote the use of wood by further dissemination of wood-based materials such as CLT

4. Project for Housing with Peace of Mind – Planning and evaluation technology for strengthening safety net of housing

While the number of households in poverty is increasing due to the low birth rate and aging population, the number of vacant houses is also increasing. In order to ensure peace of mind for citizens with regard to housing, a technique of planning housing safety nets is being commenced by means of logical management/application of public housing stock and private vacant houses.

★Purpose

- To develop safety net planning technology for multilayered housing through further logical management/application of public housing, application of private vacant houses, and suitable arrangement of welfare/health services based on future population

★Research contents

Public housing and housing safety net planning technique in cooperation with citizens

- Durability evaluation for repair parts such as outer walls/waterproofing, etc. of existing public housing, and techniques for ensuring long service life of logical repairs, etc.

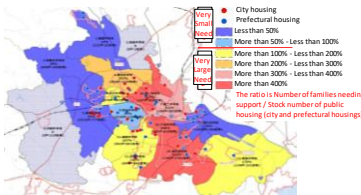


Swelling of waterproof layer; removal of waterproof layer required for long service life



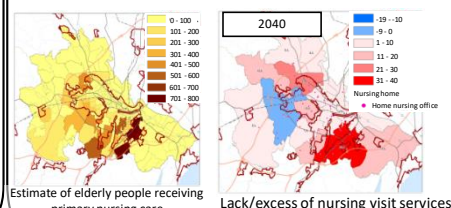
Expansion of EV1 foundation connecting 2 buildings, and logical impediment removal

- Technique for estimating future number of households requiring support through public housing, etc. by region, and technique for planning through cooperation with citizens



Technique for evaluation suitable arrangement of welfare functions, etc.

- Technique for predicting future needs and lack/excess of welfare/health functions by region, and technique for evaluating suitable arrangement thereof



Promotion of housing with peace of mind for citizens by strengthening multilayered housing safety net functions

5. Effective use of historical and other existing buildings by rational regulations on fire prevention, evacuation safety and others

In order to make for smoother alteration of building use and regeneration, technical development is being done for rational regulations on fire prevention, evacuation safety and building use in land use zone.

★Background

- Expansion of trend for existing buildings such as historical ones to be used as key in regional activation and promotion of tourism

★Purpose

- For the purpose of smoother alteration of building use and regeneration, rational regulations on fire prevention, evacuation safety and building use in land use zone is necessary

★Research contents

- In FY2017, there are ongoing surveys and research on clarification of performance requirements, substitution of current regulations, and logical calculation methods for evacuation time, etc. for performance based regulations of general fire prevention and evacuation safety.
- Additionally, for rationalization of restrictions on building use in land use zone, surveys and research are being carried out regarding the actual conditions of diversifying building use, exception approval to the restrictions, evaluation method of environmental impacts of the building use, etc.



Commercial facility
Example of use of historical building



Superior rental housing for elderly people



Example of use of disused school

Regional activation and promotion of tourism through effective use of historical and other existing buildings

Support for disaster response

TEC-FORCE, etc.

When a disaster occurs, in response to requests from the disaster region, the NILIM sends NILIM 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 powerful support for measures to prevent secondary disasters and to reconstruct of the region.

In recent years experts have been dispatched to disaster sites such as the Hiroshima landslide disasters in FY2014, heavy rain in Kanto and Tohoku in FY2015, and the Kumamoto Earthquake in FY2016.

[Technical support at the first response stage]

- Surveying state of the damage
- Advising concerning emergency measures
- Advising concerning prevention of spread of damage
- Providing information needed to prevent secondary disasters

[Technical support during the temporary and permanent measure stages]

- Advising concerning monitoring systems
- Providing technical support for temporary restoration work methods etc.
- Participating in committees formed to establish permanent measures

* 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.

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

○ Dispatch history

2016: 6 disaster, 281 person-days
2015: 3 disasters, 31 person-days
2014: 10 disasters, 120 person-days

Itoigawa City large-scale fire (Dec. 2016)

Itoigawa City, Niigata Prefecture



Large-scale disaster survey

Hiroshima landslide disasters (Aug. to Sept. 2016)

Hiroshima City, Hiroshima Prefecture



Survey of top of mountain stream

Kumamoto Earthquake (Ap. 2016)

Minamiaso Village, Mashiki Town, Kumamoto Town, Kumamoto Prefecture, etc.

Oita City, Oita Prefecture, etc.

*See photo on P18

Nemuro Harbor surge tide disaster survey (Dec. 2014)

Nemuro City, Hokkaido

Typhoon disasters (Aug. 2016)

(Typhoon nos. 9, 11, 10, 13)

Hokkaido: Biei, Kamikawa, Iburi coast

Takase River, Aomori Pref.

Omoto River, Iwate Pref.

Tone Town, Numata City, Gunma Pref.

Saitama City, Saitama Pref.

*See photo on P18

Heavy rain in Kanto and Tohoku (Sept. 2015)

Joso City, Ibaraki Pref., etc.



Field survey of damaged site

Nagano Hokubu Earthquake (Nov. 2014)

Nagano Prefecture: Otari Village, Hakuba Village (Kamishiro District)

Mt. Ontake eruption (Sept. to Oct. 2014)

Nagano Prefecture: Otaki Village, Kiso Town



Volcanic ash survey

Nagano Prefecture landslide disaster (July 2014)

Nagiso Town, Nagano Prefecture

Activity introduction ①Emergency technical support in 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 Response Force (TEC-FORCE), formed an independent survey team, and dispatched a total of 323 personnel to the locality. (As of June 17th, 2016)

From FY2017, the "Kumamoto Earthquake Recovery Support Division" has been established to locally assist with recovery after the disaster, contributing to quick restoration and recovery in harmony with the Kumamoto Restoration Office of the Kyushu Regional Development Bureau.

1. Advice regarding points to keep in mind when carrying out disaster surveys and direction to be taken in compiling survey results, etc.
2. Advice for consideration of crisis management systems and emergency countermeasure construction methods
3. Advice for quick progress of projects for restoration and recovery



Survey of disaster site



Meeting of NILIM Disaster Prevention Measures Division



Explanation of technical support to Keiichi Ishii,
Minister of Land, Infrastructure and Transport

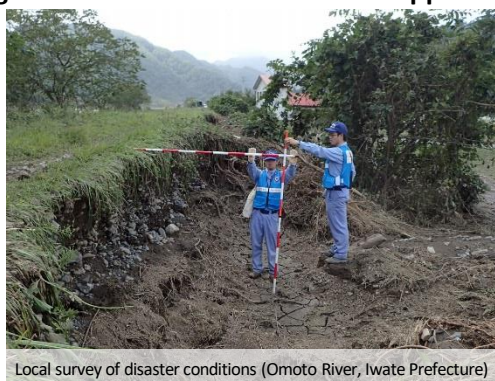


Explanation of emergency inspection results
to municipality (Village Head Nishihara-san)

Activity introduction ②Emergency technical support for August 2016 typhoon disaster

In August 2016, heavy rain brought about by 4 consecutive typhoons resulted in enormous damage, including the collapse of banks in tributaries of State-managed rivers and rivers managed by Hokkaido and Iwate Prefecture. The NILIM dispatched survey teams to the disaster sites.

1. Advice regarding points to keep in mind when carrying out disaster surveys and direction to be taken in compiling survey results, etc.
2. Investigation of causes of disaster and support for drafting restoration plans



Local survey of disaster conditions (Omoto River, Iwate Prefecture)



Local technical guidance (Pekerebetsu River)

Technology transfer

Cooperation

In addition to joint research and contracted research, the NILIM effectively utilizes technologies provided by industry and academia and knowledge of different fields such as the social sciences and humanities, in order to increase human mobility and improve the efficiency and quality of its research.

■ Joint research (2016)

15 organizations including Tokyo University, AIST, Toyota Motor Corporation

■ Contract research (2016)

58 organizations including Hokkaido University and Japan Sewage Works Agency

■ Domestic cooperation

Tsukuba University, Kansai University, etc.

■ International cooperation

Indonesia Department of Public Works and Department of Citizen Housing Road Research Institute, Korean Research Institute for Human Settlements, Chile Ministry of Public Works, Pontifical Catholic University of Chile, others

Personnel training, etc.

● 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, etc., experience of research activities, etc., and lectures, etc. (41 exchange researchers have been accepted as of April 2017.)

● Hosting personnel from regional development bureaus

In order to improve the technological capabilities of personnel belonging to regional government bodies 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.

● Training young technologists

The NILIM trains researchers with advanced specializations looking ahead to the next generation.

● 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 Disaster Recovery Research Division was established in the area affected by the Kumamoto Earthquake disaster. Personnel are also being dispatched to the Kinki Regional Development Bureau Large-scale Sabo Disaster Prevention Technology Center.



Understanding failure phenomena by performing loading tests



Participating in field surveys and technical consulting



Internal presentation meeting for young researchers

Completing and strengthening training

The NILIM holds training sessions and lecture courses, and sends out lecturers in order to transfer its research achievements and its technologies with other organizations and to improve the technological level of society as a whole. (448 lecturers dispatched as of April 2017)

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 will assign teachers to representative courses and at the same time will help with the preparation of common national lecture documents and textbooks.



Training in maintenance



Technical training in bridge maintenance

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. And it regularly responds to requests for consultation concerning problems encountered in the field by, for example, giving advice concerning inspections of deteriorated bridges, or studying river improvement planning. (In FY2016, approximately 2,200 consultations were handled.)

Technical Consultation Office

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



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



Research Evaluations

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

Evaluation of Individual Research Challenges

Individual research challenges such as research that are tackled as priority research by the NILIM are evaluated to give comprehensive evaluations from the perspectives of necessity, effectiveness, and efficiency.



Institutional Evaluation

For overall research activities of the institution (operations of the institution), the NILIM strives to conduct its operations appropriately in light of the evaluation results.

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.

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,” and “productivity revolution” 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.

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 and Vietnam as focused countries.

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.

1) Improvement of the quality of research results (main initiative)	2) Exportation of infrastructures and systems (main initiative)	3) International contribution (main initiative)
<p>[Sediment disaster] The Japan-Switzerland Conference for Sediment Disaster Risk Management Technology</p> <p>Overview</p> <ul style="list-style-type: none"> - A bilateral conference that was held between the Ministry of Land, Infrastructure and Transport and the Swiss Government with the aim of exchanging information regarding sediment disaster risk management technology <p>Conditions in FY2016</p> <ul style="list-style-type: none"> - Information and views were exchanged about the occurrences of sediment disaster, monitoring and prediction technology, hazard map and land utilization, plan and design of “sabo” facilities of both countries. Debris flow control facilities in Switzerland were visited.  <p>Visit to the debris flow control facilities</p> <p>Ports and harbors APEC Transportation Working Group</p> <p>Overview</p> <ul style="list-style-type: none"> - Improvement of capacity for promoting trade in Asia-Pacific region and economical growth of it, the responses to environmental issues, etc, views were exchanged about future policy coordination in harbor maritime field, measures aimed at improving abilities of policy makers, the future direction of individual projects in cooperation among APEC officials, and sharing method of best practices. <p>Conditions in FY2016</p> <ul style="list-style-type: none"> - The meeting was held twice, harbor maritime field related policy makers and researchers were gathered from countries and regions of APEC, and views were exchanged about future global maritime trends and policy response, green ports, and improvement of connectivity of supply chain. 	<p>Research collaboration with Indonesia Japan-Indonesia research collaboration workshop</p> <p>Overview</p> <ul style="list-style-type: none"> - The NILIM and the Institute of Road Engineering (IRE), Ministry of Public Works and Public Housing of Indonesia concluded a memorandum of understanding on research collaboration in 2009, and research collaboration workshops were held since then. <p>Conditions in FY2016</p> <p>The 17th and 18th workshops were held. The research of both the NILIM and IRE were reported, the research results until then were reviewed, and future plans were proposed.</p>  <p>Workshop</p> <p>International standardization activities Participating in ISO committee meetings held overseas and in Japan</p> <ul style="list-style-type: none"> - Total number of ISO Domestic Screening Committees whose members include NILIM personnel: 26 (As of June 2016) - Number of times they participated in technical committee meetings held overseas FY2016: 10 FY2015: 15 FY2014: 10 - Major technical committees Fire safety, water and sewage, building environment design  <p>ISO Meeting (TC205/WG2)</p>	<p>[Short-term dispatch of experts] Disaster Risk Reduction Training Program for Latin America</p> <p><Overview></p> <ul style="list-style-type: none"> - Technological cooperation on human resources development training on disaster risk reduction for Latin America and the Caribbean countries held in Chile based on the request of the Japan International Cooperation Agency (JICA). <p>Conditions in FY2016</p> <p>In the training based on the emergency risk assessment by the Ministry of Public Works of Chile, a lecture on the post earthquake damage evaluation were given, and technical knowledge and experience of Japan were introduced.</p>  <p>Lecture of the training</p> <p>Acceptance of trainees, etc. Acceptance of trainees in JICA training, etc.</p> <ul style="list-style-type: none"> - Trainees were accepted and lecturers were dispatched for 16 training events in FY2016. - For JICA training “Project Management in Infrastructure Development for Civil Engineers,” 14 trainees from 9 countries were accepted. In addition to lectures on “Advanced management of construction management information in construction project” and “Operation improvement by introducing ICT into construction project,” demonstration by real machine of “work progress control total station” was carried out.  <p>Demonstration</p>

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

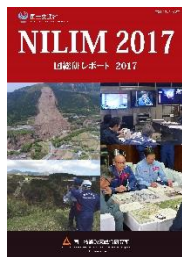
We make simple and timely introductions of the activities and research achievements of the NILIM. We send it out more than twice a month. You can register to receive mail service from the 2D bar code on the right.



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 (on our web site in April).



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. (Published on website when appropriate.)



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.



4th Heat Island Institute International
Best Paper Award (August 2016)

Lectures

NILIM Lectures

The NILIM holds a "NILIM Lecture Meeting" every December and introduce its activities: announces research results and make recommendations for resolution of technical policy issues.

Approximately 700 people attend every year.

It also irregularly holds various lecture meetings and symposia planned according to needs of the times.

Lectures on Demand

Lectures on demand are provided by going directly to schools, etc. and explaining research contents and answering questions while communicating with people from elementary school students through to the general public.

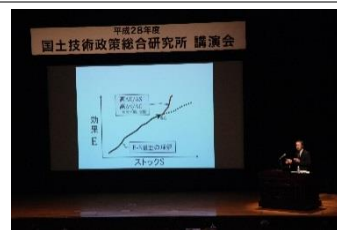
We can hold them anywhere in Japan depending on the course.

Open House

We hold open houses of our research facilities in April, July and November at the Asahi and Tachihara Offices, and in July at the Yokosuka Office. We accept requests for group tours of our facilities, which include explanations of research concerning the prevention and mitigation of disasters and the maintenance of public capital, along with introductions to our facilities. (In FY2016, 3,628 people visited.)

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.



NILIM Lecture Meeting (Dec. 2016)



Great East Japan
Earthquake report meeting



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



Contest for making bridges out of cardboard



Tour of a testing facility



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

Introducing research departments, etc.

(11 research departments, 1 research center, and 3 administrative departments)

Director-General

- Deputy Director-General ● Deputy Director-General
- 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

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 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 Integrated 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, tsunami 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.

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 traffic 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 Division

The Marine Environment Division is involved in research initiatives that have to do with the implementation and development of environment assessment, database archiving, ecosystem restoration techniques in coastal and marine environments with field observations, analytical modeling and numerical calculations.

■ 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.

■ Disaster and Emergency Management Division

The Disaster and Emergency Management Division conducts research to find effective ways to sustain functions of ports and harbors considering diverse stakeholders, to improve the efficiency of logistics, and preserve the security of international transportation.

■ Coastal Zone Systems Division

The Coastal Zone Systems Division conducts research on the mitigation of the problem of floating debris in coastal areas, and develops technologies to mitigate tsunami damage by using ocean surface high-frequency radars, taking advantage of coastal resources to revitalize regions.

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 to ensure the quality of public works in the port field, to procure environmental goods in the port field, and to maintain port facilities.

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

The Airport Facilities Division conducts research to enact standards for design, maintenance and rehabilitation of airport facilities such as runways and taxiways in order to contribute to good airport operation that ensures safety and on-time air transport while considering the life cycle costs of the facilities.

■ 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 Committee

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 Test course

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



5 Asahi Office



6 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.

7 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.

8 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.

3 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.



4 Noise experiment facility

This facility is used to perform experiments to forecast road traffic noise and study peculiarities of sound propagation and experiments on measuring the acoustic characteristics of various acoustic material and noise barriers.



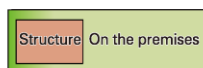
Tachihara Office

Kyokkensyu center
(National Center
for Teachers' Development)

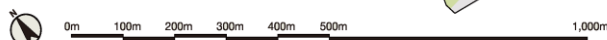
Kenchiku Kenkyusho
(Building Research
Institute)

Doboku Kenkyujo
(Public Works Research Institute)

Asahi Office



Note. Buildings and lots other than those indicated above are those of the Public Works Research Institute, Building Research Institute and the Port and Airport Research Institute.



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

Yokosuka Office

9 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.



10 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.



11 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.



12 River model experiment facility

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



13 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.

14 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 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 × width 6 m × depth 5.5 m) and one deep-tank type (length 10 m × width 3 m × depth 10 m).



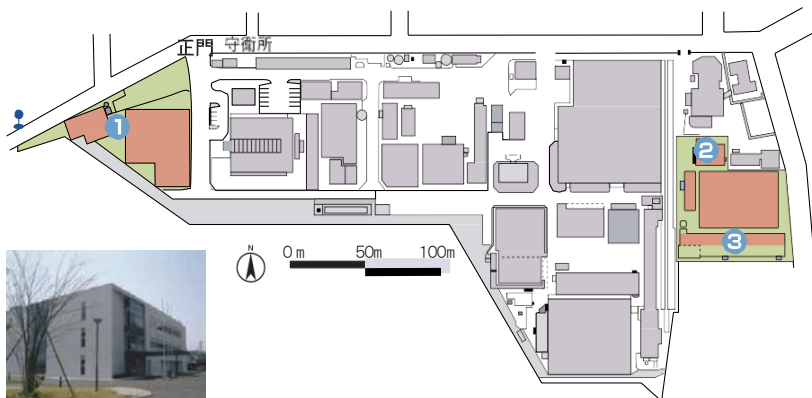
16 Pipe model to evaluate TV camera performance

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.



17 ITS driving test course

This facility is used to conduct research and development intended to mitigate congestion on expressways by developing congestion mitigation services linking road infrastructure with automobile technologies through convoy driving experiments using automobiles equipped with ACC, which maintains automobile driving distances and speeds at constant levels.



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.

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.

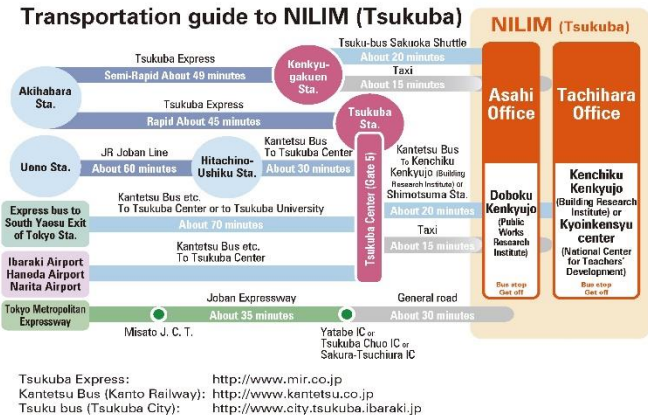
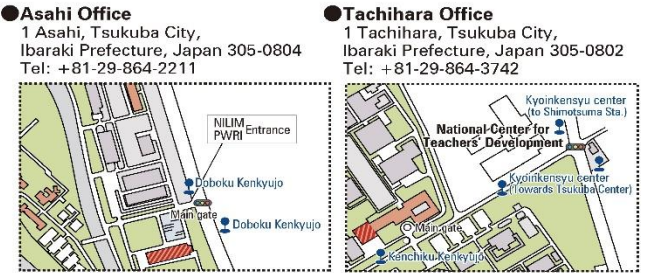
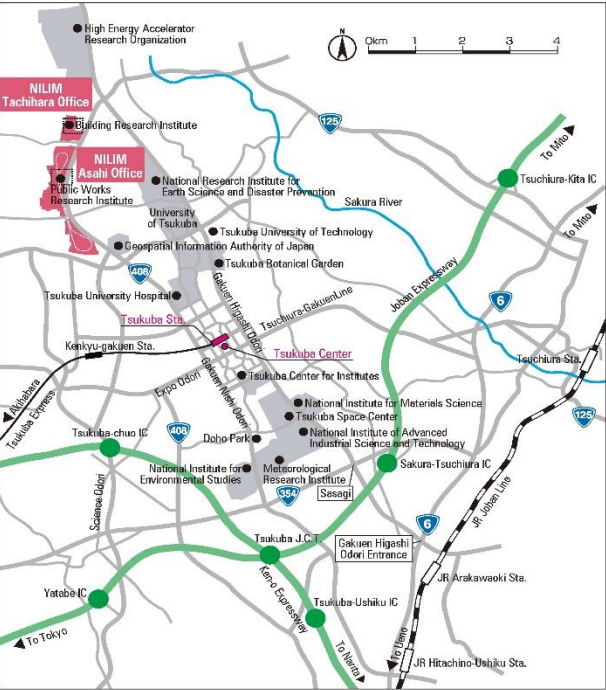


2 Aircraft load simulator

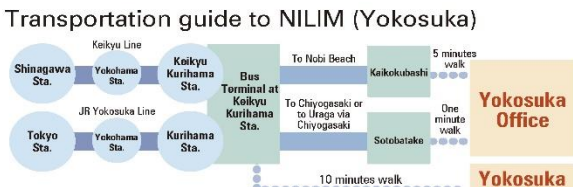
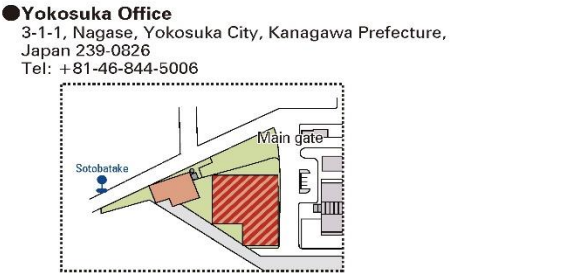
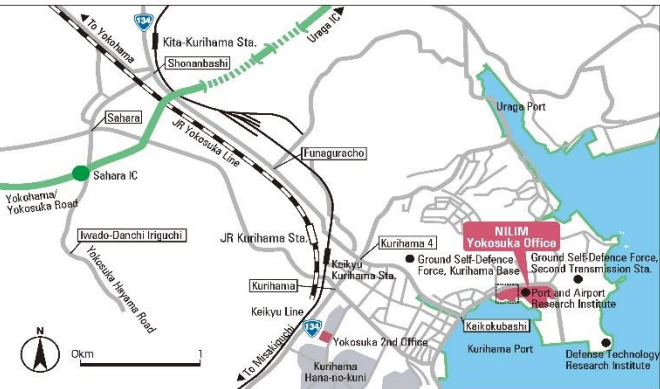
Aircraft load simulator which has one set of 4-wheeled landing gear as same size as that of B747-400 aircraft is an apparatus for evaluation of bearing capacity and durability of airport pavements such as runway, taxiway and apron.



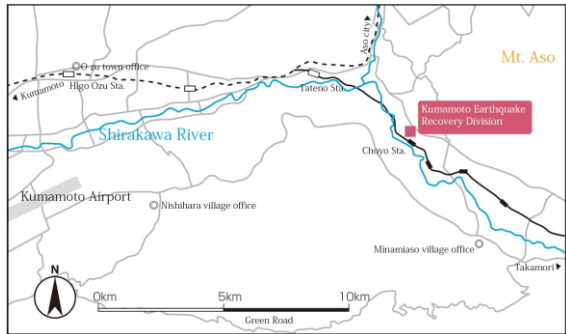
National Institute for Land and Infrastructure Management (Tsukuba)



National Institute for Land and Infrastructure Management (Yokosuka)



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



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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.

Photo on front cover:

Disaster site survey at Aso-ohashi Bridge (Kumamoto Earthquake)	CLT vibrating table test
Seepage failure test using actual size weir	Naha Port cruise terminal