

Three fields emphasized by NILIM in FY2019 and main efforts

Planning and Research Administration Department Planning Division
Administrative Coordination Department Planning and Coordination Division

In FY2019, NILIM is promoting R&D that focuses on three main fields, namely "Research to support safety and security, building a more resilient country", "Research to support strong and continuous economical growth", and "Research to support regional development that serves as the foundation for richer livelihood", and is returning the technological strength cultivated by such research to the actual sites.

[1. Research to support safety and security, building a more resilient country]

- Example of efforts undertaken ①: reduction of inundation damages due to heavy rainfall
 - Development of system that delivers information on predicted inundation to PCs and smartphones 40 to 50 minutes before it occurs, contributing to proper evacuation.
- Example of efforts undertaken ②: promotion of strengthening of infrastructure facilities against liquefaction damages
 - Creation of a highly accurate liquefaction risk map for infrastructure, contributing to strengthening against liquefaction.
- Example of efforts undertaken ③: long-term demonstration of infrastructure functions
 - Improving selection of inspection technologies for deteriorated buildings, contributing to inspection and repair that are more efficient and effective.

[2. Research to support strong and continuous economical growth]

- Example of efforts undertaken ④: supporting self-driving technology from the point of view of infrastructure

- Development of roadside mechanisms to provide information on road obstacles etc. that cannot be detected by a vehicle's sensors, contributing to making self-driving vehicles a reality.

- Example of efforts undertaken ⑤: aiming to increase the amount of cruise ship port calls in Japan
 - Research on the scale and spatial formation of ports able to accommodate large cruise ships, contributing to show Japan as a tourism destination.

[3. Research to support regional development that serves as the foundation for richer livelihood]

- Example of efforts undertaken ⑥: effective utilization of historical buildings
 - Avoiding the demolition of historical buildings etc. via the rationalization of fire protection and other regulations, contributing to their effective utilization.
- Example of efforts undertaken ⑦: development of design and construction technologies for mixed structure buildings employing new wood materials
 - Development of design and construction technologies for mixed structure buildings employing both wood and RC, contributing to further the use of wood materials in architecture.

More information: [press releases materials of April 26, 2019 \(NILIM homepage\)](http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20190426-1.pdf)
<http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20190426-1.pdf>

Started to introduce "Application examples of statistical data on people movement based on operational data of mobile phone base stations".

Urban Planning Department Urban Facilities Division
Research Center for Infrastructure Management Information Platform Division

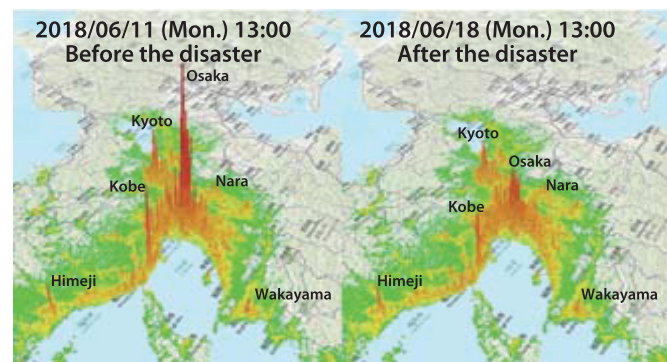
In order to inform the public at large regarding the results and application methods of the referred research, we have initiated efforts to introduce application examples of statistical movement data on the website.

A collaborative research was performed in conjunction with Tokyo University and NTT Docomo Inc. (between 2014 and 2017) aiming to apply "statistical data on people movement based on operational data of mobile phone base stations" to urban and traffic planning.

Now, in order to inform the public at large regarding the results and application methods of the research, we have initiated efforts to introduce application examples of statistical movement data on the website.

The following examples have been posted on the website:

- Analysis of de facto population before and after the earthquake in northern Osaka
 - Grasping a reduction area up to around 26,000 people -
- Analysis of traffic concentration factors and congestion situation on holidays
 - There is a spike in the number of large shopping facility customers when main roads are congested! -
- Comparison of tourist data before and after opening of the Hokkaido Shinkansen
 - Increase in up to 40% in the staying time -
- Analysis of tourism industry results
 - Clarification of number of tourists by region of residence and in a time series -
- Analysis of nighttime bustling activities of foreign tourists
 - Grasping the rate of night tourism in Nagoya city -



Vertical bars show the number of people present between 13:00 and 14:00 in each area.

Fig. Application example (Northern Osaka Earthquake)

More information [Research results: NILIM HP](http://www.nilim.go.jp/lab/bcg/siryu/tnn/tnn1015.htm)
<http://www.nilim.go.jp/lab/bcg/siryu/tnn/tnn1015.htm>
Application examples: Information Platform Division HP
<http://www.nilim.go.jp/lab/qbg/katsuyozirei/katsuyozirei.html>

■ Operation of experimental facilities for high concentration methane fermentation in small scale wastewater treatment plants - Achieving sludge volume reduction and energy recovery via methane fermentation -

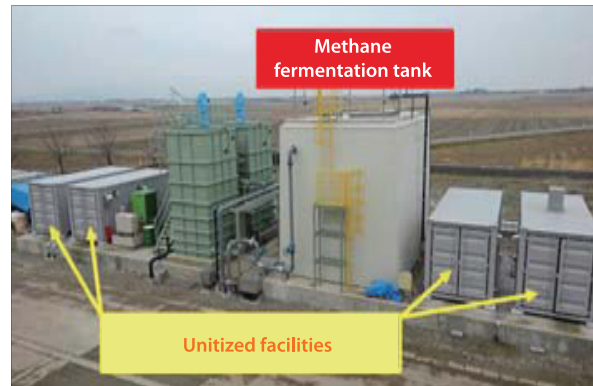
Water Quality Control Department Wastewater and Sludge Management Division

We have started operating experimental facilities for high concentration methane fermentation in small scale wastewater treatment plants that allow sludge volume reduction and energy recovery.

Though with methane fermentation technologies (one of the existing technologies for sludge treatment) it is possible to recover the methane gas produced due to sludge volume reduction as energy, often there is a profitability problem for small scale treatment plants. In order to solve this issue, NILIM is conducting experimental research on "high concentration methane fermentation with low cost, low energy for small scale treatment plants", as part of the B-DASH Project (verification operations for innovative wastewater system technologies).

By combining high concentration methane fermentation technologies and sludge concentration technologies, we promote the introduction of methane fermentation technologies for small scale wastewater treatment plants that make both the methane fermentation tank and the power generation facilities (whose output can be controlled based on the amount of methane gas produced) more compact, and that also unify gas purification devices and power generation facilities, contributing to lowering sludge treatment costs via sludge volume reduction and energy recovery.

The construction and trial run of the facilities was performed in 2018, and it could be verified that, in comparison to technologies employed so far, construction costs were about 45% lower, while site area required was about 30% smaller.



Picture External view of digestion and power generation facilities

In 2019, upon operating the facilities uninterruptedly and obtaining data for each season of the year, we plan to collect information regarding management and maintenance, while also attempting to obtain treatment performance data. Foreseeing the diffusion of the technology, we also plan to formulate introduction guidelines based on the information obtained.

More information Wastewater and Sludge Management Division HP <http://www.nilim.go.jp/lab/ecg/index.htm>

■ Announcing a list of checkpoints to prevent daily life accidents in apartment buildings

Building Department Standards and Accreditation System Division

We have announced a list of checkpoints to prevent daily life accidents for people living in apartment houses, such as falls inside the building, including falling down the stairs or from high places.

According to vital statistics from the Ministry of Health, Labor and Welfare, in 2017 a total of 3,614 people have died in or around buildings (including apartment buildings) due to falling down, falling over or slipping; adding to this those who were simply injured, we can see the number of people who suffer daily life accidents in buildings is extremely large.

With the objective of preventing such daily life accidents in buildings, since 2009 we at NILIM have been publishing on NILIM's website a "Knowledge base for prevention of accidents in buildings", which compiles prevention measures and examples of daily life accident in buildings aimed mainly toward architects.

This time, as a means of improving provision of information for those who utilize or manage buildings, we have applied the information from the "Knowledge base for prevention of accidents in buildings" to create and publish a list of checkpoints to prevent daily life accidents in apartment buildings.

The list is comprised of 7 checkpoints that require attention in order to prevent daily life accidents in apartment buildings such as people slipping, falling over or falling down, and contains both explanations and illustrations that may serve as reference even for those living in detached houses. We hope this material can be widely diffused in order to make apartment buildings more safe and secure, eliminating daily life accidents.

Accidents such as these have been occurring:

- Example 1** A person who was clearing branches and leaves from the rooftop fell to the ground due to lack of handrail (fence).
- Example 2** A 1 year old child fell down from the 6th floor through the gap of the balcony handrail.
- Example 3** A person who lost balance on the 2nd floor balcony grabbed the aluminum handrail, but fell together with it because the balusters came off.
- Example 4** A 1 year old child climbed on shelves and cardboard boxes to reach the window and pushed the window screen, falling together with it.

Fig. Excerpt from the list of checkpoints (Handrail to prevent falls)

More information NILIM HP (List of checkpoints to prevent daily life accidents in apartment buildings) <https://www.tatemonojikoyobo.nilim.go.jp/kjkb/pdf/anshinazen.pdf>

■ Release of video for overseas promotion (English version) and exhibition at CECAR8

Planning and Research Administration Department International Research Division

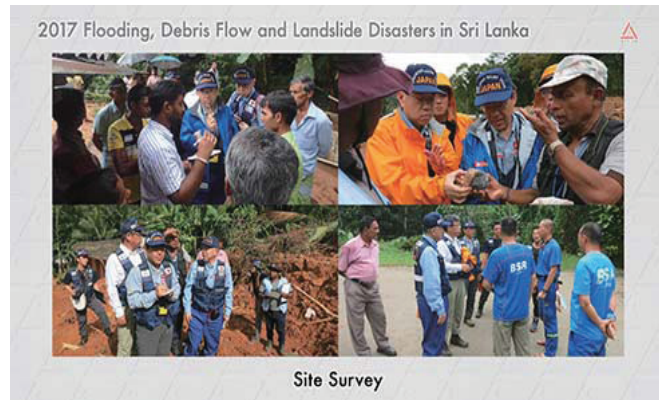
We have made a promotional video (in English) to introduce various research activities to overseas researchers and engineers. The video was uploaded to the website and was also presented at the exhibition booth of CECAR8, held between the 16th and 18th of April.

Though at NILIM we already publish research activities for international visitors on the English website, now we have also created a promotional video in English so that overseas researchers and engineers, and administrative officials may further get to know NILIM and the content of our activities.

The video introduces the large variety of research topics approached at each department, with an overview of NILIM and its mission, so that a general picture of the institute can be conveyed in a short time. In particular, it presents many topics on collaborative research with foreign institutions, and our support in response to natural disasters abroad.

While in other countries infrastructure-related research institutions are often divided in several organizations by field of expertise, NILIM differs itself by uniting several research departments under a single organization, being able to conduct cross-field research activities. The video produced this time is meant to convey such special characteristics.


The complete promotional video was presented at the Civil Engineering Conference in the Asian Region (CECAR8)'s exhibition booth.



Scenes from the PR video (sediment disaster support in Sri Lanka)

Among other topics introduced in the video, tidal waves and ICT also seemed to gather the interest of foreign visitors.

After the session at CECAR8, the same video has also been made available on NILIM's English website.

More information  Published on NILIM English website's top page <http://www.nilim.go.jp/english/eindex.htm>

■ Compilation of a set of proposals regarding "new port town planning"

Coastal, Marine and Disaster Prevention Department Coastal Zone Systems Division

A set of proposals regarding new port town planning efforts for a society facing population decline has been compiled by the Coastal Zone Systems Division's secretariat research group.

Promenades and open cafés or restaurants facing pleasure boats, albeit commonplace in the Western world, as of yet are hardly found in Japan's ports. Though Japan's coastal zones (ports and seashores) do have attractive waterside local resources, it cannot yet be said in the least that they are being effectively used. With the current population decline, it is important to devise ways to improve and revitalize each region, also increasing the number of visitors, via spatial formation design that can create beautiful and pleasant coastal zones, rediscovering and effectively utilizing regional waterside resources. In "PORT 2030", a mid- and long-term concept for ports and harbors that has been announced in July, 2018, "spatial formation" measures were also regarded as one of the primary concerns.

For that reason, in the end of 2018 we have started a "Research group for new port town planning" (sponsored by the Waterfront Vitalization and Environment Research Foundation, with secretariat formed by the Coastal Zone Systems Division), composed of experts, each related division of this Ministry, and related foundations, and have since been making considerations regarding the state of new port town planning.

Among such can be listed:

- New state of spatial formation in coastal zones for a society facing population decline;
- Points that require attention when planning spatial formation;
- Compilation of proposals upon consideration of necessary measures etc. (to be announced within May).

Also, from 2019 onwards we hope to consider guidelines regarding inspection, planning, and spatial formation methods while advancing on-site support to actual port town planning projects.



Citizens relaxing at promenade adjacent to a marina (Saint-Raphaël, France)

More information  Coastal Zone Systems Division HP <http://www.ysk.nilim.go.jp/kakubu/engan/enganiki/index.html>



● Publications (research results)

Download here <http://www.nilim.go.jp/lab/bcg/siryou/index.htm>



PROJECT RESEARCH REPORT of NILIM

No.	Title	Project leader
62	Development of strategic management technology for rental housing and residential functions supporting regional habitation	Housing Department
63	Development of technologies for accumulating and utilizing information in order to streamline and upgrade maintenance of social capital	Research Center for Infrastructure Management Research Coordinator for Advanced Information Technology

TECHNICAL NOTE of NILIM

No.	Title	Department / Division
1029	Street redesign and management case study handbook	Landscape and Ecology Division
1054	Research and study on application method of structural computation program through example analysis of relatively regular shape middle-low-rise buildings	Structural Standards Division
1055	Report of the lecture meeting of NILIM(2018)	Planning Division
1056	FY2017 Annual report of wastewater management and water quality control	Wastewater System Division Wastewater and Sludge Management Division
1059	Manual of the countermeasures for tree failure of street trees Second Edition	Landscape and Ecology Division
1060	B-DASH Project No. 22 Guideline for introducing the excess sludge reduction by multi-stage fixed bed biofilm process	Wastewater and Sludge Management Division

● Receive information on research performed at NILIM.

• NILIM email service

Twice a month, we deliver the latest information introducing various research activities conducted by NILIM and lecture meetings, etc. Register here (URL and QR code) <http://www.nilim.go.jp/lab/bcg/mailmag/index.html>



• 2018 Annual Report of NILIM

This website introduces NILIM research activities and achievements, as well as details of the latest research activities to be formally initiated in the future. Go to this website: <http://www.nilim.go.jp/lab/bcg/siryou/2018report/index.htm>

Please answer our readers survey! <http://www.nilim.go.jp/lab/bcg/siryou/newsletter/nwsltr.htm>



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