

### ■ Result of Full-scale Fire Experiment of a Three-story Wooden School Building

Building Department, Fire Standards Division

Last year's preliminary experiment has been followed by a full-scale fire experiment (preparatory experiment) of a three story wooden school building in order to revise the Building Standard Law.

A full-scale fire experiment (preparatory experiment) was performed on November 25, 2012 in Gero City in Gifu Prefecture. It was done in order to check the effectiveness of countermeasures taken to prevent a fire from spreading to the upper stories in its early stage and from spreading through fire compartments of stairwells and through fire doors in fire walls, which were problems shown by the preliminary experiment of February 22, 2012 (reported in News Letters [No. 39](#) and [No. 41](#)), and to collect data to evaluate fire spreading routes, state of collapse, and the impact on the building's surroundings.

This preparatory experiment confirmed that as a result of progress in non-combustibility of interior finishing of buildings and the construction of balconies or eaves above openings in exterior walls, the expansion of the fire in the first story room where the fire started (50 minutes after ignition, re-ignition of other combustible materials in the room where ignition occurred) was restricted, but about 129 minutes after ignition, the fire spread through the floor of the second story. Until the fire was extinguished 142 minutes after ignition, the fire had not spread through the fire doors, confirming the effectiveness of countermeasures. For an outline of the experiment building and results such as temperatures etc. of typical rooms, see the NILIM web site.

Based on the results of the preliminary experiment and this preparatory experiment specifications and experiment methods will be adjusted to prepare for a scheduled second full-scale fire experiment based on building specifications which will hypothetically be standardized in 2013.

- Web site: Research on Fire Safety of Three-story Wooden School Buildings  
<http://www.nilim.go.jp/lab/bbg/kasai/h23/top.htm>



View of the building 137 minutes after ignition, when the fire had spread to the 1st and 2nd stores

### ■ Japan's first hydrogen supply open experiment using a common duct

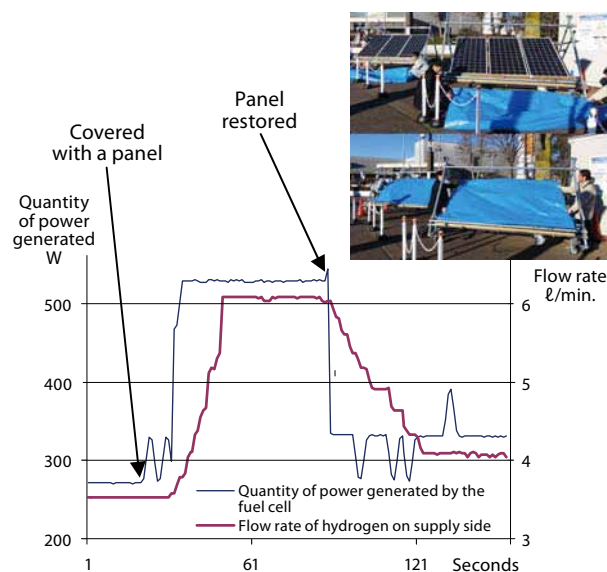
Building Department, Environment and Equipment Standards Division

A hydrogen supply experiment using a common duct was conducted publicly in Tsukuba City, and a hydrogen society will be realized in the near future. Phenomena such as power failures which can occur were verified.

The Building Department of the National Institute for Land and Infrastructure Management, in cooperation with Tsukuba City, conducted an open experiment: operating a fuel cell by supplying it with hydrogen through a pipe laid in a common duct owned by Tsukuba City.

Fuel cells using City Gas have been introduced under the brand name Ene-Farm, but the fuel cell used for this experiment is called PEFC (Polymer Electrolyte Fuel Cell), and directly generates power using hydrogen gas.

Reusable energies such as solar electric power and wind electric power cannot be declared to be stable energy sources, because they quantities of power they generate fluctuate according to the weather, but this PEFC used for this experiment can follow the quantity generated and electric power demand by a building extremely well, so it can generate only the required quantity according to the power



Electric power generated and hydrogen consumed by a fuel cell following photovoltaic cell power generation

generated by photovoltaic cells, which are governed by changing weather conditions.

In order to introduce this PEFC to buildings, hydrogen must be supplied through pipelines, but in order to transport hydrogen through pipelines in urban regions, it is impossible to avoid laying pipes in common ducts.

This experiment was carried out as part of research to obtain basic data to be used to verify the basic technologies needed to

ensure safety in common ducts and to calculate the cost, and thereby realize an energy system combining reusable energies and PEFC in the near future.

- Web site of the Environment and Equipment Standards Division <http://www.nilim.go.jp/lab/heg/index.htm>

## ■ A New Guideline for the Creation of Safe and Comfortable Bicycle Use Environments

**Road Department, Traffic Engineering Division  
Advanced Road Design and Safety Division**

In November 2012, the Road Bureau of the Ministry of Land, Infrastructure, Transport and Tourism and the Traffic Bureau of the National Police Agency issued the Guideline to the Creation of Safe and Comfortable Bicycle Use Environments (below called the "Guideline") to road managers (government managed roads, regional governments) and to prefectural police bureaus.

The Guideline was prepared jointly by the Ministry of Land, Infrastructure, Transport and Tourism and the National Police Agency based on the results of surveys and research by the National Institute for Land and Infrastructure Management to present concepts to guide the creation of bicycle use environment undertaken throughout Japan in the future.

The basic concept of the Guideline is that under the Road Traffic Law, "a bicycle is a vehicle, which in principle, travels on roads." Thus the Guideline shows items to be studied concerning the provision of road space permitting bicycles to travel safely and comfortably on roads.

The Guideline consists of Planning, Design, Obeying Rules, and Overall Initiatives. Planning describes procedures and study methods to be applied by regional authorities to enact bicycle network plans. And it also shows the concepts and yardsticks to be applied to select a form of improvement according to traffic conditions of network routes chosen by the plan.

And Design presents concepts of design of bicycle traveling space on roads including intersections. Obeying Rules widely disseminates knowledge of the rules, provides incentives to comply with the rules, and presents guidance and enforcement. And Overall Initiatives presents parked car and parked bicycle countermeasure efforts and examples of countermeasure to promote the use of bicycles.

We are counting on road managers referring to the Guideline to create and improve bicycle use environments throughout Japan. And the Guideline will be sequentially revised in response to technical knowledge obtained in the future and to revisions of legal standards etc., and the National Institute for Land and Infrastructure Management will also conduct technical studies based on its application in regions throughout Japan.

From January 2013, briefing sessions were held in succession in 10 blocks to explain the Guideline to road managers and to prefectural police bureaus.

To refer to the Guideline, access the following URL.

- Web site of the Road Bureau of the Ministry of Land, Infrastructure, Transport and Tourism [http://www.mlit.go.jp/report/press/road01\\_hh\\_000300.html](http://www.mlit.go.jp/report/press/road01_hh_000300.html) (Japanese only)

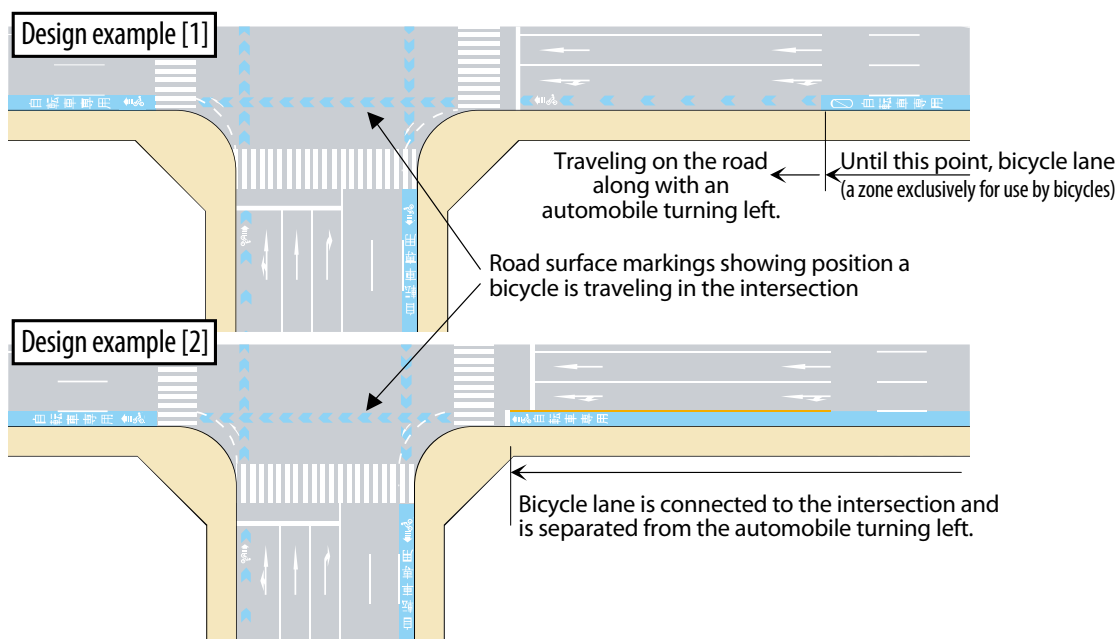


Figure. Examples of Design of Bicycle Traveling Space at a Four-leg Intersection

## ■ Development of Life Cycle Environmental Assessment Methodology for Infrastructures - Prospect of Infrastructures LCA -

Environment Department, Road Environment Division

In order to achieve a low carbon construction industry by using infrastructure life cycle assessments (LCA), a system to widely disseminate awareness of LCA and to use the results of LCA is necessary.

In order to achieve a low carbon construction industry in Japan by using infrastructure LCA, it is necessary to introduce systems to widely disseminate awareness of LCA and to provide motivation for the reflection of the LCA evaluation results in design and construction.

The National Institute for Land and Infrastructure Management has conducted the NILIM Project, “Research on the Practical Application of Infrastructure LCA (2011-2012)”, and in order to improve the usability of LCA, it conducts research on the dissemination of awareness of LCA and the introduction of LCA. One of the products of its research on dissemination of awareness was the preparation of “the Handbook on the Calculation of Carbon Dioxide Emissions through the Life Cycle of Infrastructure”, which was intended to make it possible to easily perform LCA calculations. In addition, on January 29, 2013, a symposium, Infrastructure LCA Technology to Realize a Sustainable Green Society, was held (see Photo). Many people attended, and scholars, people representing industrial groups and administrative officers gave speeches about initiatives using LCA to reduce carbon emissions.



Greeting by  
Director General  
Kazusa



View of the Symposium

As research on the introduction of LCA systems, the Committee to Study the Integration of Sustainability Indices formed by the Japan Society of Civil Engineers studied present challenges hampering the introduction of the LCA system in the future and methods of responding to the challenges.

The use of Green Purchasing Goods designations and the addition of new NETIS application items etc. are considered as ways to introduce infrastructure LCA while using the existing framework. The NILIM will continue research in order to realize a low carbon construction industry by applying infrastructure LCA.

- Infrastructure Life Cycle Assessment web site  
<http://www.nilim.go.jp/lab/dcg/lca/top.htm>

## ■ The 13th Tokyo Bay Symposium

Coastal, Marine and Disaster Prevention Department, Marine Environment Division

On November 22, 2012, the 13th Tokyo Bay Symposium was held in the KFC Hall, Ryogoku, Tokyo.

At this symposium, attended by approximately 200 participants, topics on the theme, “Succession to our Wish for the Restoration of Tokyo Bay”, were presented and discussed by the panel. A broad range of topics were presented from a variety of perspectives: policy promotion, environmental conservation, fisheries, monitoring, people, and living things.

The panel discussion was a debate on the best way to restore Tokyo Bay. All present unanimously approved of the following summation of the symposium. “To restore Tokyo Bay, we must joyfully aim to integrate ancient wisdom backed up by scientific knowledge, and looking forward to more broadly reflecting achievements, gain an understanding of differences between multiple answers and values of end users in order that easily understand symbols and approaches are visible from the perspectives of others, and having done so, led by members of regional governments, continually, step-by-step, and comprehensively obtain results not only by creating the new but without forgetting conservation. And a dynamic place where this can be experienced to make this visible is necessary.

The report on the symposium is publicly available at the following site.

- Web site of the 13th Tokyo Bay Symposium  
<http://www.meic.go.jp/tokyo2012/>



Photographs Taken at the 13th Tokyo Bay Symposium

● **Schedule of Principal Events**

Scheduled Dates	Event Name
February 25	7th National Conference on the Restoration of the Sea
March 07	River Structure Management Research Seminar <a href="http://www.nilim.go.jp/lab/bbg/kouenkai/index.html">http://www.nilim.go.jp/lab/bbg/kouenkai/index.html</a>
March 12	Workshop on Flood Control Policies Adapted to Climate Change <a href="http://www.nilim.go.jp/lab/bbg/kouenkai/index.html">http://www.nilim.go.jp/lab/bbg/kouenkai/index.html</a>
March 19	Report on the Great East Japan Earthquake <a href="http://www.nilim.go.jp/lab/bbg/saigai/h23tohoku/index.html">http://www.nilim.go.jp/lab/bbg/saigai/h23tohoku/index.html</a>

● **Publications (Research Achievements) (November 2012 to January 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
39	Research on the Conservation of Northwest Pacific Marine Environments	Director of Water Quality Control Department(FY2008-2009) Research Coordinator for Water Quality Control(FY2010)

TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
674	Report on Field Surveys and Subsequent Investigations of Building Damage Following the 2011 off the Pacific coast of Tohoku Earthquake	Building Department, Housing Department, Urban Planning Department, Research Center for Land and Construction Management
693	Annual Report of Basic Data on Road Structures In FY 2011	Bridge and Structures Division
694	An Analysis on the Impact of Low Cost Carriers(LCC) Entry into the Domestic Aviation Services in Japan: A Simulation Based on Bertrand Nash Equilibrium	Airport Planning Division
695	Case Studies of Crisis Management in the World and Lessons learnt to the Japanese ports	Disaster and Emergency Management Division
696	A calculation of the parameters for planning of the width of fairway for very large vessels	Port Planning Division
697	Analysis of the Withdrawal/Existence of Domestic Air Routes in Japan	Airport Planning Division
698	Research of Potential Establishment on the New Air Route by LCC or Downsizing of Aircraft	International Maritime Policy Analyst
699	Report of the Lecture Meeting of NILIM(2012)	Planning Division

● **We provide you with research information.**

- 2012 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/annual2012/ar2012e.html>



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