

● Publication (research achievements) < March, 2016-May, 2016 >

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TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
868	Reconnaissance Report on Damaged Road Bridges in Hokkaido Prefecture	Structural Standards Division
874	Key points for simulation methods for sediment dynamics due to sediment yield during heavy rainfall	Sabo Planning Division
875	Report on Investigations into Disasters in Izu Oshima Island Caused by Typhoon Wipha in 2013	Sabo Planning Division
876	B-DASH Project No.7 Guideline for introducing a sewage pipe management system based on screening survey	Wastewater System Division
877	Development of efficient inspection camera and simple criteria for abnormality classification of sewer pipe ~Joint research of a new efficient technique for the inspection of sewer pipe lines~	Wastewater System Division
878	Study on developing criteria for abnormality and urgency classification of polyvinyl chloride pipes	Wastewater System Division
879	A Study of "Ocean-and-ship-Viewing Slopes", a regional revitalizing resource of port towns	Administrative Coordination Department
880	A Basic Study of the Level 1 Reliability Design Method Based on Load and Resistance Factor Approach ~Performance verifications of sliding failure and overturning failure for caisson type quay walls in permanent situation~	Port Facilities Division
881	Landscape and Ecology Division, Annual Research Report (30th)	Landscape and Ecology Division
883	Technical note on basin-wide water cycle analysis ~ For combined analysis of surface water and groundwater ~	Water Cycle Division
885	Street tree restoration manual	Landscape and Ecology Division
904	Manual of Technical Standard for establishing Sabo master plan for debris flow and driftwood	Sabo Planning Division
905	Manual of Technical Standard for designing Sabo facilities against debris flow and driftwood	Sabo Planning Division
907	The Technical Report of Surveying Techniques of Raptors Using New Technology	Landscape and Ecology Division
908	Two-stage comprehensive and specific contracting methods in the United Kingdom and the United States - Framework Agreement and Indefinite Delivery/Indefinite Quantity Contract -	Construction Management Division

● We provide you with research information.

- 2016 Annual Report of NILIM **NEW**

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/annual2016/ar2016e.html>



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■ Planning Manual for Creating a Plaza- A method for evaluating plaza spaces by planners of future urban improvements -

Urban Planning Department, Urban Facilities Division

We have created a draft plaza planning manual for use by people planning to create a plaza as an attractive urban space, to help improve our cities!

The role of plazas in creating bustling urban centers and highly sustainable and productive cities has been reconsidered. Specifically, there is a growing need for the following three aspects related to plazas:

- Creation of bustling neighborhoods and formation of local communities
- Creation of opportunities to involve diverse participants and devise sustainability mechanisms in urban spaces
- Flexible methods of effectively utilizing existing stock

Therefore, it has become necessary to suggest ways of creating higher quality plaza spaces. The NILIM has compiled a manual presenting easy-to-understand concepts of plaza planning including sample cases and data analysis.

Structure of the manual:

- [1] Creating plaza planning strategies (systematic classification of plazas according to location conditions and characteristics of the space)

- [2] Maximizing the potential of a plaza (key points of spatial layout based on data analysis)
- [3] Ascertaining the effects of creating a plaza (basic concept of evaluating plazas)
- [4] Actually building the plaza (key points of planning, maintenance and operation)

This manual offers the following benefits for various participants in the creation of a plaza.

Building a plaza in a good location and enhancing the quality of the plaza space will not only increase its attractiveness and users' satisfaction, but also create a lively atmosphere and have ripple effects on the surrounding streets by, for example, becoming a starting point for urban excursions. A plaza can also be operated autonomously, sustainably and productively to form communities.

We are continuing our studies and hope that many people will refer to this manual to create many higher quality plazas.

Details [NILIM Website \(Urban Facilities Division\): http://www.nilim.go.jp/lab/jcg/index.htm](http://www.nilim.go.jp/lab/jcg/index.htm)

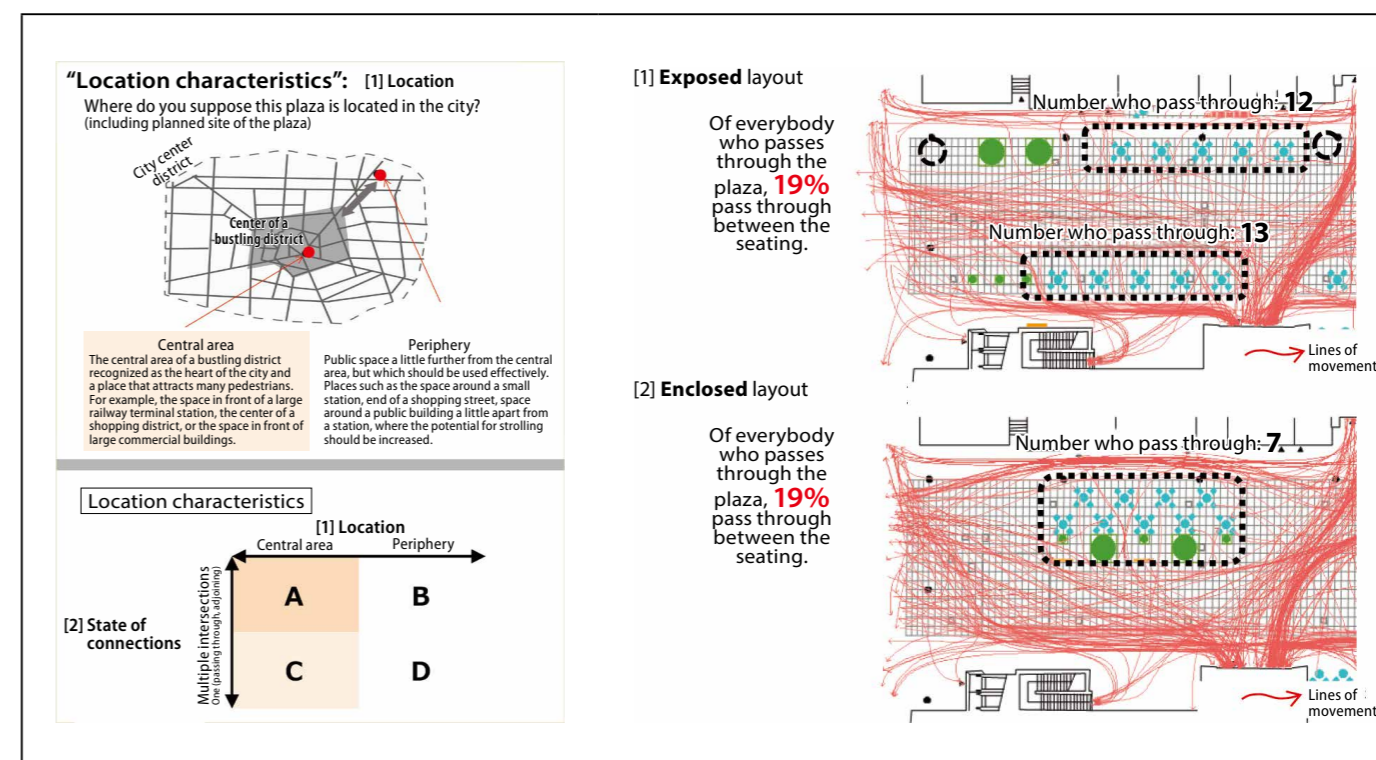


Figure: Images of the manual

Verification test of recycling of treated wastewater to supply water suitable for low-cost cultivation of vegetables

Water Quality Control Department, Wastewater and Sludge Management Division

The NILIM is developing technologies to obtain recycled water suitable for the cultivation of vegetables. A test to verify a treated wastewater recycling technology that combines membrane filtration to efficiently remove fine particles with ultraviolet radiation disinfection to effectively kill viruses has been in progress since February 2016. The aim is to establish a treated wastewater recycling technology that is cheaper and emits less CO₂ than existing technologies.

Recycling treated wastewater through a supplementary process is one way of increasing water resources in water-poor regions. Performing treatment to recycle water is costly and consumes energy, and there is a risk that the water will contain pathogenic

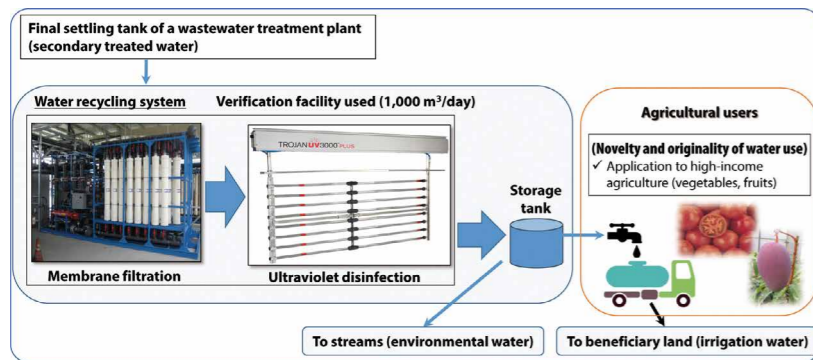


Figure: Schematic diagram of the verification test

microorganisms such as intestinal tract viruses; accordingly, sophisticated technology that guarantees the safety of water used to cultivate vegetables is essential.

The Ministry of Land, Infrastructure, Transport and Tourism is carrying out the Breakthrough by Dynamic Approach in Sewage High Technology Project (B-DASH Project) in order to promote R&D and the commercialization of new sewage system related technologies. It has commissioned the NILIM to conduct research on "Treated Wastewater Recycling Technology," which is a technology selected for FY2015.

This test will verify the effectiveness of treated water recycling technology that combines membrane filtration with ultraviolet radiation disinfection. The items verified are: [1] advanced virus removal rate, [2] comparison of costs and carbon dioxide emissions of technologies which satisfy [1] (technology that combines adding chemicals, sand filtration with disinfection), [3] safety of water quality, and [4] technology to detect membrane breakage and decline of ultraviolet radiation intensity. The research will be continued this year, with the aim of the technology contributing to the establishment of a recycling society by using the nutrients, nitrogen and phosphorus of the recycled water for agricultural purposes.

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

Remote monitoring of marine debris on the west coast of North America

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

Marine debris including Tsunami debris on the west coast of North America is being remotely monitored using webcams.

It is estimated that a total of 1.5 million tons of the Tsunami debris by the Great Tohoku Earthquake has been floating in the North Pacific (Ministry of Environment website). To investigate the impact on the ecosystems of the North American coast by coastal Japanese species that have adhered to the Tsunami debris, the Ministry of the Environment and the North Pacific Marine Science Organization (PICES) have been conducting an international cooperative project, Assessing the Debris Related Impact From Tsunami (ADRIFT) for three years since 2014.

The division has been using webcams to remotely monitor marine debris including Tsunami debris washed ashore on the west coast of North America (coast of the State of Oregon) for about 1 year as part of ADRIFT in cooperation with Kyushu University, Ehime University, and Kagoshima University. The webcams, which were installed in April 2015, have taken photographs of the shoreline at one-hour intervals from 9:00 to 18:00 (local time: PST) for about 1 year. The images obtained have been sent by internet to a server at the Division.

Analysis of images obtained during the one year since the start of remote monitoring has not confirmed any Tsunami debris. However, the results of image processing to measure the quantity of marine

debris have clarified that the quantity fluctuates with time, which is a characteristic of the west coast of North America.

The project has provided useful data for forecasts and simulation of marine debris transportation. It will also provide indices for evaluating coastal environment contamination by marine debris.



Photo: Webcam installed on the west coast of North America

Details  ADRIFT website: <https://www.pices.int/projects/ADRIFT/main.aspx>

PR activities to mitigate congestion – linked with NEXCO and JAF –

Road Traffic Department, Intelligent Transport Systems (ITS) Division

The ITS Division has been conducting public relations activities to mitigate congestion during Golden Week holidays with NEXCO East, Central, West and JAF.

The ITS Division has been conducting public relations activities to mitigate congestion during Golden Week holidays with NEXCO East, NEXCO Central, NEXCO West and JAF (Japan Automobile Federation). "Expressway Cruising Manners Improvement Strategy!" (Reference map) has been published on the Division's website*1. Its aim is to mitigate congestion during the Golden Week holidays by encouraging many drivers to observe the manners described.

Specifically, it recommends that at congestion-prone locations (mainly locations where drivers often slow down, such as gentle slopes called sags; see the photo), drivers use the cruising lane (keep-left lanes) because congestion is triggered from the passing lane. In addition, because different following distances are another cause of congestion, it calls on drivers to avoid following other cars too closely or too distantly, and to refrain from changing lane frequently. With the recent spread of automobile technology such as Adaptive Cruise Control (ACC), drivers are urged to "comfortably use the cruising lane" and "when in congestion, follow cars quickly by setting a short following distance (S mode)."

It has been calculated that, by following these recommendations, if even one car out of 10 moves back to the cruising lane, time lost to congestion will decline by about 18%. Your actions can help mitigate congestion. Please try it!

"Expressway Cruising Manners Improvement Strategy!"

1. Cruising manners* at congestion-prone locations

- Drive in the cruising lane (Keep left)
- When congestion is heavy, do not change lanes frequently.
- Do not following other cars too closely or too distantly.

2. How to use ACC

- Drive in the cruising lane.
- When in traffic congestion, follow smoothly at the Smode (short heading distance) setting.


Reasons

- Sag congestion **starts in the passing lane**
- **With ACC**, driving keeping to the left **is pleasant and comfortable**
- Using the passing lane, **driving at high speed does not get you there faster.**



*Example of a congestion location
→The above sign warns of a sag section.

*1 Details  NILIM, ITS Division website: <http://www.nilim.go.jp/lab/qcg/index.htm>

*2 Details  JAF dedicated ACC website: <http://jaf-acc.jp/>

Reorganization of 2016 (Strengthening the I-Construction related survey research system)

Planning and Research Administration Department, Planning Division

The NILIM has established the Construction Management Division to strengthen the survey and research system related to I-Construction, which the Ministry of Land, Infrastructure, Transport and Tourism is promoting. The Research Center for Land and Construction Management has been reorganized as the Research Center for Land and Construction Management.

It is predicted that the future decline of the working-age population in Japan will exacerbate the shortage of workers on construction sites, so there is an urgent need to improve the productivity of construction sites.

Information technologies and robotics are speeding up the technical revolution in mechanized construction work. For example, computerized construction and unmanned construction are counted on to dramatically improve productivity on construction sites.

Therefore, the NILIM has established the Construction Management Division in the Disaster Prevention and Maintenance Infrastructure Research Center to speed up the use of the latest construction machinery and related technologies to build social capital, and to strengthen the system for performing required surveys and research.

Along with the new division, the names of other divisions attached to the Disaster Prevention and Maintenance Infrastructure Research Center have been changed and the center was reorganized as the Research Center for Land and Construction Management. This will create a survey and research system intended to strengthen management at every stage from new construction and improvement of public capital to its maintenance, renewal and use, thus contributing to the progress of I-Construction (Construction Productivity Revolution), which the Ministry of Land, Infrastructure, Transport and Tourism is promoting.

The NILIM has also established the Road Earthquake Disaster Division to strengthen systems which conduct survey and research necessary to study how to ensure the functions of road networks after a large earthquake and to give technical support to regional public bodies.

The NILIM will continue to widely introduce the results of its infrastructure research in order to contribute to society through its 11 research departments, one research center, and three administrative departments.

Details  NILIM website: <http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20160401.pdf>