

● Publication (research achievements) < December, 2015-February, 2016 >

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TECHNICAL NOTE of NILIM

No.	タイトル	担当部課室名
847	Many Problems and Correspondence Policy about a Standard of Smoke Exhaust Assembly	Fire Standards Division
858	Annual Report of Road-related Research in FY 2014	Road Traffic Department, Road Structures Department, Research Center for Land and Construction Management
859	B-DASH Project No.9 Guideline for introducing an innovative energy-conversion system through total optimization of sludge dehydration, combustion and electricity generation	Wastewater and Sludge Management Division
860	B-DASH Project No.10 Guideline for introducing an electricity generation system from sewage biomass source	Wastewater and Sludge Management Division
861	Research and evaluation of Non-structural measures against tsunamis	Coastal, Marine and Disaster Prevention Department
862	Production Capacity Change in Industrial Sectors of Hachinohe City due to the 2011 Tohoku Tsunami	Coastal, Marine and Disaster Prevention Department
863	Seismic Risk Management Tentative Guidelines on Airport Safety Assessment	Airport Department
864	Fundamental Analysis on the Characteristics of Berthing Velocity of Ships For the Design of Port Facilities	Port Facilities Division
865	Technical study on data interchange and electronic providing system development of port logistics information between Japan, China and Korea	Administrative Coordination Department, Port and Harbor Department
866	Study on dynamic soil-building structure interaction based on strong motion observation	Structural Standards Division
867	Reference to Fire Prevention Measures for Bridges Works	Bridge and Structures Division
869	Report of the 1st Evaluation Committee of NILIM in FY 2015	Research Administration and Evaluation Division
870	B-DASH Project No.8 Guideline for introducing a technology for sewage sludge solid fuelization using hydrothermal processing and high temperature digestion with carrier	Wastewater and Sludge Management Division
871	Report of the joint research on collaborative service among government, industry and academia based on the common platform ITS Spot. Working Group 1: Heavy vehicle management	Intelligent Transport Systems Division
872	Report of the joint research on collaborative service among government, industry and academia based on the common platform of ITS Spot Working Group 2: Logistics Support	Intelligent Transport Systems Division
873	Report of the joint research on collaborative service among government, industry and academia based on the common platform ITS Spot. Working Group 3: Weight Estimation of Vehicle	Intelligent Transport Systems Division

● We provide you with research information.

• 2015 Annual Report of NILIM

This web site introduces NILIM activities throughout the year, including research activities and achievements, future initiatives, etc.

Go to this web site: <http://www.nilim.go.jp/english/annual/annual2015/ar2015e.html>



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■ Full size shallow landslide model test using soil from Izu-Oshima

Sabo Department, Sabo Risk Management Division

To clarify the mechanism of the occurrence and expansion of a slope collapse caused by localized heavy rain in volcanic regions, a full size slope collapse model test using soil from Izu-Oshima was conducted.

In recent years, in the Aso region, Izu-Oshima and other volcanic regions, shallow landslides have occurred, claiming many victims. As one cause, it has been pointed out that collapsed soil fluidizes to overflow rugged ground and spread over a wide area.

The Ministry of Land, Infrastructure, Transport and Tourism takes such circumstances seriously and has begun research to clarify the mechanism of landslides. At this time, the NILIM and the Japan Landslide Society (below, "JLS") are working to "clarify large-scale shallow landslide occurrence mechanism under localized heavy rain and develop dangerous land identification technologies" under a three year plan that started in 2014. This test was performed as part of this research.

To perform this test, similar soil was sampled from near slopes that actually collapsed in Izu-Oshima with the cooperation of Metropolitan Tokyo and Oshima-machi Town. On December 11, 2015, in the large rainfall test facility located at the National Research Institute for Earth Science and Disaster Prevention, soil layer thickness etc. was reproduced in full size, and rainfall with intensity of 100mm/h was applied to perform a trial collapse. The collapse began about midway on the slope, and immediately spread towards the top of the slope. In

particular, it was confirmed that a collapse that has expanded to the top of a slope overflows the soil that collapsed first then flows for a long distance (Photo).

Based on a detailed analysis of this test that the JLS performed, the Sabo Risk Management Division wants the achievements of the test to be applied to nationwide sediment disaster countermeasures by, for example, improving the precision of future sediment disaster warning information and improving facilities.



Photo: Views of test model and collapse

■ Dispatching Road Maintenance Experts ~ Technical Assistance to Municipal Governments ~

Road Structures Department

NILIM helps road administrators manage aging road structures. As one of its support activities, it has sent NILIM experts to three municipal governments with structures requiring expert assessments.

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has sent experts to municipal governments since last year to support their inspection and structural safety assessments in the face of increasing aging and deteriorated road structures in Japan.

This year, upon requests from municipal governments, MLIT regional bureaus supported three municipal governments with three facilities including two road bridges and a shed. NILIM also sent researchers with rich technical expertise to help corresponding MLIT regional bureaus conduct investigations and assessments of their structural safety.

The NILIM researchers performed on-site investigations and give technical advice concerning investigation planning and appraisal of the investigation results based on their knowledge and experience gained through their earlier researches and on-site investigations. For example, the NILIM researchers visited the Sarukai Bridge in November 2015 with regional bureau engineers (Photo) and observed the condition of its structural members and then gave advice on reasonable remedial and preventive work plans to maintain the bridge.

The final reports will be submitted to those municipal governments

respectively by MLIT regional bureau and regional bureau and NILIM working together to come up with the reasonable advice.

Table: Facilities where a Direct Control Diagnosis was done

Road structure name	City, town, or village name	Body conducting the support
Numao Shed	Shimogomachi (Fukushima Prefecture)	Tohoku Regional Development Bureau
Sarukai Bridge	Totsukawa-mura (Nara Prefecture)	Kinki Regional Development Bureau
Yobuko Bridge	Karatsu City (Saga Prefecture)	Kyushu Regional Development Bureau



View of Diagnosis of Sarukai Bridge

Details [NILIM HP \(Press conference on October 22, 2015\) http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20151022.pdf](http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20151022.pdf)

■ **Development of barrier free technologies for emergencies in the aging society**

Housing Department, Housing Production Division

Barrier free environments have been extensively provided in collective dwellings, but with many problems related to the response to fire or other disasters still unsolved, the development of new technologies is eagerly awaited.

Conventional evacuation methods were not planned hypothesizing the many elderly and disabled people who will be part of the coming aged society.

NILIM has been developing evaluation technologies for disaster evacuation support technologies for elderly and disabled people living in collective dwellings since 2015 in order to develop new evacuation support technologies and methods of evaluating the performance of these new technologies. The photos show testing of conventional evacuation equipment and of a prototype of evacuation equipment now being developed. With outside experts participating in the committee, it studies research guidelines while observing actual equipment. We are considering starting the development of equipment also accessible to wheelchair users next year.

In order to conduct the development while considering the anatomical characteristics of people who will use it, it is important that it be carried out cooperatively with people actually concerned through testing using test subjects conducted to evaluate operability and safety. When the equipment research period (3 years) has concluded, as the achievements of the research, proposals for new evacuation support technologies and technology standards to be

reflected in building construction related laws will be summarized in guidelines.

And the results will immediately be announced through research reports of the NILIM and in academic association conference abstracts as interim reports, and at the same time, we will strive to inform the general public of the evacuation support equipment now being developed by holding open houses at the test facility.



Photo 1: Conventional evacuation equipment (Bridge type)

Photo 2: Prototype developed (Lift type)

■ **Results of research on an international logistics model for Central Asia receive best paper award from the East Asia Society for Transportation Studies (EASTS)**

Administrative Coordination Department, International Coordination Division

At the 11th EASTS Conference held in Cebu in the Philippines in September 2015, the Best Paper Award for Best Application in Practices was given to a paper concerning research on a model of international logistics in Central Asia, which was submitted jointly by Dr. Shibasaki, Doctor of Engineering and Head of the International Coordination Division of NILIM and researchers of the University of Tokyo.

The paper that received the award was titled, "Impact Assessment Model of International Transportation Infrastructure Development: Focusing on Trade and Freight Traffic in Central Asia. As part of "Multi-mode International Logistics Simulation Model and Policy Analysis between the Continents of Asia and Europe (research period 2013-2016), a research theme subsidized as Grants-in-aid for Scientific Research and represented by Director Shibasaki, the paper was submitted as the results of joint research with Professor Hironori KATO Department of Civil Engineering of the University of Tokyo and with Tanabe Satoshi, a student of the same department.

The paper was selected in recognition of its superior applicability to other work in particular from among approximately 370 papers that were submitted to the EASTS Conference.

This paper applied an intermodal international logistics model that Dr. Shibasaki constructed for South-East Asia to five countries including Uzbekistan and Kazakhstan that comprise Central Asia. By reproducing the state of the sharing of transportation by railways and by trucks and of traffic volume at border crossing points, it simulated the impact of constructing infrastructure and simplifying border crossing procedures on the international cargo flow.

The research group led by Dr. Shibasaki is continuing research to build similar models in cooperation with the Ministry of Land,

Infrastructure, Transport and Tourism (MLIT), the Japan International Cooperation Agency (JICA), and international organizations such as the Asia Development Bank (ADB). The object of the construction of the model is expanding beyond the Central Asian region, to include South Asia, which includes Pakistan that is also attracting attention as a gateway port for marine transport cargoes to and from Central Asia, and even the entire continent of Eurasia including China and Russia. And the application of the model is now spreading to other regions including Oceania.

The East Asian Society of Transportation Studies was established in 1994 at the insistence of Professor Hideo Nakamura of the University of Tokyo. Nineteen countries from Northeast Asia, South-east Asia, and Oceania are now member countries (about 1,600 members). EASTS meets once every two years, with about 500 papers presented at each conference.

Details  EASTS HP (Outline of the results of the 2015 conference) [http://www.easts.info/events/conference/easts2015/conf\\_rep\\_2015.html#022](http://www.easts.info/events/conference/easts2015/conf_rep_2015.html#022)



Photo: EASTS Conference Awards Presentation (from left, Chairman Feng (former), Professor Kato, Mr. Tanabe, Dr. Shibasaki)

■ **Civil Engineering Day ~Research Facility Open House and Bridge Contest Awards~**

Planning and Research Administrative Department, Planning Division

NILIM held an open house at test facilities in the institute in cooperation with the Public Works Research Institute and a Bridge Contest as part of Civil Engineering Day Events.

On November 14, 2015, NILIM held a Civil Engineering Day event jointly with the Public Works Research Institute. This event is held annually in connection with Civil Engineering Day (November 18), in order to introduce the general public to the research institutes and to familiarize them with public works projects.

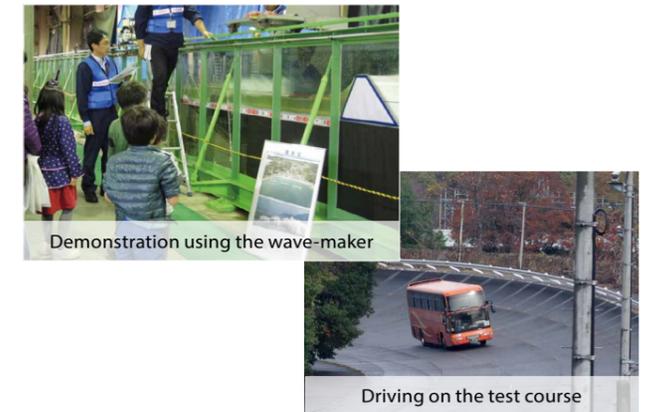
Unfortunately it was a rainy day, but 947 visitors took part, reminding us of growing interest in Civil Engineering.

At test facilities open to the public, they could observe and hear an explanation of waves produced by the wave-maker at varying heights and intervals and observe a demonstration of ETC2.0 while traveling on the 6.2km long test course. Children who attended responded enthusiastically.

On the day of the event, the Bridge Contest awards ceremony was presented. To enable children, who will guide the future of Japan, to experience the importance of Civil Engineering and the joy of creation, they were invited to submit models of bridges made of cardboard which were screened before Civil Engineering Day.

This year, 388 grade 5 elementary school children from 30 elementary schools in Tsukuba City entered 349 creations marked by rich creativity and imagination. These were screened from a variety of perspectives to award those selected as best entry and other prizes.

Such events are counted on to provide opportunities to deepen interest in civil engineering among the many children who see the experiments and experience the creation of bridge models. We will make special efforts to improve these events that will introduce them to the benefits of civil engineering in the future.



Demonstration using the wave-maker

Driving on the test course

Photos: View of test facility open house



Photo: Bridge Contest Awards Ceremony

Details  NILIM HP (Event report) <http://www.nilim.go.jp/lab/bbg/event/dobokunohi/doboku2015.pdf>

■ **Report on NILIM Lecture Meeting 2015**

Planning and Research Administration Department, Planning Division

The NILIM Lecture Meeting 2015 was held in Nissho Hall in Toranomon, Minato-ku, Tokyo on December 3 (Thurs.), 2015.

The NILIM lecture meetings are held annually in order to inform the general public of the activities of the NILIM by presenting all-encompassing presentations and reports on recent research achievements of the NILIM and on research themes and trends. This year's lecture meeting attracted 537 guests.

A special lecture, "National Land Technology Policies that Induce Social and Economic innovations", was given by Professor Ishida Haruo (Photo) of the Faculty of Engineering, Information and Systems Division of Policy and Planning Sciences, University of Tsukuba. Professor Ishida clearly explained his view that social and economic systems will be transformed by innovation by incorporating his own rich experience innovating in transportation systems.

In other lectures, representatives of various departments and centers of the NILIM introduced research achievements and survey and research trends that meet recent needs in various fields.

At this lecture meeting, three sessions dealing with topics of great concern for society: [1] disaster prevention and mitigation, [2] maintenance, and [3] innovation (Technology required for regional creation, more intelligent use, and improved productivity) were added. Presenters talked about the most advanced research achievements that will be applied immediately in the field and

prospects for the future. Documents presented that day are available at the following URL.



Photo: Professor Ishida Haruo

Details  NILIM Lecture meeting (NILIM HP) <http://www.nilim.go.jp/lab/bbg/kouenkai/kouenkai2015/kouenkai2015.htm>