

### ■ A Public Experiment on Debris Flow: Approaching Mechanism of the Driftwood Disaster Occurrence

Sabo Department, Sabo Planning Division

A public experiment has been conducted to clarify the impact on the range of driftwood inundation by the particle size of sediment in a debris flow in the case of the inundation by driftwood accompanying a debris flow on June 9, 2014.

Disasters occurred in Izu-Oshima in October of last year and in Aso in 2012, including frequent severe sediment disasters. The Sabo Planning Division has conducted surveys and research on debris flow and driftwood flow and inundation phenomena and methods of countering these phenomena. Among these, experiments using channels, models, etc. are useful methods of clarifying debris flow mechanisms. In June, that is also sediment disaster prevention month, part of the experiments were carried out publicly for members of the press. The experiment was done by mixing sediment and driftwood in a debris flow to confirm the way the debris flow flowed and inundated the land (Photo 1).

The experiment was done in the presence of many members of the media during rainfall on the afternoon of June 9 (Photo 2). On the day of the public experiment, two different experiments using sediment with different particle sizes including driftwood were conducted. In the experiment

case including a large quantity of fine particle size sediment, the driftwood was carried further in the direction of the debris flow, but in the experiment case not including a lot of fine particle size sediment, the driftwood spread out laterally. This experiment has revealed that differences between sediment can impact the inundation of a debris flow containing driftwood. The Sabo Planning Division will analyze these results at the same time as it carries out surveys of actual conditions and a study based on numerical calculations etc. to improve debris flow and driftwood inundation prediction technologies.

Details ■ Sabo Planning Division web site  
<http://www.nilim.go.jp/lab/rbg/index.htm>



Photo 1: Experiment channel



Photo 2: View of the public experiment

### ■ Social experiment of road safety measures for school commuting routes

Road Traffic Department, Road Division

To implement traffic safety measures for school routes, from October to December 2013, a social experiment was conducted with the cooperation of Tsukuba City and Tsukuba Central Police, confirming the effectiveness of countermeasures.

In recent years, traffic accidents involving children walking to and from school have been reported one after another, increasing the public's desire that safety on school routes be ensured. The NILIM has, guided by its commitment to traffic safety with priority on people, researched measures to protect the safety of pedestrians and cyclists on school routes and on other community streets.

The social experiment was done in sections where it is difficult to install sidewalks because the road is too narrow, sections which are somewhat wide, but many vehicles travel through at high speed, and streets used by through traffic, by widening or coloring shoulders (where people walk), or by installing structures to slow traffic such as hump (raised road surface) or chicanes (narrowing and adding curves to force vehicles travelling through to swerve



Photo: View of the Public Experiment

to the left and right) or by adding road indicators or constrictions to keep traffic from entering the sections and their effectiveness was surveyed.

As a result, a questionnaire survey was conducted, and about 70% of children using the routes to commute to school responded, "I can now walk with confidence." At the same time as it was confirmed that traffic speed fell in humped sections, it also confirmed that in chicane sections, about half of morning

traffic slowed to meet and pass oncoming vehicles. And about 40% of the drivers traveling on the streets responded, "I drove more carefully than usual when I realized it was a school route."

Based on these results, Tsukuba City has implemented actual countermeasures. And the results obtained will be used for

research to spread traffic safety measures for school routes and community streets.

Details Road Division web site

<http://www.nilim.go.jp/lab/gdg/links/syakaijikken.htm>

## ■ Opening the Experiment Video Library on the NILIM Website

Planning and Research Administration Department, Research Administration and Evaluation Division

The NILIM has collected videos of various experiments that it has conducted, and opened the Experiment Video Library on its website.

The NILIM website now includes the Experiment Video Library that combines videos of experiments and explanations of research in order to contribute to wider understanding of the activities and research achievements of the NILIM. The Library presents many impressive videos of experiments and easily understood explanatory videos including a movie of a full-scale fire test using a wooden three-story school building and a video explaining congestion countermeasures by linking roadside information with vehicle control technologies.

We will continue to regularly add contents including videos of experiments conducted by the NILIM. Please have a look at this page.

### 実験映像ライブラリー

国総研で実施した各種実験の映像や説明ビデオを掲載しています。随時、追加・更新して参ります。(担当研究室のページにリンクします)  
※各動画で閲覧に必要なプレーヤーやブラウザ環境が異なりますのでご注意ください。

#### ▶ 道路交通分野

路側情報と車両制御技術との連携による  
渋滞対策の説明ビデオ(2012年)  
(高度道路交通システム研究室のページ)

高速道路サグ部における  
路車協調システムを活用した  
交通円滑化対策

ITS

高速道路サグ部において、路側機から車に  
対して車間距離の適正化等の情報提供を行  
うことにより、効果的な交通円滑化を行う研  
究について説明したビデオです。

#### ▶ 建築分野

木造3階建て学校の実大火災実験(本実  
験)の映像(2013年)  
(実大火災実験のページ)



岐阜県下呂市において実施した木造3階建  
学校の実大火災実験(本実験)の屋内と屋外  
の様子を撮影した映像です。

Image: Example of contents of the Experiment Video Library

Details Opening the Experiment Video Library website

<http://www.nilim.go.jp/lab/bcg/videoibraly.html>

## ■ Research on methods of improving sustainability of infrastructure management incorporating the perspective of risk assessment

Maintenance Research Committee

The NILIM established the Maintenance Research Committee in April 2014. It started conducting the above research that will continue for two years starting in 2014 in order to propose an evaluation method and an evaluation axis (framework) for infrastructure management bodies to perform self-inspections to improve the way they conduct management.

Aware that the deterioration of public infrastructure is now a serious problem, many administrators are enacting plans for life span extension of various types of infrastructure. And they are carrying out concrete studies of management execution methods including the building of an inspection, countermeasure and database. In the future, it must find management techniques to determine how to incorporate execution methods in maintenance work to sustainably conduct the PDCA cycle, and how to prevent fatal risk to management facilities.

Deciding which basic policies for sustainability of infrastructure management or risk assessment, for example, preventive maintenance, restrictions on use, early reconstruction, or corrective maintenance will be prioritized is likely to vary according to the properties of the object of management, the organization of the management body, and completeness or degree of uncertainty of the technologies applied to inspections and countermeasures.

This research will first set a common evaluation axis that should be applied to actual management work based on an understanding of essential differences between fields while comparing the

circumstances in each infrastructure field.

The completeness of the evaluation axis that is insufficient or requires improvement will be enhanced with reference to private sector infrastructure fields and overseas efforts etc. Finally, through verification using case studies, a framework that allows evaluation of management methods and provision of knowledge concerning improvement measures will be proposed.

### Organization of present condition and problems facing management in various public infrastructure fields

(From the perspectives of sustainability and risk assessment)

- Concerning physical damage, human loss and social impact of deterioration of objects of management
- Concerning inspections, soundness evaluations, predicting progress of deterioration, countermeasures, and employment of database



### Trial preparation of an evaluation axis for management common to all public infrastructure fields

- Reflecting differences between characteristics of each infrastructure, ability of organization, and reliability of applied technologies
- Reflecting private sector infrastructure fields or efforts thought to be effective overseas to improve the completeness of the evaluation axis
- Comparison with ISO55000 etc.



### Proposing the management evaluation axis and evaluation method (framework)

(From the perspectives of sustainability and risk assessment)

- Verification of the evaluation axis that was trial prepared, by conducting a case study

## ■ Holding the 3rd Joint Workshop (NILIM - KRIHS)

Urban Planning Department

The NILIM held a research exchange conference on urban affairs with the Korean Research Institute of Human Settlement (KRIHS) on May 24, 2014 to exchange opinions on policy challenges common to Japan and Korea.

The NILIM signed an MOC (Memorandum of Cooperation) with the Korean Research Institute of Human Settlement (KRIHS) in November 2012, and since that time, they have continued research exchanges through visits to each other's research institutes. This year, the 3rd Joint Workshop was held at the NILIM and a field tour of regional cities was conducted. The results confirmed that urban regeneration and the restoration of regional cities are major themes shared by the two institutes.

### (1) Holding the 3rd Joint Workshop

After giving presentations at three sessions ([1] Directions of urban regeneration, [2] Improving living and residential environments, and [3] urban transportation infrastructures), opinions were exchanged with the participation of Professor Tatsuo Akashi of Tokyo City

University (outside commentator). The KRIHS proposed that joint research be conducted concerning specified cities.

### (2) Tour of regional cities

Accompanied by NILIM staff members, they toured Toyama City and Fukui City, which are representative of regional cities conducting urban regeneration. In addition to the regional tour and explanations by city officials, the Korean researchers' understanding of conditions in Japan was further deepened by, providing them with an opportunity to exchange opinions with railway companies and with NPO that are promoting urban policies in cooperation with administrative bodies.



The Joint Workshop



Regional Tour (Toyama LRT)

## ■ Field Survey of Damage to Coastal Facilities in Philippines Caused by Storm Surges of Typhoon 1330 (Haiyan)

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

When Typhoon 1330 crossed the islands of the southern Philippines, it triggered storm surge disasters that inflicted severe damage on Leyte Island and other islands in its path. Our survey team conducted a field survey of the damage along these coastlines.

The estimated maximum storm surge distribution caused by Typhoon 1330 (Haiyan), that struck the Philippines in November 2013, revealed that storm surges were triggered on the north side of the path of the typhoon, including Leyte Island, where the most severe damage was reported. In particular, around Estancia Port on the east coast of Panay Island, high storm surge deviations between 2 and 4 meters were observed. Therefore, we conducted a joint field survey on the state of the storm surges and their damage to facilities on the coast of several points in the path of the typhoon with the Port and Airport Research Institute (PARI) in January 2014.

In Estancia Port, we measured traces of storm surge deviations with height from 4 to 5 meters. The storm surges and strong winds caused devastating damage to piers and buildings behind the coastline. The wooden houses along the shoreline were almost all damaged by the storm surges, because seawalls and other protection facilities were not constructed.

In Lipata Port, we measured traces showing a storm surge deviation of nearly 3 meters. Wharves were collapsed by scouring, and passenger terminals were damaged. Many fishing boats moored along the neighboring beach and the small community behind them were damaged by inundation of storm surges, by shore erosion due to the storm surges, and by strong winds.

In Tacloban City, many protection facilities along the coastline were destroyed. Because it was a famous tourist site, RC construction hotels had been built along the coast, but lower floors of each hotel were damaged by flow overtopping the protection facilities.

Before we left the Philippines, we held a meeting to report the results of the field survey to the Department of Transportation and Communication (DOTC) of the Philippines.

In Tacloban City, the construction of houses within 40 meters from the coastline was prohibited, so the residents would move to high ground. But it seems that the moving of the houses has not progressed since the debris was removed. Now that this year's typhoon season has started, secondary disasters are feared in the disaster region. The people are eager for the region to be restored quickly.

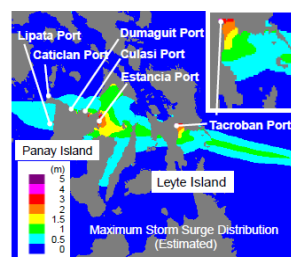


Figure: Maximum Storm Surge Distribution of Typhoon 1330 (provided by PARI)



Photo: Damages in Estancia Port

Details  Coastal Disaster Prevention Division website  
<http://www.ysh.nilim.go.jp/kakubu/engan/engan/engan1.htm>

## ● Schedule of Principal Events

Scheduled Dates	Event Name
November 15	Open House (Public Works Day), Bridge Contest Awards Ceremony
December 3	2014 Conference of the National Institute for Land and Infrastructure Management

## ● Publication (research achievements) < May, 2014 -July, 2014 >

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

### TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
779	Technical notes on design and construction of stucco finished walls for timber framed residential buildings	Structural Standards Division
781	Field Survey of the 2011 off the Pacific coast of Tohoku Earthquake and Tsunami on Shore Protection Facilities in Ports (II)	Coastal Disaster Prevention Division
782	Study on Refuge Area Estimation Method under Tsunami Attack in Tokyo Bay	Port Planning Division
783	A Study on Method of Probabilistic Risk Analysis of Airport	Research Coordinator for Advanced Airport Technology
784	Stated-Choice Analysis to Estimate the Impact of Future LCC Entry into Domestic Aviation Services in Japan	Airport Planning Division
785	An Analysis of International Passenger Transit Traffic	Airport Planning Division
786	The Method of Estimating Gross Origin and Destination International Air-Passenger Flows	Airport Planning Division
787	Technical Report of Road Safety Measure Planning	Advanced Road Design and Safety Division
790	Manual for the calculation of the travel time reliability index value	Traffic Engineering Division
791	Method of emergency search for the location of landslide dams and collapses using high-resolution dual-polarization SAR image interpretation	Sabo Risk-Management Division
794	Report of the Evaluation Sub Committee of NILIM in FY 2013 Evaluation Committee of NILIM	Research Administration and Evaluation Division

## ● We provide you with research information.

### • 2014 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/annual2014/ar2014e.html>