International Workshop on Water Hazard and Risk Management: Introduction to PWRI and Workshop Schedule

January 20-22, 2004
Public Works Research Institute
Workshop

Organized by Public Works Research Institute

Sponsored by Ministry of Education, Culture, Sports, Science and Technology (MEXT) and PWRI

Cooperation: National Institute for Land and Infrastructure Management (NILIM)
Water hazard as a major challenge

- Intensifying and increasing occurrence of water related hazard in many part of the world

- Serious concern on climate change such as extreme hydrologic events and sea level rising
There is pressing need to develop advanced risk management on water hazard in order to secure human life and ensure sustainable socio-economic development and poverty alleviation.
Background and History

2000

- 2nd World Water Forum (The Hague)
  → “Managing Risk” as a challenge.

2002

- WSSD (Johannesburg)
  → Recognized the necessity to develop programmes for mitigating the effects of extreme water-related events

2003

- 3rd World Water Forum (Kyoto, Shiga & Osaka)
  → Need to establish IHP Centre on water hazard
- 32nd UNESCO General Conference
  → Willingness to establish the Center inside PWRI, Japan
International Centre for Water Hazard and Risk Management
(tentative name)

To be established inside the Public Works Research Institute (PWRI) in Tsukuba City, Japan

Support from the Government of Japan (MLIT, MOFA, MEXT...)

Partnership with IHP National Committee, NILIM, and other relevant organizations
The Pillar Activities

- Research
- Information
- Networking
- Participation
- Knowledge
- Data
- Outcomes
- Curriculum
- Network
- Training
Social background related to flood damage in Japan

Many years of flood control efforts have reduced total inundated area.

However, the flood damage has hardly decreased.

The reason is that the population and property continued to grow and be located in flood hazard areas.
Damage to underground facilities by the flood in Fukuoka City (June 1999)
Objectives of Workshop

(1) to deliver PWRI’s experience and potential to world renowned scientists in the field of water hazard and risk management;

(2) for PWRI researchers to learn world’s leading technologies and trends; and most importantly

(3) based on presentations, to discuss areas to be focused and future directions in this area by brainstorming as wise-men’s input to the IHP Center.
Workshop Program

- Keynote lecture by Prof. M.L. Kavvas at the University of California, Davis
- Six sessions in two separate rooms
- Sessions are videotaped for internal (PWRI/NILIM and participants) use only, no redistribution
- Chairperson and rapporteur (volunteer) for each session
- Oral and one-page written report from each session
- Brainstorming in the Plenary Meeting on January 21
- Tour on January 22
Workshop Report

- PowerPoint files will be collected after each presentation for workshop report.
- Presentations, Sessions report and discussion record will be wrapped up to make a workshop draft report by the secretariat.
- Draft workshop report will be sent to participants for review by February 25.
- Final report will be published on the PWRI homepage by March 25.
Miscellaneous

- Bus from the hotel to PWRI leaves at 8:15 am.
- Lunch box (Bento) on 1F meeting room: Reservation required. Cancel or change should be informed to 8F registration desk by 9:00 am on the day.
- On Jan 22, a chartered bus leaves for Tokyo at 5pm after the Jan 22 afternoon tour. Check out the hotel on Jan 22 morning, and leave your luggage at the hotel.
- PCs with internet connection are available in Hydrologic Engineering Team Room on 8F. Feel free to visit and use.
Tour on Jan. 22 morning: Mt. Tsukuba Experimental Basin (1969 -) as a part of International Hydrologic Decade IHD (1965 - 1974)

Tour Bus leaves at 8:15, on Jan. 22 at the hotel.

Established by PWRI at the north slope of Mt. Tsukuba in 1969 as a part of IHD to research hydrological response of natural river basins.

The basin area is 3.12 Km² with two discharge-gauging stations and a rainfall gauging station, which has kept on observing over 30 years.

The data has been used to elucidate the characteristics and mechanism of rainfall-runoff.
Tour on Jan. 22 afternoon:
PWRI/NILIM Laboratories

Meet at 1:30 pm on 1F lobby.

After the tour, pick up baggage at Epochal Hotel and go to Tokyo
Before reorganization of 2001

Ministry of Construction
- River Bureau
- Road Bureau
- Housing Bureau
...

Eight Regional Bureaus

Research Institutes
- Public Works Research Institute

Ministry of Transport

Research Institutes

Land Agency

Hokkaido Development Agency
Ministry of Land Infrastructure and Transport

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<td>(Administratively independent) Research Institutes</td>
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<td>• Public Works Research Institute</td>
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<td>• Others</td>
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Public Works Research Institute (PWRI)
Ministry of Construction before Reorganization

The largest national institute in the field of civil engineering in Japan (310 research staff)

http://www.pwri.go.jp/

• General Affairs Department
• Planning and Research Administration Department
• Environment Department
• River Department
• Water Quality Control Department
• Dam Department
• Erosion and Sediment Control Department
• Road Department
• Materials and Construction Department
• Structure and Bridge Department
• Research Center for Public Works Management
• Earthquake Disaster Prevention Research Center
• Niigata Experimental Laboratory
Split of PWRI into Two Institutes in April 2001

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<td><strong>River Dept</strong></td>
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<td><em>River Div.</em>, <em>Coast Div.</em>, <em>Water management and dam Div.</em></td>
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<td>Road Dept.</td>
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<td>Research Center for Land and Construction Management</td>
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<td>Research Center for Advanced Information Technology</td>
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<td><strong>Research Center for Disaster Risk Management</strong></td>
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<td>Erosion and Sediment Control Div.</td>
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<td><strong>Flood Disaster Prevention Div.</strong></td>
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<td>Earthquake Disaster Prevention Div.</td>
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<td>Construction Technology</td>
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<td>Materials and Geotechnical</td>
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<td>Earthquake Disaster Prevention</td>
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<td><strong>Water Environment (River Restoration, Water Quality)</strong></td>
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<td><strong>Hydraulic Engineering (Hydrology, Dam structure, Dam hydraulics)</strong></td>
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<td><strong>Erosion and Sediment Control (Volcano and debris flow)</strong></td>
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<td>Road Technology</td>
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<td>Structures</td>
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<td>Niigata Experimental Laboratory</td>
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• History
  1927 : Creation as governmental institute
  1979 : Relocation to Tsukuba
  2001 : Re-organization
• Staffs : 220
• Researchers : 150
• Project themes : 200
• Annual Budget :
  approx. 6 billion JPY
  (50 million US$)
Layout of PWRI in Tsukuba

2.5 km
Dam Hydraulics Laboratory
Dynamic Geotechnical Centrifuge
Vibration Laboratory
Structural Engineering Laboratory
Mission of new PWRI

Incorporated Administration Agency Act of Incorporation

IAIs provide critical public services that

(1) are not required of the government, but that are not necessarily provided by the private sector; or

(2) can be provided efficiently by a single entity.
Position of PWRI’s hydrology section

• PWRI water section’s main function is bridging academic, private worlds and the government.

• Connectivity is important.
Infiltration facilities for urban runoff reduction

Detention ponds were popular in urbanized areas

Rainwater infiltration trenches were proposed by PWRI engineers

Extensive research for evaluating infiltration ability in relation to soil types, configuration, clogging, etc.

Reflected on technical guidelines and manuals

Infiltration facilities are now very popular on-site runoff regulator.
PWRI’s Contribution to development of radar rainfall gauging system

**Basic element research**
- Evaluation of various types model of radar wave effected by rain fall particle cluster
- Evaluation of decreased radio-magnetic wave by rainfall

**Application research**
- Optimizing method of image composition
- Online calibration system
- Study of correcting ground rainfall value
- Optimization method of Radar number B, b
- Clearing method of ground clutter

**Outreach to public users**
- Radar rain info distribution on the web
  - http://www.river.go.jp/jsp/mapFrame/MapC500.jsp?
    longitude=138.00.00&latitude=37.20.00&scale=0&time=
- Run-off prediction
- Evaluation of various types of rainfall forecast model

**Diagrams**
- Image showing wave guide tube, transmitted and received equipment, signal processing equipment, ANT control equipment, and online calibration system.
Global Warming Impact on Precipitation over Japan: series of downscaling of global change to regional scale and river basin scale

Interpretation of GCM outputs to regional scale

Mesoscale atmospheric model in consideration of heterogeneity in surface hydrology

IRSHAM with fully-coupled boundary layer model

Impact on basin scale water uses

Change in flow regime and water shortage by precipitation change scenarios

Water distribution model as decision support