
ICUS NEWSLETTER

International Center for Urban Safety Engineering



**Institute of Industrial Science
The University of Tokyo**

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WORKING AT INTERNATIONAL ORGANIZATIONS

By

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I worked at four international institutes for 27 years, including International Center for Disaster-Mitigation Engineering (INCEDE) which was a ten-year program, from 1991 to 2001, by the Institute of Industrial Science (IIS), University of Tokyo. All organizations are/were aiming to make our Earth safer from natural disaster and safer from nuclear weapon. In this short article, my observation and experiences at these organizations are mentioned.

IISEE

International Institute of Seismology and Earthquake

Engineering (IISEE) was established in 1962 jointly by the Japanese Government and the United Nations. The establishment was based on a resolution of the General Assembly of the United Nations. This resolution was a follow-up of the initiative by International Association of Earthquake Engineering which took place in 1960 at the IIS. Prominent professors of IIS such as the late Professors Shunzo Okamoto and Keizaburo Kubo devoted themselves to this initiative as their contribution to earthquake disaster reduction in the world.

The objective of the IISEE is to foster engineers and seismologists in the field of earthquake disaster mitigation, in particular, in the developing world. Since its inception, more than 1,000 participants from 105 countries have reportedly finished courses which were programmed by international well-known experts. Nowadays large alumni of IISEE are playing the central role in earthquake disaster management in the respective countries. IISEE is still active in conducting its mission. I was involved in diversity programs of IISEE for 15 years.



Shaking test of actual 7-story apartment house at the Almaty city

One of the programs which I was in charge was for seismic risk reduction of the Almaty city in the Republic of Kazakhstan. Almaty is located in a high seismic region at the northern foot of the Tien-Shan Mountains. Kazakhstan was one of the developed republics among the former Soviet Union. Collapse of the Soviet regime led the Republic to serious economic disruption. Under the marketing economy, most investment has been addressed to business potentially producing more benefit quickly. Disaster management which the government should take responsibility has been put in less priority issues. Needless to say, Kazakhstan is not exceptional. There are many disaster prone countries in the world where even poor measures against disaster cannot be taken.

My activities focused on knowledge transfer to researchers in the Institute of Seismology at Almaty. They were enthusiastically keen to absorb any knowledge. Any lectures and colloquia were filled with many participants. These meetings were followed by hot discussion. I am very much satisfied with my activities at the Institute. A charming and very much talented secretary helped me with excellent faithfulness. She viewed my lecture notes before the classes to understand what I was going to talk. So that she spoke as if she herself was a teacher. I took opportunities to observe full scale shaking test of a 7-story building, while I was in the Institute. The test was sponsored by a general contractor (see the photo on the 1st page) which has its industrial base



My staff at the office of IISEE, Republic of Kazakhstan

at Almaty. They said that such test has not been conducted since the beginning of 1990s. The successful test has encouraged researchers to develop further studies for earthquake disaster mitigation.

The lunch time was an opportunity to know what Kazakhstan people think in daily life. My secretary and driver are of mid thirty age. The first half of their lives were under the Soviet and the second under the marketing economy. They talked about summer holidays in forests while they were children. Their parents did not meet any costs for the camp, contrarily, they need much money for their children to spend long summer vacation in forests. Education in better school is also costly. When they were children, no education fee was charged from their parents. Bread and butter were certainly in hands, although they had to be in long queue. Nowadays, some poor people have difficulty in even getting bread. They talked that they realized that richer people could get more benefit in the current system. I learned that the name of Kazakhstan was taken after Khazar Kingdom which existed in the 8-10th century around the Caspian Sea and which is thought to be the home place of Ashekenazi people. The Ashkenazi people must be one of key-people to understand the modern world.

IDNDR

International Decade of Natural Disaster Reduction (IDNDR) was an initiative based on the unanimous resolution of the United Nations General Assembly in 1999. This 10-year program started with enthusiastic welcome by disaster prone countries in the world. It was thought that the 10-year, 1990-2000, would be enough to identify problems to be solved for the safer Earth in the 21st century and to establish institution/machinery for putting the issues into practice The IDNDR Secretariat at Geneva, however, could not help any initiatives and undertakings by

Программа «Радиус» — во бла



Newspaper clip of 'Tashkent Evening News'.

scientific communities or engineering associations financially, as the Secretariat had no mechanism for regularly getting money. The funding was made on voluntary base at willingness of donor agencies. Actually the Japanese Government made the largest contribution. It reached almost 60 % of total operational expense.

I was at position to monitor scientific activities undertaken at various places by different organizations. I learned that many projects are stranded due to financial difficulties. Therefore the Secretariat itself had to launch projects to encourage the world. RADIUS project was one of these projects.

A Symposium about VAN by International Council of Scientific Union (ICSU) was another. In the beginning of 1990, most seismologists were very much pessimistic in earthquake prediction. Nevertheless, Greek physicists claimed that the VAN method needed to be paid more attention. Sir James Lighthill of ICSU thought that there was something in VAN as Professor Kanamori of California Institute Technology commented to the Science, a well-known scientific journal. All papers presented in this successful symposium were compiled into a book, titled as 'Critical Review of VAN' published by World Scientific

Press. I was involved in coordination of the Symposium. Dr. Sir James was of strongly scientific curiosity and He never had prejudices toward's any scientific view. He tried to see only facts. His manner moved him to dare hold the symposium. It is very much pity that he passed away soon after the Symposium by an accident in the sea.

INCEDE

After retiring from the job as director of IISEE, I was invited as Director of International Centre for Disaster–Mitigation Engineering (INCEDE) in the summer of 1996. It should be surprising to see that only four permanent staff members were conducting many international collaborative projects, holding 'Open Lecture', managing the INCEDE human network, and publishing INCEDE Newsletter, having help by a couple of beautiful and hard-working secretaries. Communication through the Network taught me that people struggling with diasters in the respective countries wanted to know what other people did, what technology or devices were available and many different things. The Newsletter responded to these wishes. Any INCEDE Newsletters were responded by voices from readers in the world. In an issue of the Newsletter, two articles on VAN were put. Two prominent researcher, Drs. Seiya Uyeda (Professors Emeritus of the University of Tokyo) for VAN and Robert Geller (Professor of the University of Tokyo) against VAN, kindly contributed articles. Since by some reasons any article for VAN had not appeared in the public at that time, this issue was welcome in the world and many copies of this issue were sent to many readers in addition to regular readers.

I had a visit by the director of natural disaster department in a country in the Caribbean Sea. She took an opportunity to observe monitoring systems and devices against disaster, while she was staying in Japan. At volcanic sites,

she saw a monitoring system consisting of many high-technology sensors and automatic information process on real time. At other sites, she saw that more than 1000 GPS data were analyzed on real time base to reveal how Japan islands were deformed by the plate motion. Certainly it will be powerful tool for earthquake prediction. Right before her leaving for her country, she sighed, saying 'in principle human-being can know when a volcano will erupt and how a large earthquake will occur at where. But it is not our case'. I could not find my response to her words.

CTBTO

In 2002 autumn, I was invited as a unit head of Comprehensive Nuclear Test Ban Treaty Organization(CTBTO). The Organization needed my knowledge and experiences on seismological analysis. When a nuclear atomic bomb is exploded under the ground surface, elastic waves are generated within the Earth. The waves are very much similar to seismic waves. CTBTO has a verification system of nuclear explosion test. The central component of the system is detection of events which might be generated by explosion. For this purpose, CTBTO deploys global observation network comprising of around 300 sensors: two thirds are seismographs and the others for hydroacoustic, infrasound and radioactive nuclide observation. Analysis of signals from the network is my task. It is almost seismological work.

Readers of this Newsletter may think that the above observations, in particular, geophysical observations can benefit studies on earth science and natural disaster monitoring. I wish to suggest you to contact your Government, if you are interested in the data and if you wish to access the data.

There are difference between the United Nation office at Geneva and Vienna International Center where CTBTO, International Atomic Energy Agency(IAEA), and



CTBTO building

other United Nation Organizations. Security system at the Vienna is much more strict. No body can enter the inside of the building without certification. In order to reach my office, anybody has to pass through one more gate which is always locked. Some data might be related to nuclear weapons. This is the reason why so strict security is kept. Needless to say, data handling is also controlled under strict rule.

Another difference of CTBTO from IDNDR is in budgetary system. While IDNDR had no financial base, CTBTO is financed by member countries. The Japanese government meets 20% of the total budget. There are five Japanese staff members among total 250. Only 2% is too small, compared to financial contribution by the Japanese Government. The rate of Japanese staff is also very small in other organizations. The Permanent Mission of the Japanese Government to International Organization at Vienna is always to keen to increase the number of Japanese staff at the organizations.

Acknowledgement

I thank Prof. Uomoto and his staff of ICUS for providing me with the space for this article. Also I wish to have your permission to say my gratitude to Ms. Yasuko Fujitani who had helped me with the most faithfulness while I was in IIS. I do hope ICUS will achieve further works helpful to safer Japan, safer Asia and safer world.

**Professor, CTBTO,
Preparatory commission for the
comprehensive nuclear-test-ban
treaty organization, Vienna*

Reports Published by the Research Committee RC-39 “Research on Sustainable Engineering for Urban Safety”(1)

The Research Committee on Sustainable Engineering for Urban Safety (Rc-39) established by the ICUS, has been working since April, 2002. Besides the members of the faculty of the Center, the committee comprises of 16 private companies and research organizations.

The reports written by the 5 working groups were published in March, 2004 in Japanese. The five ‘working groups’ were as follows and a brief explanation of each report is given here in after.

WG1: *Methods to handle aging infrastructure (Secretary: Mr. Kenji SHIBA, Shimizu Corporation)*

WG2: *Global environment (Secretary: Mr. Hidenobu NAKAI, The Tokyo Electric Power Co., Inc.)*

WG3: *Study on heat islands in urban environments (Secretary: Mr. Haruhido TSUBAKI, Kajima Corporation)*

WG4: *Disaster prevention and response (Secretary: Mr. Seiichiro FUKUSHIMA, Tokyo Electric Power Services Co., Ltd.)*
(Abstract To be published in vol.4-2)

WG5: *Developments in sensing technology and its applications (Secretary: Mr. Yukio AKAMATSU, Kokusai Kogyo Co., Ltd.)*
(Abstract To be published in vol.4-2)

WG1: Methods to handle aging infrastructure

Japan’s dramatic economic growth was remarkable during the sixty years after the Second World War. Social infrastructure was also developed. Those constructed in the early phase are now aging and starting to require renewal. According to 2003 White Paper on Land, Infrastructure and Transport in Japan, the social capital stock was 405 trillion yen as of 2001. It led is the prospect that, as the maintenance/management and renewal cost for 2025 should be about 10 trillion yen, such cost needs to be increased by 150 billion yen every year for the next 10 years. Replacement was once preferred for the social capital infrastructures based on the strategy “Scrap and Build”. However, the shift to “Stock and Renovation” is now prioritized in the eco-friendly and recycle oriented society of the modern world. Therefore, aging structures should be properly managed and renewed to sustain the function of urbanized areas.

From this viewpoint, Aging Structure Working Group studied aging structures from three aspects: Engineering (Physics), Function and Economy and identified issues that need to be addressed to carry out the effective asset management. Based on the case study of “BANKOKU-BASHI (BANKOKU Bridge)” the

concrete road bridge built about 65 years ago in Yokohama, Maintenance and Management Guidelines of Social Capital Stock (for “System Design”) was developed.

The study on BANKOKU-BASHI revealed that structures may sustain its semi-permanent material life with the minimum cost as far as they are properly designed, built, and undergone sufficient construction management unless it was uniquely designed or affected by unavoidable environmental actions. On the other hand, it also reminded the importance of establishing the framework to sufficiently maintain such social assets to accept the extension of functionality of the structures as they age in order to meet the needs of the society. Some issues remain unverified from the study which was conducted for less than 2 years. Thus, we are determined to further study this issue to develop an overall asset management policy.

WG2: Global environment

Keeping in mind that global warming due to greenhouse gases (GHGs) emissions by fossil fuels is one of the most critical issues that we need to cope with immediately, we have explored how to estimate the GHGs emissions from activities within cities by reviewing existing studies in order to figure out factors which influence most to GHG

emission reduction.

Based on the recent study (Kiryama et al "Urban and Land Structure for Lower Environmental Impacts", Journal of Policy Research for Land, Infrastructure and Transport, Vol. 12, 2002), the electricity consumption per capita has a tendency that is higher in city center and lower in suburbs. It is also noted that there is little difference among total consumption between city center and suburbs, despite the fact that the density of electric appliances tends to increase in a small size house of city center and the amount of automobile energy consumption from residence is lower in city center than in suburbs.

According to our findings, there are very few studies indicating the possible future scenarios covering energy demand increase, population trends, changes of economic situation in various regions, and urban life style changes in the future, even though some studies show that GHGs emissions can be roughly estimated by statistical analysis of existing available data.

For pursuit of the ultimate goal, which is the establishment of the effective and accurate tool to estimate and forecast GHG emissions by urban activities, it is exactly needed to cooperate with wisdom in various related field such

as engineering, geography, economics, science. Although, we believe that we have found the key issues to be solved, this study was only able to reach the door to the future goal. We are hoping to continue the study on the issues in any way.

WG3: Study on heat islands in urban environments

In order to develop a so-called sustainable city, it is necessary to study about a sustainability of urban infrastructures organizing the city and environmental influence of these infrastructures. There are many factors of the urban infrastructure development that affect the environment in cities, such as air the pollution, water pollution, noise problem, etc. This working group focused and investigated the heat island phenomenon which is rapidly

increasing in Japan . The heat island phenomenon has a very complicated mechanism so that a numerical simulation based on a mathematical model is very useful for this investigation. So we carried out a numerical simulation of Hanshin district where the air temperature is getting remarkably high in recent years using remote sensing data. Specifically speaking, we shared the preparation of initial data with Nakanihon Air Service, the simulation of meso-scale atmosphere with University of Tokyo and the heat balance analyses at the ground surface with Kajima Cooperation. The subjects below were investigated.

(1)Development of numerical simulation method using data obtained from MSS fitted to an aircraft as a tool to predict an environment in cities.

(2)A difference from prediction accuracies depended on sets of land covering data for the purpose of establishing numerical simulation method.

Under restriction of two years period, this working group could obtain excellent results on these subjects because it has been organized from specialists of many fields, such as architecture and building, civil engineering, geographic information and so on, and could carry out an analysis of the heat island phenomenon from many technical views.

We hope these results can contribute to developing a sustainable city practically and make studies about sustainability and the influence on the environment of urban infrastructures progress.

The 6th ICUS Open Lecture

The 6th ICUS open lecture was performed at the first meeting room of IIS in the afternoon of April 9, 2004. The title of the open lecture was "World and Japan, Peace and Disaster Prevention". In the open lecture, three interesting lectures were given from the three famous professors, Prof. Fukuwa, Prof. Sudo and Prof. Okada. At the end of the lecture, special session was organized to discuss the importance of safety engineering with the three professors and the audience (90) from many different aspects. The lecture ended at 17:00 but the talks continued till the end of the cocktail party after the lecture.

The title, brief explanations and the lecturers were as follows:

- 1) Prof. N. Fukuwa, Nagoya University: "Disaster Mitigation Strategy for Local Area Based on Experience in Nagoya Area ",
- In the near future, within 50 years, one or more large earthquakes are expected to happen in Shizuoka and Nagoya area. To deal with the earthquake, lecture was given how the government and private sectors are planning and working hard to prevent and mitigate disasters in this area.
- 2) Prof. K. Sudo, CTBTO (Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization): "My Activities for Safer and More

Peaceful Earth",

- Brief explanation of the lecture is given at the top of this Newsletter. The lecture was given by the former director of INCEDE.

- 3) Prof. H. Okada, Hokkaido University: "Successful Predication for Volcanic Eruption of Mt. Usu",
- The lecture was given how the prediction was made at the time of volcanic eruption of Mt. Usu in Hokkaido. Although the prediction was successful due to detailed inspection and monitoring of the movement of the volcano, disaster may happen when the inspectors visited the site.



Technical Delegation from France

A technical delegation from France visited ICUS on April 21, 2004. The mission of the French team visit to Japan was to survey the new technologies applied to large projects, newly developed construction materials, risk and management methodologies now being used in Japan.

The team consisted of 14 members including senior officers from French Embassy, Tokyo and it was led by Mr. Daniel TARDY of MEDEF (Mouvement des Entreprises de France). The delegates were mostly from



French delegation with some ICUS staff members

industrial sectors.

Prof. Uomoto, Dr. Meguro and Dr. Ooka of ICUS presented recent works on their respective areas of research related to the interests of the visitors and showed the their on



Prof. Uomoto explains various activities of ICUS to the visitors

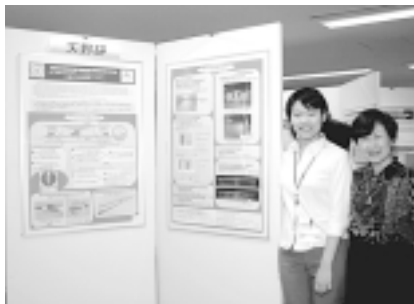
going research activities at the research laboratories. The delegates were impressed by the wide range of fundamental research and collaborative research activities performed at ICUS.

IIS Open House

The Institute of Industrial Science opened the facilities to the public on June 6 and 7, 2004. Our ICUS (International Center for Urban Safety Engineering) also opened the facilities and explained our activities both in English and Japanese. The title of the open house of ICUS was "Towards Safer and Securer Built Environment in Mega Cities in Asia". Total number of participants for two days was 120.

Under the umbrella of the ICUS title, ICUS members' research titles were as follows:

- 1) Dr. Kimiro Meguro:
 - Development of Integrated Information System for Total Disaster Management -



- 2) Prof. Taketo Uomoto:
 - Methodology from Inspection and Diagnosis to Repair Method of Concrete Structures -
- 3) Dr. Ryuzo Ooka:
 - Sustainable Urban Design with CFD Simulation -
 - Wind Energy Use and Diffusion of Contaminants in Urban Area with Wind Tunnel



- Experiment -
- 4) Prof. Yoshifumi Yasuoka:
 - Environment Monitoring and Disaster Assessment Using Remote Sensing -
- 5) Dr. Yoshitaka Kato:
 - Development of Maintenance Management System for Existing Concrete Structures -

ICUS Activity Records

- Prof. Uomoto visited Zurich (Switzerland), Munchen, Berlin and Kohn of Germany for participating in research activities related to concrete engineering (June 12-20).
- Prof. Yasuoka and Dr. Endo participated at the 8th MODIS meeting at Bangkok, Thailand with GISTDA and AIT on management and utilization of MODIS data

- (June 23-26).
- Prof. Ooka participated in the conference on "Development of Urban and Building Models for Densely Populated Area with Minimized Environmental Load in Hot and Humid Climate" and attended the annual meeting of ASHRAE at Nashville, USA (June 26-July 2).

- Prof. Dutta visited AIT, Thailand for collaborative research at RNUS (June 15-Aug 31).
- Dr. Kato attended the 4th International Conference on Concrete under Severe Conditions at Seoul, Korea (June 28 - July 1) and visited AIT, Thailand for collaborative research at RNUS (July 2- 22).

Awards

- Mr. Kei OYOYOSHI, a student of Prof. Yasuoka, won the best presentation award at a Conference of the Japan Society of Photogrammetry and Remote Sensing in June

- Mr. Pakawat SANCHAROEN, a student of Prof. Uomoto, won the excellent presentation award at the annual meeting of Japan Cement Association in May.

- Mr. Kazumichi SHIRASE, a student of Prof. Uomoto, won the excellent presentation award at the annual meeting of Japan Cement Association in May.

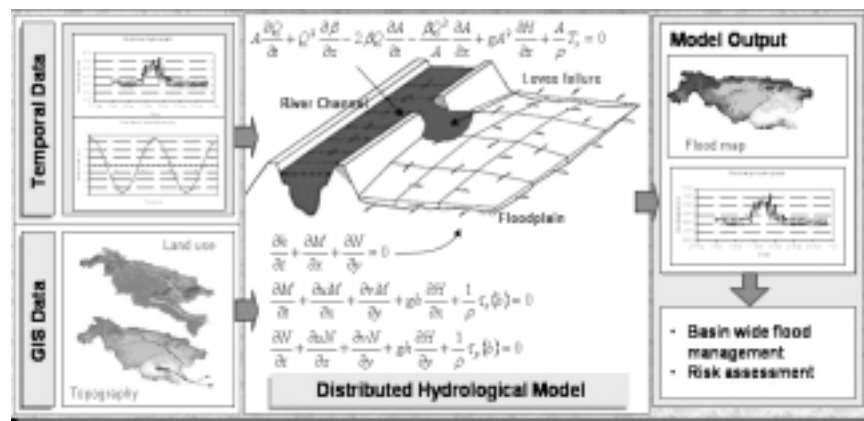
- RNUS Activities -

An Introduction to RNUS Project on Urban Flood Modeling in Mekong Basin

Since inception, the Regional Network Office for Urban Safety (RNUS) of ICUS/AIT has initiated several research projects in collaboration with other research institutes or private sectors. This is one of sponsored research projects of RNUS by private sector, which aims at developing a system for urban flood inundation simulation in the Lower Mekong river basin. The project mainly focuses on physically based surface-river modeling for flood inundation simulation.

The model is developed with the objective of integrating it with airborne and space borne resources and numerical weather prediction models for designing an integrated flood warning system. An existing distributed surface-river hydrological model developed at the Public Work Research Institute (PWRI) of Japan is modified and improved for Mekong river basin. Initially, the existing model is tested in a small river basin in Japan with historical data and then, it is modified to make it suitable for large basin for its application and verification in the Mekong River basin with data of some selected major flood events. The focused area in the Mekong basin is Cambodian floodplains of the Mekong, Tonle Sap and Bassac Rivers. After successful application, the model will be utilized as the flood simulation model of a proposed comprehensive flood warning system for the Mekong Basin.

For further information about this project, please contact RNUS by e-mail (rnus@ait.ac.th) or visit the RNUS website (<http://www.sce.ait.ac.th/rnus/>).



Schematic representation of the modeling concept

ICUS Report 5: Proceedings of 3rd WSSI International Workshop is published

RNUS spearheaded the editing activities of the ICUS Report 5, which was published recently. This volume of ICUS Report contains the proceedings of the Third International Workshop of the World Seismic Safety Initiative (WSSI) on Seismic Risk Management for countries of the Asia Pacific Region. WSSI is an undertaking of the International Association of Earthquake Engineering. The workshop was held in Bangkok, Thailand during December 7-8, 2003 and was attended by 52 participants from 19 countries. The organizing activities of the workshop were coordinated by RNUS.

The proceedings include country reports from 12 countries, reports on inter-national cooperation of JICA and reports from other International Organizations. The country reports emphasized on the earthquake risk mitigation efforts, strategies, responses and assessment measures initiated in their respective countries. Most of the country reports focused on seismic risk management activities in the last five years, scope for future collaborations in the region for varied resources and further

networking and information-sharing with international organizations. Important roles played by WSSI as a catalyst in initiating several activities for earthquake disaster reduction in different countries are highlighted in the country reports. The four papers on JICA related activities introduce major projects and programs of JICA on international cooperation, which have been implemented in an attempt to reduce seismic risk in different countries of Asia. The last section of the proceedings includes reports from five international organizations.

For obtaining a copy of this Report, you may contact RNUS by e-mail (rnus@ait.ac.th).



Cover page of ICUS Report 5

Editor's Note

ICUS has been opening international symposiums, workshops, and open lectures to the public every year, addition to the activities required by IIS, such as "Open House of Komaba Campus" and "Open House of Chiba Campus". In this News letter, the lecture given to us in the open lecture by Prof. K. Sudo, the former director of INCEDE, is introduced. As given in the paper, it is not an easy work to start a new activity without any help from the public. Our ICUS was lucky enough to overtake the networks of former center "INCEDE", and succeeded in enlarging the relations with other organizations, universities and industries throughout the world.

Three years have passed since ICUS started its activities in April,

2001. Many projects have been performed among the staff members of ICUS related to urban safety engineering. Since April of 2001, 6 new staff members joined ICUS : Prof. S. Misra, Dr. T. Endo, Ms. M. Yoshimura, Prof. T. Takahashi, Prof. M. Setojima, and Prof. R. Amano. But after one to two years of stay, 4 members, Dr. S. Ochi, Prof. S. Misra, Prof. T. Takahashi and Prof. M. Setojima have already left ICUS, working hard during their stay in ICUS. The secretaries of ICUS have also changed: Ms. N. Shiuchi, Ms. C. Murakami, Ms. V. Aravinthan, Ms. Y. Ochi, Ms. S. Hazarika have left ICUS but Ms. E. Yoshimoto and Ms. T. Fujita are taking over their works.

On May 5, we have a celebration day for children in Japan. To celebrate, large carps made of cloth are hoisted in tall poles and let them swim in the air as shown in the

photograph. The carps are believed to be live and strong fishes and people wish their children to grow up with high spirits like carps. Although members of ICUS are changing year by year, we wish all the members including former members to support our activities like the carps in the photograph. Although ICUS is becoming one of the top centers in Japan, we hope our center to be one of the most active international center for urban safety engineering throughout the world. (by Uomoto)



Swimming carps and Mountain Fuji

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