Schedule of Principal Events

Scheduled Dates	Event Name
November 18	Open House “Public Works Day” (Tsukuba)
December 6	The Lecture Meeting of NILIM (2017)

Publication (research achievements) <Jun, 2017-August, 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
55	Study on Environmental Restoration Technique in Port and Harbor Damaged by the “Great East Japan Earthquake of 2011”	Director of Coastal, Marine and Disaster Prevention Department
57	Research on Techniques for Improving Port Area Safety from Tsunamis	Director of Coastal, Marine and Disaster Prevention Department

TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
884	Performance Validation Test Protocols on NDT Tools for the Inspection of Road Bridge and Structures: NDT Tools for Post-Installed Anchor Bolts	Bridge and Structures Division
953	Study on the Unified Performance Validation Test Protocols for the Holding Measures of Surface Concrete Chunks of Structures	Bridge and Structures Division
954	A Proposal on Design Method for wave force of Breakwater with Reinforcing Embankment	Port Facilities Division
955	A Basic Study of the Level 1 Reliability-based Design Method of Circular Slip Failure Verification by Modified Fellenius ' Method	Port Facilities Division
956	A Basic Study on Level 1 Reliability Design Method for Anchored Sheet Pile Quay Wall in a Permanent Design Situation	Port Facilities Division
957	Study on Safety Consideration of Mooring and Detachment work in Installation of Ancillary Equipment of Mooring Facilities	Port Construction Systems and Management Division
958	Analysis of the Future Trends in Trade Considering Changes in the Economic Environment of the Asia and Pacific Region Using Computable General Equilibrium Model (GTAP Model)	International Coordination Division
959	A field experiment for the simple measurement of tide level using ultrasound	Coastal Disaster Prevention Division
960	Numerical Simulations on Inundation due to Storm Surge for Port Areas in Ise Bay	Coastal Disaster Prevention Division
961	Analysis of Future Trend of World Container Ship Building in Terms of Freight Capacity and Ship Size	Port Systems Division
962	A Study on Adoption of the Reliability-based Design in the Earthquake Resistance of the Airport	Airport Department
963	A simultaneous Equations Model for Strategic Determination of Aircraft Size and Frequency by Airlines in Japan	Airport Planning Division
964	An Analysis of Inbound Tourists' Airport Choice in Japan	Airport Planning Division
965	Analysis on World Container Ship Movement and Containerized Cargo Flow (2016)	Port Planning Division
966	Research and Development Report on Sewerage, 2016	Water Quality Control Department
968	A Draft of Technical Manual for Dam Anchor Inspection	Large-scale Hydraulic Structure Division
969	Technical note on development of system to clarify state of damage to road bridges by an earthquake	Earthquake Disaster Management Division
972	Questionnaire survey on controlling alien plants in river management	Landscape and Ecology Division
975	Research on construction method and its performance evaluation of external envelope of timber framed houses for durability upgrading.	Structural Standards Division
977	Technical note on seismic performance evaluation of coastal dikes mainly made of soils	Coast Division
980	Report of the Survey on the Building Damage by the Large Fire Occurred in Itoigawa City, Niigata Prefecture on December 22, 2016	Urban Disaster Mitigation Division

We provide you with research information.

- 2017 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/annual2017/ar2017e.html

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Release of Results of Investigation of the Large-scale Fire in Itoigawa City – Analysis of the spread of fire by sparks blown by strong wind –

Building Department and Urban Planning Department

The NILIM has announced the results of its investigation and analysis of the spread of the large-scale fire that occurred in Itoigawa City in Niigata Prefecture on December 22, 2016, which it conducted in collaboration with the Building Research Institute.

This article outlines the results of the investigation and analysis which were announced on July 28 of this year.

From videos of the fire, the investigators analyzed the time and direction of the spread of the fire to each building in order to draw up a diagram of the spreading dynamics and to identify which buildings were ignited by sparks from buildings that were already burning.

On many of these buildings, fire damage was limited to the roof or the fire started on the roof and then spread to the rest of the building, so fire tests were performed to confirm whether or not sparks passed through the tiles and ignited the roof underlayer (Photo 1). The testing was done by preparing specimens using tile roofs based on prewar specifications common in that region and specimens of tile roofs based on modern specifications, and then comparing the frequencies with which each type of specimen caught fire. The results confirmed that when the wind was blowing at 10 m/s, on the tile roofs based on prewar specifications, the roof underlayer burnt through (Photo 2), but on the tile roofs based on modern specifications, it did not burn through.

Photo 1 Test of fire ignition by sparks

Photo 2 Example of fire burning through roof underlayer

Urban fire simulations were done by preparing data that reproduced local conditions when the fire occurred – a mixture of old buildings constructed before the war – and data representing a case where fire prevention measures were taken on all external walls or windows of old buildings and the tile roofs were of the modern specifications. The results also confirmed that if fire prevention measures are also taken on old buildings and modern specification roofs are built, sparks will not spread a fire, sharply reducing the number of fire-damaged buildings.

Details ☛ NILIM website (Technical Note of NILIM No. 980)
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0980.htm

National Road Census Announcement of Results of the Survey of Traffic Conditions on All National Highways and Municipal Streets in Japan, 2015 (General Road Traffic Volume Survey)

Road Traffic Department Road Division

In the autumn of 2015, the Ministry of Land, Infrastructure, Transport, and Tourism conducted the Survey of Traffic Conditions on All National Highways and Municipal Streets in Japan, which is also called the National Road Census. The results of the General Road Traffic Volume Survey were summarized and announced in June of this year.

The Survey of Traffic Conditions on All National Highways and Municipal Streets in Japan consists of the General Road Traffic Volume Survey (clarification of road traffic conditions and the state of traffic facilities) and the Automobile Start and Stop Point Survey (clarification of the movement of automobiles between districts). The results of the surveys will be used to draw up road plans and to maintain and repair roads.

For the General Road Traffic Volume Survey, the Road Division studied the survey method to perform the survey more efficiently and effectively. For the Traffic Volume Survey, mechanical observations were widely introduced, specifically, on 50% of sections (38% during the previous survey) on National Highways. Travel speeds (speed including stopping to wait for signals to change or in traffic congestion) were surveyed, using ETC2.0 probe information for the first time on 66% of the total road length surveyed, and by finely demarcating survey sections, it was possible to clarify the state of conditions according to more actual circumstances.

The following is an overview of the major results of the General Traffic Volume Survey. Vehicle-kilometers traveled, which indicates road traffic demand, remains flat overall, with a tendency toward higher speeds among large vehicles and on expressways. Overall, the average travel speed during congestion shows a declining trend (Fig. 1).

In the future, research will be conducted on increasing efficiency by, for example, applying ETC2.0 probe information to the Automobile Start and Stop Point Survey.

Details ☛ 2015 Survey of Traffic Conditions on All National Highways and Municipal Streets in Japan website
http://www.mlit.go.jp/road/census/h27/

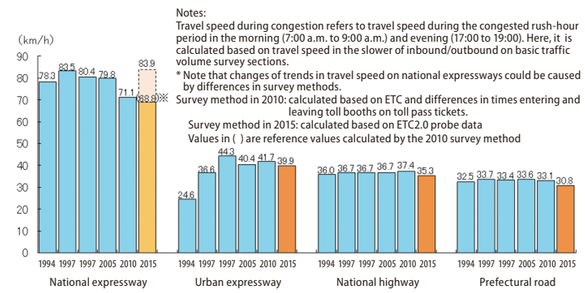

Figure 1. Changing average travel speeds during congestion periods (business days)

Revision of the Technology Standards for Road Bridges

Road Structures Department, Bridge and Structures Division

The Technical Standards for Road Bridges, which are design standards for road bridges, have been revised substantially by, for example, introducing the partial factor design method.

The Technical Standards for Road Bridges have been revised in response to the latest technical knowledge and social conditions, etc., but this is the most sweeping revision since their enactment. On July 21, 2017, it was announced by the Directors of the City Bureau and Road Bureau of MLIT.

This revision replaced the existing allowed stress design method with the partial factor design method and the limit state design method as the foundation of the verification system while maintaining the performance regulations introduced by the revision of 2001 in order to improve productivity and achieve good quality, long-lasting road bridges.

The allowed stress design method used in the past used empirical load combinations and safety factors to consider variations of the load, material, and strength of members and considers types of failure that should be avoided.

However, changes in various bridge conditions or structural forms accompanying progress in structural analysis and technical development of materials have transformed the scale and rates of loads borne by each member. Therefore, in order to more accurately evaluate performance, a method is now needed that can be used to reconsider not only empirical load combinations, but also appropriate load combinations according to changing conditions. In order to evaluate the design strength of new materials and compound members, a method is needed that can calculate the strength predicted by the design based on data concerning the variations of materials and execution and precision of design methods, etc.

This existing safety factor was divided into five partial factors, which were separately stipulated. Specifically these are partial factors which are multiplied by loads according to variations of the loads themselves and differences in the frequency of occurrence of load combinations; partial factors which consider variations of material strength, variations of execution, and the precision of design formulas or quality or quantity of foundation data; partial factors that consider the quality of ground surveys or structural analysis; and partial factors according to differences in type of failure; and regulates each of these partial factors (Fig).

The Bridge and Structures Division has conducted research to convert to the partial factor design system, which is a standard format for international technical standards based on the concept of reliability design, and this revision reflects many achievements including the factors multiplied by loads.

By clarifying the methods of evaluating performance regardless of how materials are combined and the quality and quantity of data needed for this evaluation, the development and introduction of new technologies will be encouraged. Introduction of the design method will also permit rational evaluations of performance, even of existing structures, in the future.

This revision will also define the limit state of bridges under earthquakes and various other loads and also set regulations that will ensure the safety and functions under multiple limit states. Clarifying common performance factors required of bridges will, even based on this fact, encourage the introduction of various structures and new materials.

Seismic design has also been revised in order to reflect the completion of regulations concerning durability performance and lessons taught by damage caused by the Kumamoto Earthquake of 2016 to improve resistance to damage, and to simplify the restoration of damaged bridges.

The new technological standards will be applied to designs newly started after January 1, 2018.

Details ☛ Ministry of Infrastructure, Land, Transport and Tourism, Road Bureau website, Revision of the Technology Standards for Bridges and Viaducts, etc. (Road Bridge Specifications)
http://www.mlit.go.jp/report/press/road01_hh_000862.html

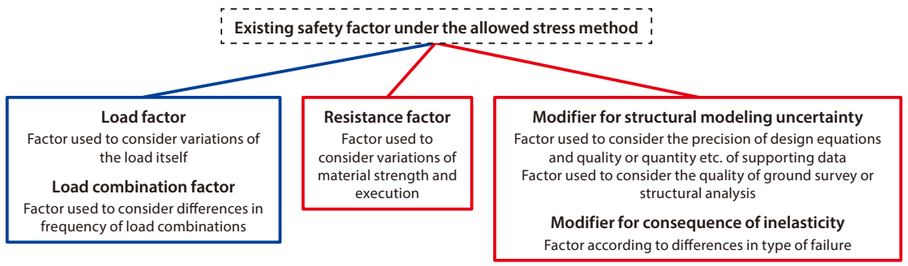

Fig. 1 Allowed stress method and partial factor method

Announcement of a Manual for a Program that Judges the Energy Consumption Performance of Buildings

Housing Department, Building Environment Division

The NILIM has announced a program that judges the energy consumption performance of buildings. It has also released a manual for this program as a Technical Note of the NILIM.

Beginning in April 2017, when a non-residential building with a floor area of 2,000 m^2 or larger is to be newly constructed or modified, the building must comply with energy efficiency standards set by the national government. The NILIM has, in collaboration with the Building Research Institute (BRI), developed and released a program that judges compliance with this energy efficiency standard.

The NILIM has recently announced manuals for two programs concerning non-residential buildings: (Technical Note of the NILIM No. 973 “Manual for the Primary Energy Consumption Calculation Program for Non-residential Buildings)”, and Technical Note of the NILIM No. 974 “Manual for Model Building Method Input Assistant Tool”).

This manual stipulates rules governing the use of this program. For example, it concretely stipulates what kinds of building materials or equipment (air-conditioners or lighting fixtures, etc.) is to be evaluated, and what values are entered as the efficiency of each machine (links to test results based on JIS or other standards). In order for the results of judgments by this program to be used for administrative procedures, it is important to set detailed rules governing the methods of using it so that no matter who uses it, the results are identical.

The NILIM will create an environment to develop evaluation programs and to build rules in order to be able to accurately and impartially judge whether or not buildings comply with energy saving standards.

* It is an on-line program that runs on Web browsers. Users can just enter the building’s insulation specifications, performance of window glass, and efficiency of air-conditioners and of lighting fixtures, etc. to find out if the energy consumption performance of the building complies with standards demanded by the national government. The program can be used free of charge, and is used by about 1,500 people every day.

Details ☛ NILIM website (Technical Note of NILIM No. 973, 974)
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0973.htm
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0974.htm

Figure 1. Interface of the Primary Energy Consumption Calculation Program for Non-residential Buildings

Proving Test to Confirm the Safety of Marinas for Wheelchair Users

Coastal, Marine and Disaster Prevention Department, Coastal Zone Systems Division

The first proving test to confirm the safety of a marina for wheelchair users in Japan has been conducted in Shonan Harbor.

In response to the increase in marine recreation in Japan, there is a major need to introduce barrier-free universal design to marinas.

An NPO that supports sailing activities by disabled people has drawn up the Guideline to Marine Facilities for Disabled People in preparation for the 32nd Tokyo Olympics and Paralympics, and the MLITT Ports and Harbours Bureau and the NILIM Coastal Zone Systems Division have provided technical advice to the NPO and assistance with this initiative. On June 12, 2017, the first proving test to confirm the safety of a marina for wheelchair users, which is a nationwide initiative, was conducted at Shonan Harbor in Kanagawa Prefecture, clarifying the relationship of the gradient and usability of a bridge connecting the top of the revetment with a pontoon. The results showed that depending on the tide level, the gradient of the connecting bridge makes it difficult to move a wheelchair up the bridge, and even at the 1/12 grade which is the standard for normal universal design, it is dangerous and difficult for a wheelchair user to use the bridge alone.It also revealed the need to install handrails or decks made of materials that resist slipping. The future position of this result in the guidelines and other matters will be studied.

Photo Wheelchair during the proving test of a connecting bridge

Details ☛ press release
http://www.ysk.nilim.go.jp/oshirase/press-release20170607-01.pdf