国総研ニューズレター
NILIM News Letter
No.45
Summer 2013

■ Durability evaluation of existing RC deck slabs

Road Department, Bridge and Structures Division

To prepare for the revision of the Periodic Inspection Manual for Highway Bridges, durability tests were conducted using RC deck slabs sampled from decommissioned bridges.

Periodic Inspection Manual for Highway Bridges (Draft) was released in March 2004 by the National Highway and Risk Management Division, Road Bureau, Ministry of Land, Infrastructure, Transport and Tourism. It is used for bridge inspections on National Highways routes managed by the Ministry.

The periodic inspection manual directs that the bottom surfaces of RC deck slabs are visually inspected.

Damage ratings are given as a function of the number (or interval) and width of cracks based on earlier laboratory tests.

However, our analysis of nationwide bridge inspection data indicates that some deck slabs collapsed even though their cracks did not expand very much.

Accordingly, an experimental study was conducted using deck plate specimens that were sampled from a decommissioned bridge.

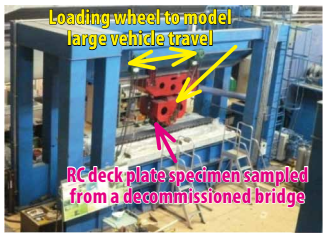
The deck plate specimens were the same age and categorized into the same damage rating in terms of crack intervals and widths, but although a penetrated crack was observed in one specimen, no penetrated cracks were found in the other specimen.

Wheel load test using a large-scale wheel loading machine was conducted as shown in the photo on the right.

The result confirmed that the rate of deterioration was very sensitive to the existence of penetrated cracks in deck slab concrete and the present damage rating criteria may underestimate the degree of damage to deck slabs.

Further investigation is also in progress to incorporate a better criterion in the next revision of Periodic Inspection Manual.

Example of the collapse of RC deck slabs



Wheel load test using a large-scale wheel loading machine

■ The Handbook for Historic Preservation

Road Department, Landscape and Ecology Division

The Handbook for Historic preservation, which presents a method of developing an attractive community by taking advantage of local historical assets, organizes concepts, important approaches, and advanced examples, etc.

In 2008, the Act on Maintenance and Improvement of Historic Landscapes in Communities (Historic Preservation Act) was enacted, introducing a system in which the MLITT and the Agency for Cultural Affairs jointly support municipalities using their local historical assets to perform community development.

Certification under the law can only be obtained by municipalities with a building designated by the national government, but Historic Preservation intended to improve the attractiveness of a region considers a variety of efforts for each district; not only policies and projects based on a certified plan. And some regional governments have, through their ongoing efforts to preserve and use cultural properties, earned designation of a local historical building as an important cultural asset of Japan, and even obtained a plan certification.

So this division has prepared the Handbook for Historic Preservation (Draft) in order to provide opportunities for action and information about concrete methods to many regions undertaking or planning historic preservation activities.

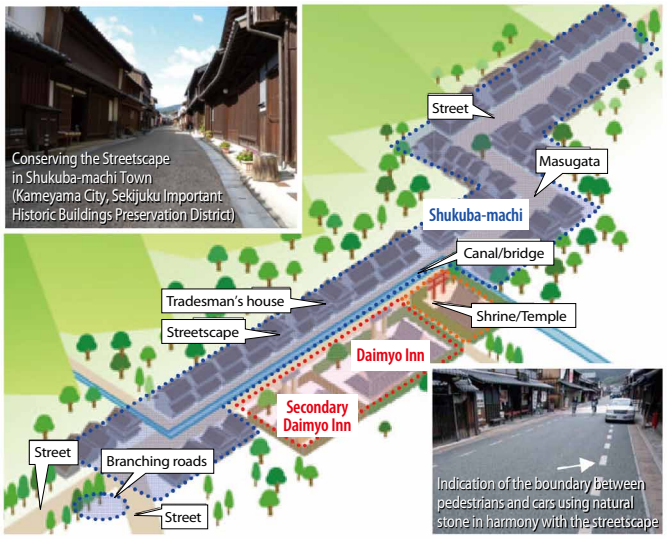


Figure: Example of the historical assets, structure, of a city originating in Shukuba-machi, and a specific method of historical preservation

Details ☛ Web site of the Landscape and Ecology Division
http://www.nilim.go.jp/lab/ddg/naiyo/rekimachi.html

Liquefaction Countermeasure by the Grid-form Underground Wall for Reclaimed Housing Areas

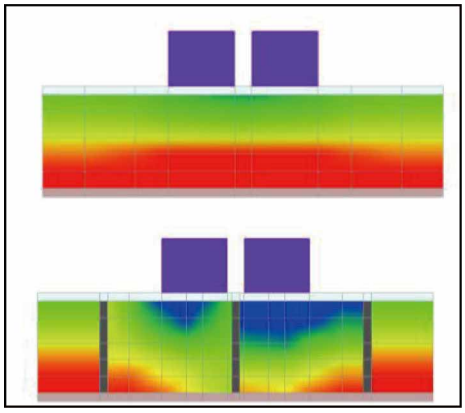
Urban Planning Department, Urban Planning Division

To provide applicable re-liquefaction countermeasures for housing areas damaged by the Great East Japan Earthquake, NILIM performed experiments to test the grid-form underground wall method.

Soil liquefaction countermeasures are usually taken on vacant land without buildings, but there has been no applicable method that can be implemented in residential districts already occupied by detached houses. However, since the Great East Japan Earthquake, urgent technical research to develop a practical method has been required. The research revealed two countermeasure methods: the ground water level reduction method and the grid-form underground wall method. Of these, the latter method is counted on to be used on reclaimed land around Tokyo Bay, where there is a lower clay layer at high risk of consolidation settlement. But it has never been applied to detached housing land so there is little technical information that local governments or residents can use as a reference to find out how to apply it and how effective it will be.

NILIM developed a software program for the simple evaluation of the effectiveness of the grid-form underground wall method, and placed it on its web site as a free download in January 2013, in order to allow local governments as well as residents to judge whether the countermeasure can be effective or not by inputting the proper test data for soil conditions at the site. Then, NILIM performed seismic experiments followed by the preparation of a ground model that can simulate ground conditions in reclaimed land along Tokyo Bay using a centrifugal device by varying conditions such as the intervals between the underground walls. The results have shown that if the grid size of an underground wall encloses a lot of about 50 tsubo (165 sq. meters), it can be counted on to mitigate damage caused by earthquake motion equal to that of the Great East Japan Earthquake, and that if this is combined with an embankment of about 1m or with ground water level reduction, it appears sure to mitigate liquefaction to a great degree.

The figure below shows the results of the seismic test with and without the countermeasure, with the red part indicating liquefaction. It is possible to view an animation of liquefaction on our web site.



Excess pore water pressure ratio contour figure obtained by the test

Details ☛ NILIM web site (Disaster Prevention for Housing Land page)
http://www.nilim.go.jp/lab/jbg/takuti/takuti.html

Research Partnership with Korean Research Institute for Human Settlements (KRIHS)

Urban Planning Department, Urban Planning Division

KRIHS (Korean Research Institute for Human Settlements) and NILIM held joint workshops on current urban policies based on the Research Cooperation Memorandum which was signed last year. In March 2013, the two institutes held a joint inspection of the new city of Sejong where the relocation of government ministries has begun.

The Korean Research Institute for Human Settlements (KRIHS) is a national research institute with 300 personnel established by the Government of Korea for the purpose of contributing to the improvement of the quality of life of the Korean people and to balanced development of the national land.

Recently, most of the problems which cities face in Korea, as an industrialized country, are shared with Japan. On the other hand, policies implemented to deal with the problems sometimes differ, and it is correct to say that Japan and Korea are two countries which can learn most from each other.

In November 2012, the NILIM and KRIHS signed the Research Cooperation Memorandum to promote research exchanges, especially those related to urban issues.

Korea is constructing a brand-new city named Sejong as a national government center about 160km south of Seoul. At the

Signing of the Research Cooperation Memorandum (November 2012)

end of last year, the Ministry of Land, Infrastructure and Transport and the Ministry of Strategy and Finance and other ministries had already moved their offices to the city and had begun operations.

In March of this year, researchers from NILIM and KRIHS took part in a joint inspection of the city. Japan also discussed a potential Capital relocation project during the 1990s, but it was not done. However, Korea has actually done it, which is of interest to Japan as a real trial of its own incomplete project.

■ Japan-Vietnam Joint Seminar on Development of Technical Standards for Port Facilities

Administrative Coordination Department, Planning and Coordination Division
Port and Harbor Department, Port Facilities Division

The National Institute for Land and Infrastructure Management held the Japan-Vietnam Joint Seminar on Development of Technical Standards for Port Facilities to promote joint projects to reestablish port and harbor standards for Vietnam jointly with the Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism and the Science and Technology Department of the Ministry of Transport of Vietnam.

The NILIM held the Japan – Vietnam Joint Seminar on the Enactment of Port and Harbour Standards for Vietnam with the backing of the Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism and the Science and Technology Department of the Ministry of Transport of Vietnam at the Yokohama International Center of the Japan International Cooperation Agency on July 22. The event was held under the joint sponsorship of the Port and Airport Research Institute, Japan Society of Civil Engineers, Service Center of Port Engineering (SCOPE), the Overseas Coastal Area Development Institute (OCDI), and the Japan Overseas Ports Cooperation Agency (JOPCA) and with the backing of the Japan International Cooperation Agency(JICA).

At this seminar, representatives of Japan and Vietnam gave 11 presentations including Outline and Characteristics of Port Standards in Japan by Kiyomiya Osamu (professor at Waseda University) to an audience of about 120 people, which was more than originally expected.

Each presentation was followed by many questions and by lively discussions which continued long than planned. Academic experts and representatives of domestic companies who attended gave valuable opinions concerning the project, ensuring that the event gained important results that will contribute to the project to establish national port and harbor standards for Vietnam.

View of the Seminar

Details

☛ http://www.ysk.nilim.go.jp/oshirase/press-releaseh250806_1.pdf

■ Conducting Showcase Demonstrations at the 20th ITS World Congress Tokyo 2013

Research Center for Advanced Information Technology, Intelligent Transport Systems Division

The EMV payment service using an automobile traffic smoothing service at sag sections on expressways in cooperation with ITS Spots and a mobile network will be showcased through demonstrations at the 20th ITS World Congress Tokyo 2013.

The Intelligent Transport Systems Division will present “GS ITS Spot Services (I2V)”, “GS Smartway with ACC/CACC (I2V, V2V)” and “GS Mobile and ITS Spot cooperative services (I2V)” as part of the ITS Green Safety Showcase (GS) scheduled for the 20th ITS World Congress Tokyo 2013, that will be held from October 14 to 18, 2013.

In “GS ITS Spot Services (I2V)”, the EMV payment service using automobiles (a service in which credit card payment is conducted using ITS Spot communication), developed through public-private joint research from FY2009 to FY2012, will be demonstrated. Participants will experience simulated payment of parking fees using credit cards in an actual parking lot.

In “GS Smartway with ACC/CACC (I2V, V2V)”, the traffic smoothing service at sag sections, where the road slope changes gradually to a rising slope, will be demonstrated. Participants will experience a service that optimizes the gap between vehicles in cooperation with ACC (Adaptive Cruise Control: technology that maintains constant speed and gap between vehicles) and ITS Spots, and experience smooth platooning with the cooperation of CACC (Cooperative Adaptive Cruise Control: technology which control gap between vehicles using vehicle-to-vehicle communication in addition to ACC) and ITS Spots.

View of a test of EMV payment using automobile

Image of “GS Smartway with ACC/CACC (I2V, V2V)”

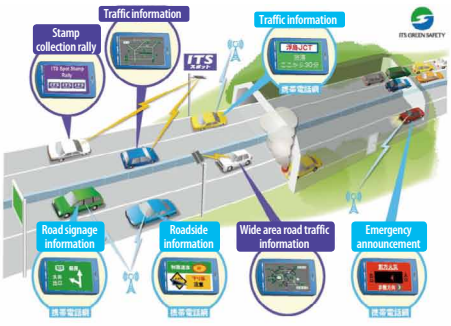


Image of “GS Mobile and ITS Spot cooperative services (I2V)”

In "GS Mobile and ITS Spot cooperative services (I2V)", the information provision service that links ITS Spots with smartphones will be demonstrated as a part of Cooperative ITS. Cooperative ITS is a service in which the collaboration and complement of infrastructure-to-vehicle communication and vehicle-to-vehicle communication to enable a variety of ITS service applications, which has been developed by public-private joint research conducted since FY2012. Participants will experience a service that displays information provided through ITS Spots and a mobile network on smartphones on metropolitan expressways.

Details

☛ 20th ITS World Congress Tokyo 2013 web site
http://www.itsworldcongress.jp/index.html

☛ NILIM mail service No.145
http://www.nilim.go.jp/lab/bcg/mailmag/pdf/ml145.pdf

● Schedule of Principal Events

Scheduled Dates	Event Name
October 14-18	20th ITS World Congress Tokyo 2013 http://www.itsworldcongress.jp/index.html
November 16	Open House (Public Works Day)
December 3	2013 Conference of the National Institute for Land and Infrastructure Management

● Publication (research achievements) < May-July 2013>

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

PROJECT RESEARCH REPORT of NILIM

No.	Title of Paper	Project Leaders
40	Research on Integrated Environmental Planning and Management Systems for Coastal Area	Director of Coastal and Marine Department

TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
715	Spatial distribution of sediments by chemical composition and particle-size distribution in Tokyo Bay	Marine Environment Division
716	Basic Analysis on Energy-saving Domestic Marine Unit Load Transportation	Port Systems Division
717	Damaged Breakwaters by Wave Action(Part-5)	Port Facilities Division
718	A Study on the Back-up Airport in the Early Stage of Tsunami Disaster	Research Coordinator for Advanced Airport Technology
719	Scenario Analysis of Domestic Aviation Markets in Japan Subject to Multiple Airports Region Based on the Supply-demand Equilibrium Model	Airport Planning Division

● We provide you with research information.

- 2013 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/annual2013/ar2013e.html

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