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N I L I M

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News Letter

■ Building Damage in 2005 Pakistan Earthquake

Evaluation System Division

At 8:50 on October 8, 2005 (local time), a huge earthquake of magnitude 7.5 occurred in the Islamic Republic of Pakistan, with the epicenter in the northern mountains of the country. The Pakistani government announced that as of December 2005, the number of casualties stood at 73,338, while the number of severely injured was 69,412, and moderately injured 58,897. The number of people suffering from the disaster totaled 4 million, among whom 2.8 million lost their houses.

I took part in a survey team of the Japan International Cooperation Agency (JICA) which visited the areas from October 23 to November 3 in 2005, and helped institutes such as the Ministry of Housing and the Ministry of Environment of the Pakistani government by providing technical advice on techniques for evaluating and improving the seismic performance of buildings, and on restoration activities in future.

The epicenter of the earthquake was near Muzaffarabad, a city in an area effectively controlled by the Pakistani government, located in the country's northern region of Jammu and Kashmir (see the figure), and the depth of the epicenter was approximately 10 km. The seismic intensities on the scale of Japan's Meteorological Agency (ranging from 0 to 7) were lower level 6 in Abbottabad, about 50 km from the epicenter, and level 4 at a distance of 70 to 100 km, calculating based on the observed acceleration at the time of occurrence.

The earthquake caused severe damage to the buildings around the city of Muzaffarabad; about 90% were damaged in Balakot, where a number of RC and plain-concrete block buildings collapsed completely (see the Photo). According to a survey by an international institute, some 400 thousand houses were damaged.

Some international bodies and nations have been actively involved in emergency aid activities, and they are expected to cooperate in future restoration activities as well.

Since one of the reasons for the massive damage is considered to be the low seismic performance of the buildings and houses, seismic code of the buildings needs to be revised and appropriately implemented,

and techniques for evaluating and improving seismic performance need to be widely disseminated.



Notes) ★ : Epicenter ○ : Accelerometers
[SI-] : Seismic intensity, not authorized, calculated by Japan Meteorological Agency Method
Figure: Map of Damaged Area

In cooperation with PAEC-MSSP, Pakistan and BRI, Japan



Photo Collapse of 1- or 2-storey RC building in Balakot

■ New Main Projects

1. Research on Restoration of Water Circulation in Collaboration with Community Activities

To activate community activities further for realizing the restorations of water circulation, more people need to be made aware of the specific benefits acquired by such activities.

In this study, multiple effects of the policies and activities will be grasped from the viewpoint of benefits for communities or individuals. And we will take measures to stimulate community activities such as development of information supply tools and the proposal the techniques to reduce the obstruction of community activities.

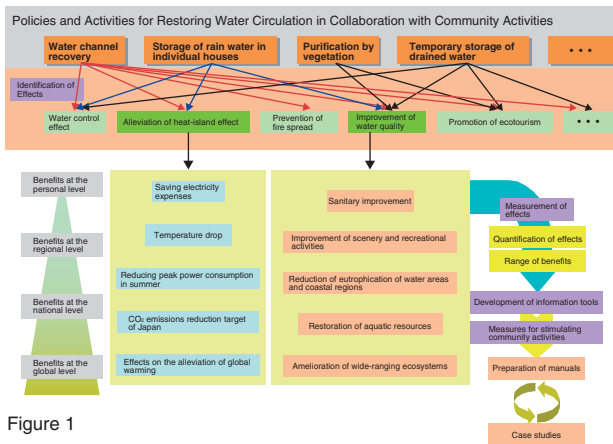


Figure 1

2. Research on Dynamics of Materials Circulation in River Basins and Effects on Environments in Closed Water Area

The dynamics of materials circulation in river basins have dramatically altered as land use patterns have changed. In this study, the properties of materials that play an important role in the restoration of water environments which contain ecosystems will be grasped, focusing on closed water bodies and coastal regions that are significantly affected by the influx of materials from river basins. The impacts of changes in material dynamics in rivers and their basins that have influenced the water ecosystems will be studied.

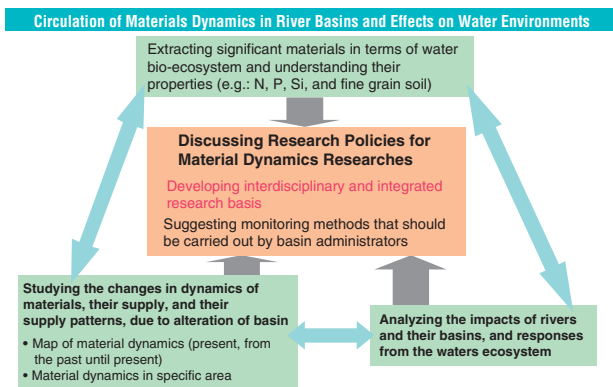


Figure 2

3. Research on River and Coast Management with Due Consideration to Climate Changes

Because the effects of global warming have already appeared at many places in around the world, studies on countermeasures are of urgent necessity. This project research focuses on the use of precipitation prediction in water management such as dam operation, as well as the effects of global warming on rivers and coasts, and countermeasures against them.

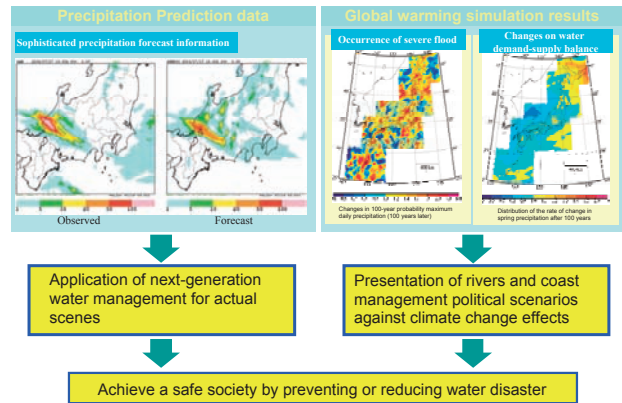


Figure 3

4. Research on Regional Damage Estimation and its Application to Disaster Mitigation Projects

Existing methods for evaluating the risk of natural disasters generally cover rather wide areas such as municipalities or river basins, and so it is often difficult to evaluate the individual risk of a specific facility or point. This project research aims to develop a method for evaluating the disaster risk of each facility and point, and to propose measures for rationalizing disaster mitigation projects based on the risk.

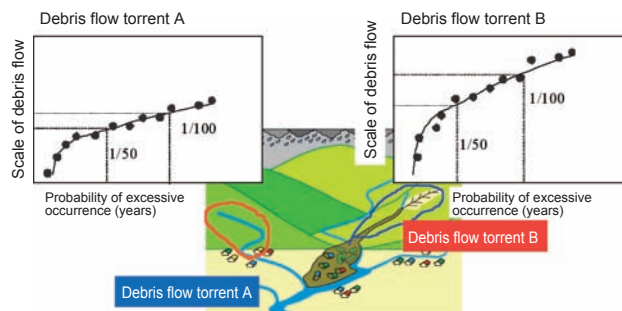


Figure 4 An example of stream-by-stream risk evaluation of the occurrence of sediment-related disasters

5. Evaluation Method of Countermeasures with Various Utilities against Infrequent Mega-Risk Type Coastal Hazards

Disasters caused by coastal hazards such as tsunamis and storm surges tend to exceed protection targets for structural design. Such disasters, whose frequency of occurrence is very low, cause severe damage.

The aim of this project is to propose measures for reducing mega-risk type coastal hazards which also have social utility during ordinary times and to establish methods for evaluating the effects of these measures and for facilitating consensus-building among local residents, administrative bodies and other stakeholders.

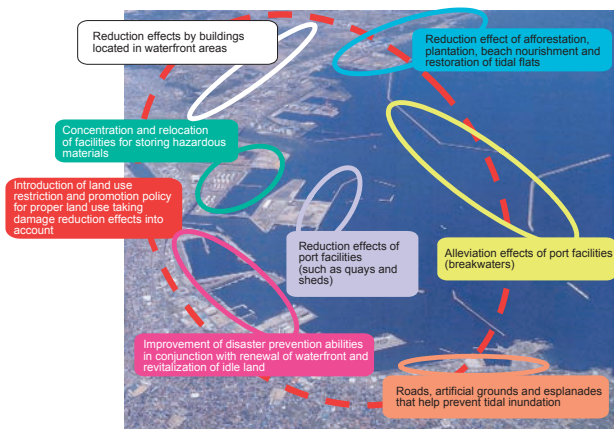


Figure 5 Schematic illustration of countermeasures with various utilities against the mega-risk type coastal hazards

6. Research on Evaluation Technologies and Measures to Protect People from Accidents inside Buildings in Daily Life

Recently, the number of deaths or injuries due to unexpected accidents, such as the death of a boy entrapped by an automatic revolving door, inside buildings during daily life is increasing. The objectives of this research are to develop methods to appropriately evaluate the risks of such accidents and to establish a knowledge base for assuring the safety of building users. Guidelines for the planning and designing of buildings and/or building equipment to evaluate risks and to take appropriate safety measures to assure the safety of building users will also be developed.

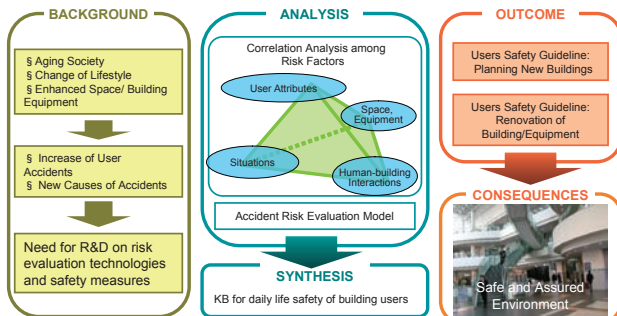


Figure 6 To achieve a safe and assured environment for building users

7. Research on Comprehensive Risk Management of International Transportation Infrastructure

There has been increasing concern that the risks of natural disasters, accidents, and criminal activities will significantly affect the operation and safety of international transportation infrastructure such as ports and airports. In this research, the influence of such risks on international transportation services will be evaluated accurately, countermeasures for improving both facilities and services will be developed, and reasonable risk management measures with high cost-effectiveness will be proposed. Measures to maintain the international transportation network security on the national level at the time of crisis outbreak.

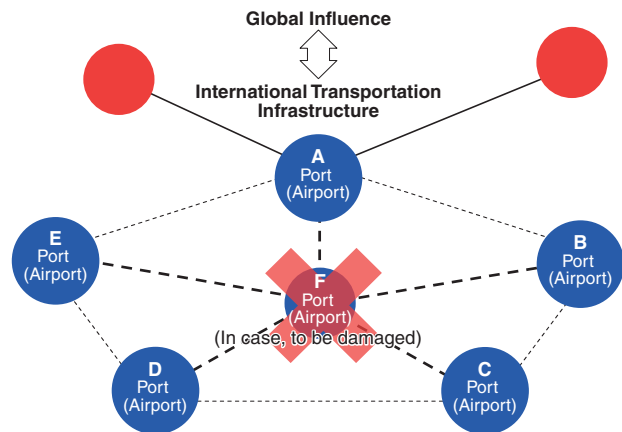


Figure 7 An image when the network hub is damaged

8. Research on Smart Mobility Based on Second Stage ITS

In August, 2004, the Smartway Project Advisory Committee (chaired by Syoichiro Toyoda) made a proposal titled "ITS Enter the Second Stage – Smart Mobility for All –". The objectives stated in the proposal are as follows:

- 1) Realization of in-vehicle environment that enables a wide variety of services delivered by a single ITS on-board unit by 2007 and
- 2) Realization of the following services using the ITS on-board unit:
 - a) Smooth passage through all types of gates;
 - b) Regional guides appropriate to location and needs; and
 - c) Timely driving support information.

To realize the proposal, research and development will be carried out on various elemental and fundamental technologies required for each service. The standards and specifications concerning on-board units, roadside units and communications will also be studied and decided.

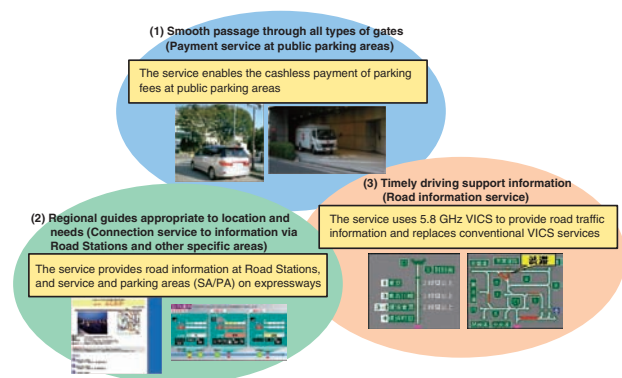


Figure 8

• Other Main Projects

You can see them in "Handbook of NILIM" on our website, www.nilim.go.jp

■ **Publication of Technical Note on Regular Inspections for Highway Bridges**
– to Enhance the Quality of Regular Inspection Data –

Bridge and Structures Division

The Ministry of Land, Infrastructure and Transport is promoting scientific bridge management to effectively preserve the enormous number of highway bridges in Japan. Inspections to collect fundamental information for strategic planning are considered to be one of the most important parts of management. A regular inspection is carried out every 5 years in Japan according to the "Regular inspection manual for highway bridges (draft)" notified in March 2004. It is important to collect reliable data in order to conduct suitable

maintenance works. The National Institute for Land and Infrastructure Management (NILIM) published the "Technical note on regular inspections for highway bridges" in order to assist the inspectors. This note provides technical information on examples of various damage patterns and the results of evaluation. The note is expected to help highway administrators to conduct planned bridge management based on reliable data.

■ **The 7th U.K.– Japan Workshop on Road Science and Technology (Japan: November 14 to 18, 2005)**

Traffic Engineering Division

The Ministry of Land, Infrastructure and Transport of Japan and the Highways Agency of the U.K. held the annual U.K.-Japan Workshop on Road Science and Technology in Tsukuba, Tokyo, and in Hyogo. Representatives of Japan and the U.K. presented papers and the participants conducted lively exchanges of opinions at five sessions: Asset Management, Road Environment, ITS, Performance Management, and Road Pricing. The representatives of the U.K. provided information on their activities including road pricing and traffic management using information technologies. In addition, a trilateral workshop - seminar was

held by the U.S. Japan, and the U.K. and the participants toured the Akashi Kaikyo Bridge and the Disaster Reduction and Human Renovation Institution. It was confirmed that the two countries would continue this series of workshops in the coming years.



Photo

■ **TECHNICAL NOTE of National Institute for Land and Infrastructure Management (September-October, 2004)**

No	Title of Paper	Names of Divisions
139	Guidebook for wildlife census with the participation of residents -By MBR method-	Landscape and Ecology Division
165	Guideline for improving road safety at Hazardous Spots -from the point of view of infrastructure-	Advanced Road Design and Safety Division
167	Report of International Symposium "Vision for Watershed/Urban Regeneration in Accordance with Nature" -Urban Regeneration from Water and Green-	River Environment Division
173	The Model for Estimation of Fuel Economy of Yard Trailer in Container Yard	Coastal Zone Systems Division
189	A Development of the Software to Measure Economic Effects of Airport Improvements	Airport Planning Division
190	An Analysis on the Change in the European Aviation Network after the 80's	Airport Planning Division
191	An Analysis on Transportation Hinterland of International Freight in North America Continent in Which it Centered on the Transportation Between North America East Asia	Port Systems Division
192	Synthesis of Estimation Systems of Energy Consumption and CO2 Emission Associated with Port Terminal Projects for Unit Load Handling	Coastal Zone Systems Division
193	Report of the 1 st Evaluation Committee of NILIM in FY 2004	Research Administration and Evaluation Division

■ **"2006 Annual Report of NILIM" is now on our website (in Japanese only, for the time being)**

We publish "2006 Annual Report of NILIM" to show our research activities and accomplishments, and you can see its contents on our website, www.nilim.go.jp. English version will be available in the future.



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