MANAGEMENT OF INFRASTRUCTURE FACILITIES AS DISASTER PROTECTION

by

Tadayuki TAZAKI[1)],Takeo NAKAJIMA[2)], Kazuhiro Nishikawa[3)]

ABSTRACT

NILIM was established in April, 2001 following the reform of the central government.
NILIM's organization and research policy was introduced. Its three comprehensive research centers characterize NILIM.
This paper concludes that discussing subjects, such as Management of infrastructure facilities to ensure the function as disaster protection, Disaster information technology and disaster mitigation, Application of ITS technologies as powerful tools for mitigating disaster, will be an important role for the UJNR joint panel meeting in the 21st century.

KEYWORDS : NILIM
Technological Policy
Management of infrastructure
Disaster Information
Application of ITS technology

1. INTRODUCTION OF NILIM

Japanese central government was restructured as of January 6, 2001. The number of ministries was drastically reduced to one cabinet office and 12 ministries. The Ministry of Land, Infrastructure and Transport, or "MLIT", was formed as a combination of the functions of these four ministries and agencies.

There were three research institutes relevant to construction in MLIT. These institutes were separated from the ministry and in principle transferred into Independent Administrative Institutions.
The functions of these three original institutes were taken over by these new institutions. Each of the three original institutes functioned to support the headquarters to make technological policies. NILIM has been established to take over half of researchers and this function.

When we are asked to explain the differences between NILIM and the three agencies. We reply that NILIM is for management, and considers the infrastructure requirements, whereas agencies are for technologies, and consider the performance of facilities.
For this purpose, NILIM was established in April, 2001 as the only national research institute in the field of infrastructure to support the headquarters of MLIT.

The figure shows the organization of NILIM. There are ten research departments and three comprehensive research centers. It could be said that these three comprehensive research centers characterize NILIM. They are organized based on demand-oriented subjects. They are engaged in cross sectional research activities.

They are the Research Center for Land and Construction Management, Research Center for Advanced Information Technology, and Research Center for Disaster Risk Management.
The last one deals with the subjects closest to this joint panel, but the others also have relevant studies.

---

1) Director General, National Institute for Land and Infrastructure Management (NILIM), Ministry of Land, Infrastructure and Transport (MLIT)
2) Director of Planning and Research Administration Department, NILIM, MLIT
3) Research Coordinator for Evaluation, NILIM, MLIT

2. THE RESEARCH POLICY OF NILIM

The first four months was spent drafting the Research Policy of NILIM, because NILIM gathered researchers from three different institutes and had to show the direction in which to proceed together. This was a very important and basic process at the beginning of the new organization management.

The research policy was settled on July 30, 2001, and consists of Mission, Research Subjects and Research Activities.

The Mission says "We conduct research and development to contribute to technological policy-making that enhances the satisfaction of citizens as the end-users of infrastructures".
I would like to emphasize the necessity of taking into account the demand-side point of view in the research activities.

The goals are stated as:
- Conservation and creation of desirable national land
- Guarantee of safe and secure life
- Enhancement of quality of life
- Vitalization of civil society and economy

To achieve the goals, seven principal subjects are selected. The first four subjects are relevant to the goals of MLIT.

1. Creation of sustainable society with a beautiful national land
2. Building of a safe and reliable national land
3. Enhancement of quality of life
4. Vitalization of civil society and economy

We believe we can construct an image of Japan in the 21st century through research on these four subjects.

The last three subjects are relevant to the procedures for MLIT's activities.

5. Improvement of construction management for public works
6. Establishment of foundation for advanced information society
7. Contribution to international society

Under these seven principal subjects, sixteen technological research subjects are provided in the policy.

Here are some examples:
- Asset management
- Disaster information technology
- Intelligent transportation system
- Public involvement

The first three subjects will be mentioned later. The last one, study on public involvement, is now indispensable regarding public works procedures, of course, including disaster prevention and mitigation. Nowadays it is impossible to carry out public works without the participation of citizens.

3. ASSET MANAGEMENT

Introducing the research subjects along with the three research centers will help to understand the institute more deeply and what kind of subjects we propose dealing with at the joint panel meeting.

The first one is the Research center for land and construction management.
There are three subjects.
The first one is "Historical study on national land and infrastructure". It is important and useful to study the past to find out the future direction.

The second one is "Construction management for public works". Effective implementation of public works might be our permanent task.

The third one is "Asset management". We often use the term "Stock Management" instead.
Asset management is very important from various aspects. These include: dwindling availability of disposal sites and increasing CO2 emissions

regarding the global environment, both of which are exacerbated by the renewal of infrastructure. Furthermore, massive demand for renewal will place a big burden on the decreasing younger generation. It is therefore essential to prolong the life of infrastructure with efficient management.

Aging and deterioration are inevitable for every infrastructure facility, but this also reduces the capacity against natural disasters.
To overcome this and to create a sustainable society, strategic management as a combination of inspection, diagnosis, rating, repair, strengthening and replacement technologies are necessary.

4. DISASTER INFORMATION TECHNOLOGY AND DISASTER MITIGATION

The next is the Research center for disaster risk management.
Its major subjects recently are Disaster information technology and disaster mitigation.
Research on disaster prevention is now spreading to include the use of information from satellites.

Hazard maps for various kinds of disaster and damage prediction technology provide valuable information.
Gathering damage information by mobile tools, integrating them with GIS, and distributing necessary information to people are extremely effective disaster mitigation methods.

5. APPLICATION OF ITS TECHNOLOGIES

The last one is the Research center for advanced information technology.

Its main research concerns ITS (Intelligent transport system), which seems to have little to do with disaster prevention or mitigation. But the application of developed technologies using new information technologies can be powerful tools for mitigating disaster.

For example, a car navigation system, already installed in over 10% of automobiles in Japan, can guide drivers along detour routes when they come across major damage caused by natural disaster. And ITS for pedestrians, developed originally for handicapped people, can inform strangers by cellular phone of where to evacuate in case of emergency.

6. CONCLUSIONS

UJNR has a tremendous track record from the 20th century. Many new technologies have been adapted in the design codes in both countries through the UJNR research-and-development programs in the field of earthquake disaster prevention and wind effect technology. The 21st century has just started, and we must create a sustainable society for future generations.

There are three subjects here that I have already mentioned. Discussing these kinds of subject will be an important role for the UJNR joint panel meeting in the 21st century. We are standing at the crossroads of the new millennium. We must define a suitable direction for UJNR activities and exchange the latest information each other.

Management of Infrastructure Facilities to Ensure the Function as Disaster Protection

Tadayuki TAZAKI, Takeo NAKAJIMA
Kazuhiro NISHIKAWA
National Institute for Land and Infrastructure Management

Central Government Reform

1 Office and **22** Ministries

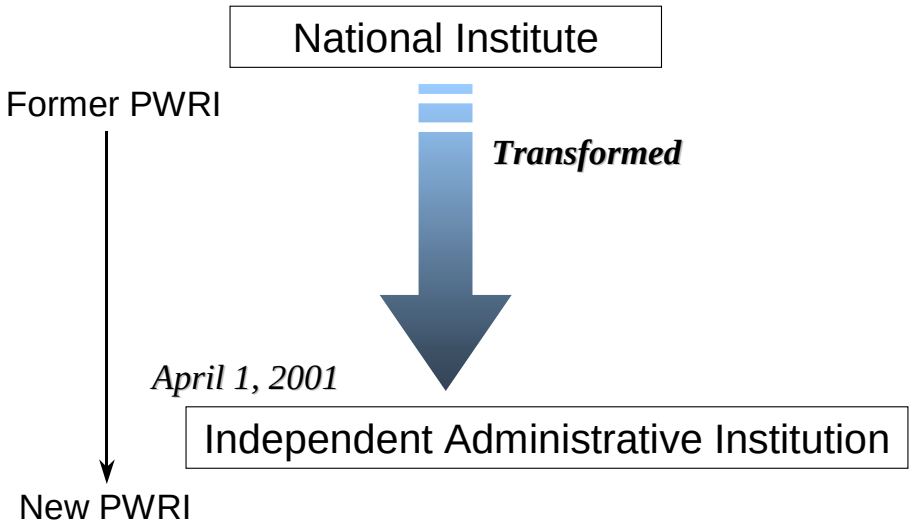
Reformed *January 6, 2001*

1 Cabinet Office and **12** Ministries

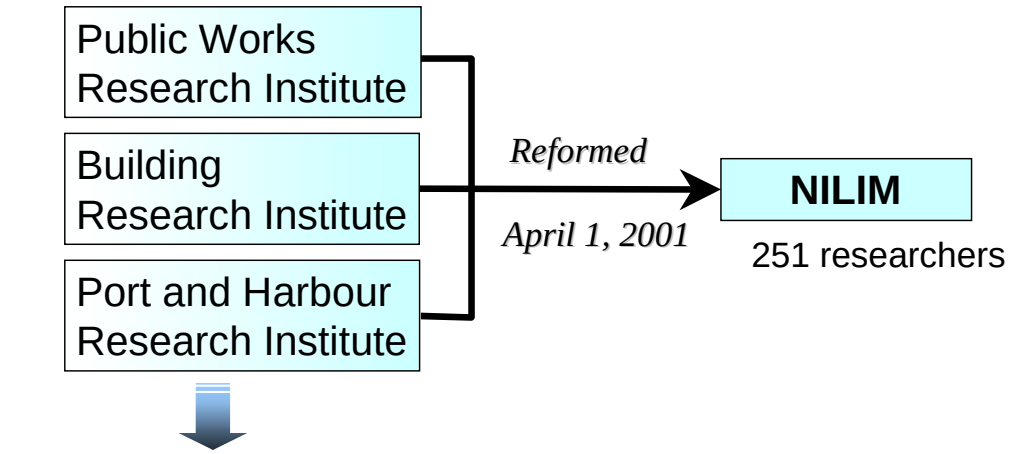
- Ministry of Construction
- Ministry of Transport
- National Land Agency
- Hokkaido Development Agency

→ Ministry of Land, Infrastructure and Transport
MLIT

Independent Administrative Institution?



NILIM
&
Independent Administrative Institution



What's the difference?

NILIM ***vs.*** ***IAIs***

Management — *Technology*

Infrastructure requirements — *Performance of facilities*

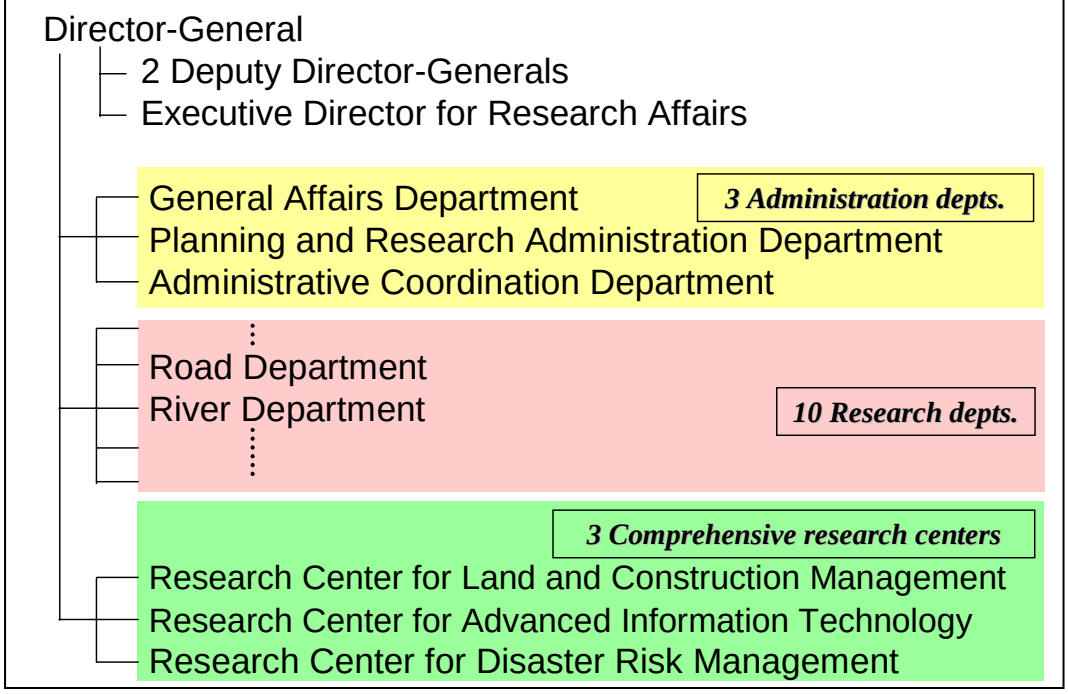
Establishment of NILIM

The only national institute in the field of Land and Infrastructure Management

Research and development to support technological policy-making of MLIT

April 1, 2001

Organization



Three Research Centers

Research Center for
Land and Construction Management

Research Center for
Advanced Information Technology

Research Center for
Disaster Risk Management

Research Policy of NILIM

July 30, 2001

Mission

Research Subjects

Research Activities

Mission

"We conduct R&D to contribute
to technological policy-making
that enhances the satisfaction of citizens
as the end-users of infrastructure."

Goals

- ✓ *Conservation and creation of desirable national land*
- ✓ *Guarantee of safe and secure life*
- ✓ *Enhancement of quality of life*
- ✓ *Vitalization of civil society and economy*

Seven principal subjects

1. *Creation of sustainable society with a beautiful national land*
2. *Building of a safe and reliable national land*
3. *Enhancement of quality of life*
4. *Vitalization of civil society and economy*

Seven principal subjects

(cont'd)

5. ***Improvement of construction management for public works***
6. ***Establishment of foundation for advanced information society***
7. ***Contribution to international society***

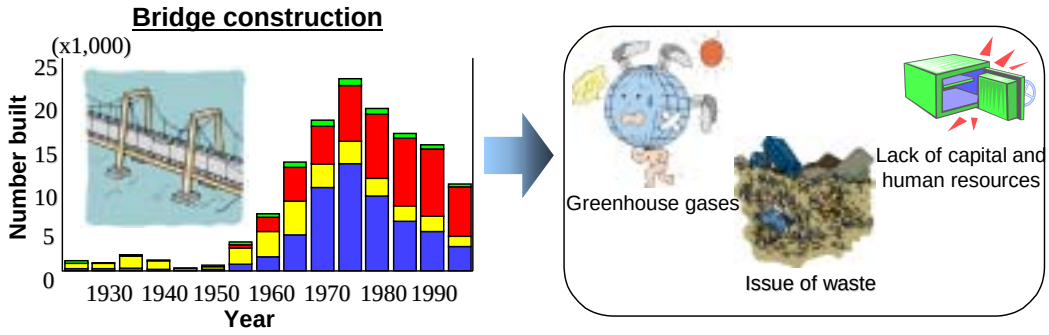
Research subjects

(examples)

- ✓***Asset (stock) management***
- ✓***Disaster information technology***
- ✓***Intelligent Transport System***
- ✓***Public involvement***

Research Center for Land and Construction Management

- ✓*Historical study on national land and infrastructure*
- ✓*Construction management for public works*
- ✓***Asset (stock) management (from "scrap & build" to "stock & renovation")***



Stock Management to Ensure Disaster-Protection Function

Aging and Degradation

Inspection, Diagnosis, Repair, Rating

Strengthening, Replacement

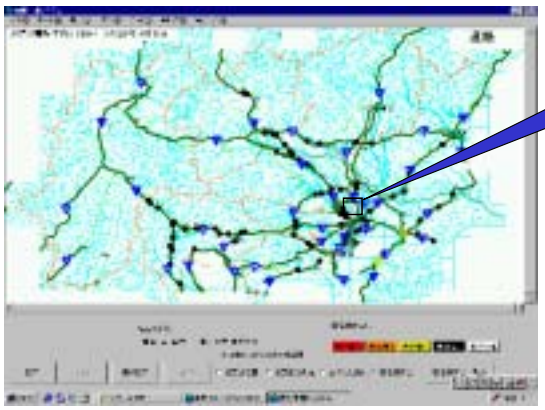
of

Existing Facilities

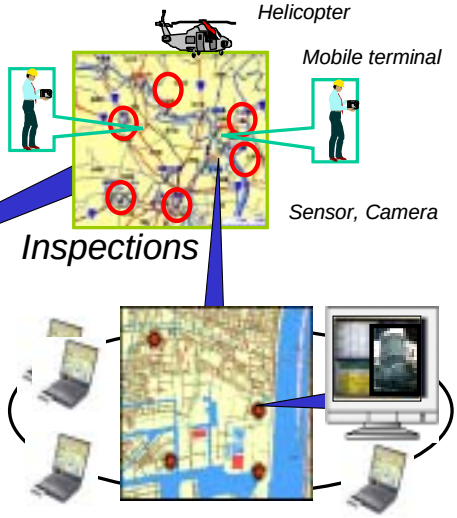
Strategic Management Is Required !!

Research Center for Disaster Risk Management

✓Disaster information technology
✓Disaster mitigation



Earthquake damage prediction system

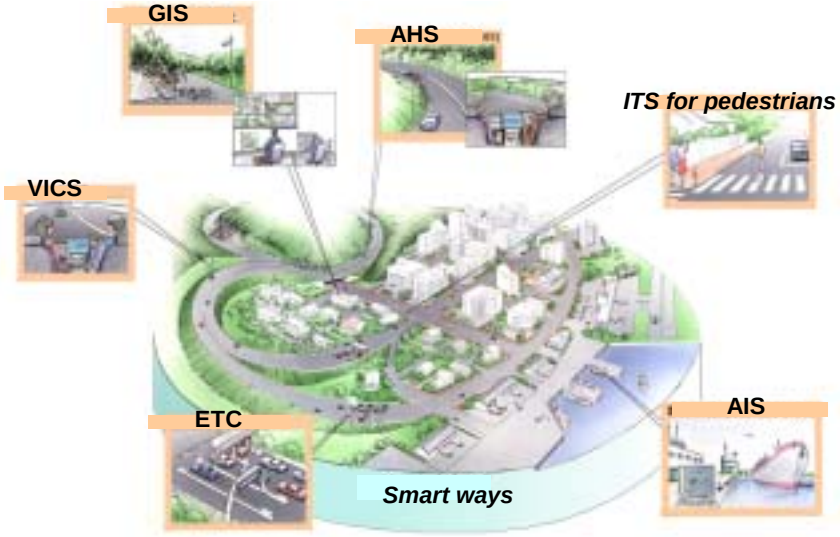


Disaster information technology and Disaster mitigation

- Hazard maps
- Damage prediction
- Information
  - gathering by mobile tools
  - integrating with GIS
  - distributing to people

Research Center for Advanced Information Technology

✓*Promotion of intelligent technology in transportation*



Application of ITS Technologies

Distribution of Disaster Information through

✓*Car Navigation Systems to guide along the detour route,*

✓*ITS for Pedestrians (cellular phone) for strangers to evacuate*

Conclusions

The roles of the Joint Meeting in the 21st century

- ✓*To renovate and make good use of existing infrastructures*
- ✓*To promote the disaster information system with IT such as GIS, GPS, mobile tools, etc.*
- ✓*To apply ITS technologies as disaster information tools*

Information Available

Please visit us at:

http://www.nilim.go.jp/