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NILIM News Letter
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Field survey of Itoigawa city fire in Niigata Prefecture – Initial investigation of factors causing the fire to spread, and stopping its spread

Building Department, Urban Planning Department

The NILIM and the Building Research Institute carried out a field survey of the fire that occurred on December 22, 2016 in Itoigawa City in Niigata Prefecture. The survey results are reported below.

The Building Department and Urban Planning Department of NILIM, jointly with the Building Research Institute, carried out a field survey and an interview survey in Niigata Prefecture and Itoigawa City from December 25 to 26, in order to study the damage to buildings caused by the fire and the factors that caused the fire to spread and that stopped the fire. The state of the damage clarified by this survey is introduced below.

The fire, which started near the south end of the fire-damaged district, spread fanned by a strong southerly wind until it reached National Highway 8 at the northern end of the city. The fire-damaged district extended over an area of up to about 300 m from north to south and 200 m from east to west. Photo 1, which was taken in the center of the fire-damaged district, shows that many buildings were burned out leaving only piles of rubble.

Meanwhile, in the fire-damaged district, some buildings were only slightly damaged, with cracked wired glass for example. The reason is considered to be that the buildings were highly fire resistant, and there were empty lots beside them, leaving large gaps between them and the surrounding buildings (Photo 2).

Photo 1. Damage in the center of the fire damaged district

Photo 2. Slightly damaged buildings

The interview survey of residents and the state of damage at the scene of the fire revealed many spots where firebrands presumably could have spread the fire.

The survey results have been released as a quick report on the NILIM website. In the near future, a more detailed survey will be conducted to learn why the fire spread, the way it spread, and why the fire stopped.

Details ☛ Report of the field survey in the Itoigawa city fire in Niigata Prefecture that occurred on December 22, 2016. (Quick report)
http://www.nilim.go.jp/lab/bbg/saigai/h28/itoigawa01.pdf

Verification of equipment inspection/diagnosis technologies using ICT –Efficiently inspecting/diagnosing equipment in wastewater treatment plants–

Water Quality Control Department, Wastewater and Sludge Management Division

In order to appropriately manage equipment in deteriorated large wastewater treatment plants, reduce life cycle cost, and optimize investment, since 2015 the NILIM has conducted tests to verify two maintenance technologies using ICT.

At wastewater treatment plants, dealing with advanced deterioration of plant equipment is a challenge, and the cost of maintenance is likely to continue to rise. In order for local governments facing harsh financial circumstances to prolong the service lifetimes of equipment in deteriorated large wastewater treatment plants, it is necessary to perform inspections at low cost and to repair and replace the equipment at appropriate times.

Accordingly, as part of the Ministry of Land, Infrastructure, Transport and Tourism's project named 'Breakthrough by Dynamic Approach in Sewage High Technology Project' (B-DASH Project), since 2015 verification tests of two technologies for diagnosing deterioration using ITC have been performed as contract research by the NILIM.

One technology combines monitoring equipment using vibration sensors with big data analysis. Vibration sensors detect abnormal operation of rotating machines to prevent sudden malfunctions. Based on big data analysis, its relationship between large volumes of data inside wastewater treatment plants is used to detect precursors of equipment anomalies to predict deterioration (see the figure).

The second technology combines sensor-based machinery status monitoring with tablet inspections. Sensors continually monitor the vibration of equipment and accumulate data. Meanwhile, tablets are used in daily inspections to accumulate inspection record data. Maintenance data accumulated by both technologies is used to efficiently diagnose and predict deterioration of equipment.

The verification testing of these two revolutionary technologies will continue this year, and the spread of the technologies will help establish efficient equipment operation, thereby improving the productivity of overall wastewater treatment systems.

Details ☛ NILIM (website, B-DASH Project)
http://www.nilim.go.jp/lab/ecg/bdash/bdash.htm

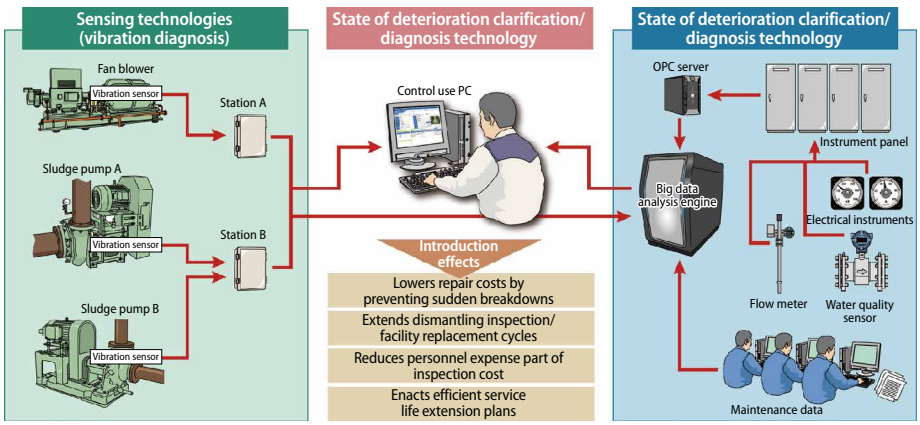

Figure Overview of verification testing

Enacting Pavement Inspection Rules – Aiming to prolong the lifetime of pavement and lower life cycle costs –

Road Structures Department, Pavement and Earthworks Division

In October 2016, the Road Bureau of the Ministry of Land, Infrastructure, Transport and Tourism released the Pavement Inspection Rules.

Japan's pavement stock is massive, equivalent to about 1 million kilometers in road length. Like bridges and tunnels, pavement must also be maintained more efficiently by setting a maintenance cycle and performing preventive maintenance.

In response to discussions by the Road Technology Panel of the Road Subcommittee, the Council for Social Infrastructure, a series of studies of inspection rules were conducted by the Road Bureau of the MLITT, the NILIM, and the Public Works Research Institute which, on October 19, 2016, enacted the Pavement Inspection Rules, which the Road Bureau of the MLITT distributed to road managers as technology guidance for regional governments.

The Pavement Inspection Rules were drawn up to be used to perform repairs more efficiently and improve drivability and comfort according to road characteristics.

The rate of deterioration of pavement varies greatly according tothe traffic volume of heavy vehicles, and the required service level also varies with travel speed. Therefore, as shown in the figure, roads are categorized into four classes according to the traffic volume of heavy vehicles and road characteristics, and an inspection method is stipulated for each class. Also, as basic inspection concepts, based on the structural properties of each type of pavement, for asphalt pavement, an "inspection intended to prolong the service lifetime by protecting the layers underneath the base course by repairing the surface and the binder course as necessary" is done. For concrete pavement, "an inspection intended to utilize the high durability of concrete pavement for a long time" is done.

With the enactment of the inspection rules, based on information and technical knowledge obtained in the future, the NILIM will continue to perform technical studies to prolong the service lifetime of pavement based on initiatives taken by road managers.

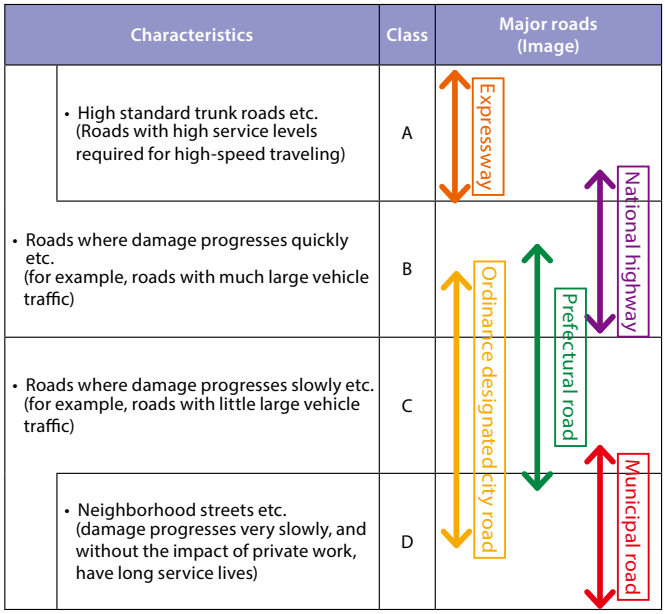

Figure Image of road classifications

Details ☛ MLIT, Road Bureau (Pavement Inspection Rules)
http://www.mlit.go.jp/road/ir/ir-council/pdf/yobo28_10.pdf

Publication of the Hydraulic Experiment Manual on Evaluating the Wave Stability Performance of Artificial Reef Protective Blocks

River Department, Coast Division

To prevent the scattering of concrete covering blocks used to protect the mounds of artificial reefs, we have published the Hydraulic Experiment Manual on Evaluating the Wave Stability Performance of Artificial Reef Protective Blocks.

An artificial reef is a mound works with the main part being a mound body cross-section, and covering work that prevents its deformation. The shoal effect of the mound deforms waves and causes them to break. Artificial reefs are widely used because they reduce spray and restore panoramic views on the shore. In 2013, there were 1,287 such reefs on the shorelines of Japan.

The manual defines the following three important experiment conditions shown in the figure for evaluating performance under conditions near the site when selecting the type of covering blocks during the detailed design: a) stipulates the use of irregular waves that can reproduce the waveform that approximates the actual waves on the ocean, b) specifies the use of waves with a long period similar to swells, which tend to cause scattering on-site, c) unifies model shapes, permitting evaluation of the same rank regardless of the developer of the blocks. It also stipulates that an experiment report clarify the conditions and results of experiments by, for example, showing the number of scattered blocks that is considered to be the allowed limit of fluctuation.

This manual will improve the reliability of selecting blocks, permitting the design of safer artificial reefs.

Details ☛ NILIM website (NILIM Report No. 927)
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0927.htm

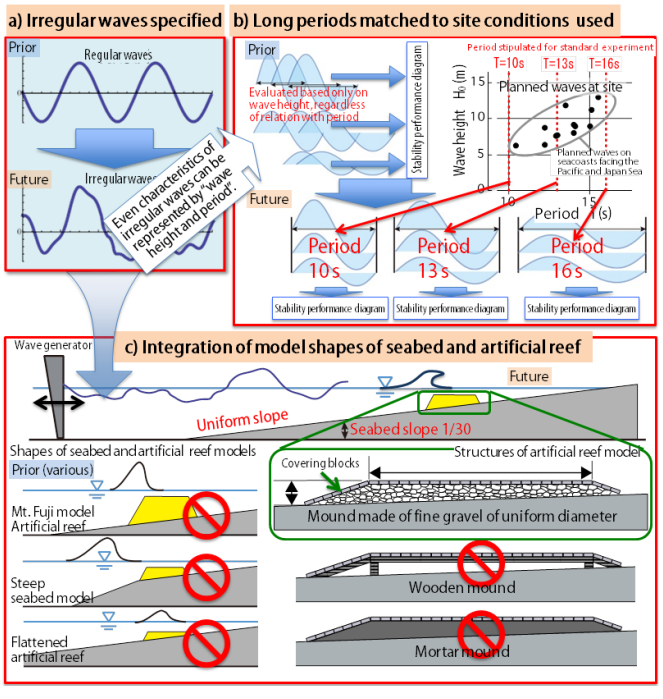

Figure Three test condition settings stipulated by the manual

NILIM Lecture Meeting 2016 held

Planning and Research Administration Department, Planning Division

The NILIM Lecture Meeting 2016 was held on December 8, 2016 in Nissho Hall.

The NILIM Lecture Meeting is held annually to broadly introduce initiatives taken by the NILIM by presenting comprehensive lectures and reports about recent research outputs, research themes and trends at the NILIM. This year's Lecture Meeting was attended by 652 representatives of private companies, national and regional governments, and public corporations.

A special lecture was given by Dr. Kubo Tetsuo, Professor Emeritus of the University of Tokyo, titled "Building Damage by the 2016 Kumamoto Earthquake following Past Earthquake Damage" (Photo). Dr. Kubo referred to many specific cases as he discussed damage to buildings by past earthquakes and the Kumamoto Earthquake, trends in research on seismic engineering and seismic design, and the study of seismic engineering as empirical engineering based on these.

Other lectures included "NILIM disaster activities and NILIM's technological support for restoration and recovery based on its knowledge and experience of past disasters" as a special session. The general session included lectures on three themes, "Improving productivity", "Strengthening maintenance and competitiveness", and "Preventing and mitigating disasters". All research departments and center introduced research outcomes, and survey and research trends etc. undertaken in response to recent needs in various fields.

Documents presented at the event can be viewed at the following website.

Photo. Professor Emeritus Kubo Tetsuo

Details ☛ NILIM website, NILIM 2016 Lecture Meeting
http://www.nilim.go.jp/lab/bbg/kouenkai/kouenkai2016/kouenkai2016.htm

Initiative to Visualize International Port Logistics – Technical Support for the Development of NEAL-NET –

Administrative Coordination Department, Port and Harbor Department

The NILIM provides technical support for NEAL-NET, which visualizes container logistics at major ports in Japan, China, and Korea, in order to contribute to more efficient international port logistics.

Economic globalization and growth of supply chains have been accompanied by a growing need for Japan's shippers and logistics companies that handle international cargo to understand the present status of cargoes, not only within Japan but including the movement of cargoes with other countries. Accordingly, at the 2010 Third China - Japan - Korea Ministerial Conference on Maritime Transport and Logistics, the three countries agreed to build the Northeast Asia Logistics Information Service Network (NEAL-NET) to share container logistics information for major ports in the countries. In 2014, port logistics information systems operated by the governments of the three countries were linked to begin providing container vessel departure and arrival times and container location information in major ports in international maritime container transport between the three countries. Following this start-up, studies continued on topics such as expanding its functions, increasing ports where it can be used and even extending it to the area outside of Japan, Korea, and China such as Europe. This series of innovations is an advanced example from an international perspective, as it is an international integration of government operated port logistics information systems.

The NILIM has, in cooperation with the MLIT, conducted system development from enacting a communication agreement to internationally link port logistics information systems to system linking testing, and has also prepared a technical manual. The development of this system requires coordination with China and Korea, so Japanese, Chinese, and Korean government experts including NILIM researchers conduct discussions at NEAL-NET technical meetings held every year. In 2016, at the technical meetings held in September in Seoul, Korea and in November in Xiamen City, China, participants discussed the enactment of a communication agreement concerning procedures for containers in container yards in order to further improve services for users.

The NILIM will continue to technically support the development of NEAL-NET to bring greater benefits to users.

Photo. View of NEAL-NET Technical Meeting (Nov. 2016)

Details ☛ NILIM website (NILIM Report No. 865)
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0865.htm

Publication (research achievements) < December, 2016-February, 2017 >

Download from here ☛ http://www.nilim.go.jp/lab/bcg/siryou/index.htm

PROJECT RESEARCH REPORT of NILIM

No.	Title of Paper	Project Leaders
53	Development of Building Evaluation/Design Technologies to Lower Dependence on Electric Power	Directer of Housing Department

TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
915	Sedimentation Rate in Coastal Regions in Tokyo bay	Marine Environment Division
916	Consideration of the spatial arrangement of settlement habitats for free-living larvae	Marine Environment Division
917	A New Method for the Quantitative Evaluation of Services of Tidal Flats	Marine Environment Division
918	Damage to Nemuro Port and Its Surrounding Areas due to the Storm Surges and Waves of Typhoon 1523	Coastal Disaster Prevention Division
919	Study on Construction Works and Structural Design of Shore Protection Facilities in Port Areas for Their Improvement and Maintenance	Coastal, Marine and Disaster Prevention Department
920	Damage to Port Areas along Seto Inland Sea due to Storm Surge and Waves of Typhoon 1511	Coastal Disaster Prevention Division
921	Damage to Kushiro Port due to Storm Surge of an Extratropical Cyclone in 2015	Coastal Disaster Prevention Division
922	A bayesian inversion for a directional spectrum of ocean waves in shallow water using HF radar	Coastal Zone Systems Division
923	Analysis on World Container Ship Movement and Containerized Cargo Flow (2015)	Port Planning Division
924	An Analysis on Actual Practices of Waterway Navigation Using Tidal Window	Port Planning Division
925	A Study on Volume and Flow of Import/Export Maritime Container Cargo of Domestic Region	Port Systems Division
926	Considerations of Level 1 Reliability Design Method for Vertically Pile-Supported Wharves under Berthing Condition(Part 1)	Port Facilities Division
930	B-DASH Project No.11 Guideline for introducing hydrogen generation from sewage biogas source	Wastewater and Sludge Management Division Water Quality Control Department
936	Survey on the flood disasters caused by the Yamaguchi- Shimane torrential rain and Typhoon 18th in 2013	Flood Disasters Prevention Division
937	Technical Regulations of one-Story Social Housing (Concrete Block and Confined Masonry) and Adobe for one-Story Housing in Republic of El Salvador (Japanese Version)	Structural Standards Division
940	B-DASH Project No.16 Guideline for introducing an operation support system of inundation measure facilities utilizing ICT	Water Quality Control Department
946	Study on Plan for Facilitating Provision of Publicly-Operated Housing after the Great East Japan Earthquake —Study on Measures to Grasp Wishes for Publicly-Operated Housing—	Housing Planning Division

We provide you with research information.

- 2016 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/annual2016e.html

National Institute for Land and Infrastructure Management
Ministry of Land, Infrastructure, Transport and Tourism
Asahi 1, Tsukuba, Ibaraki, 305-0804, Japan
(Tachihara) Tachihara 1, Tsukuba, Ibaraki, 305-0802, Japan
(Yokosuka) Nagase 3-1-1, Yokosuka, Kanagawa, 239-0826, Japan
TEL:+81-29-864-2754 FAX:+81-29-864-4322
http://www.nilim.go.jp/english/eindex.htm

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