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COMMUNICATING RISKS TO THE PUBLIC

By

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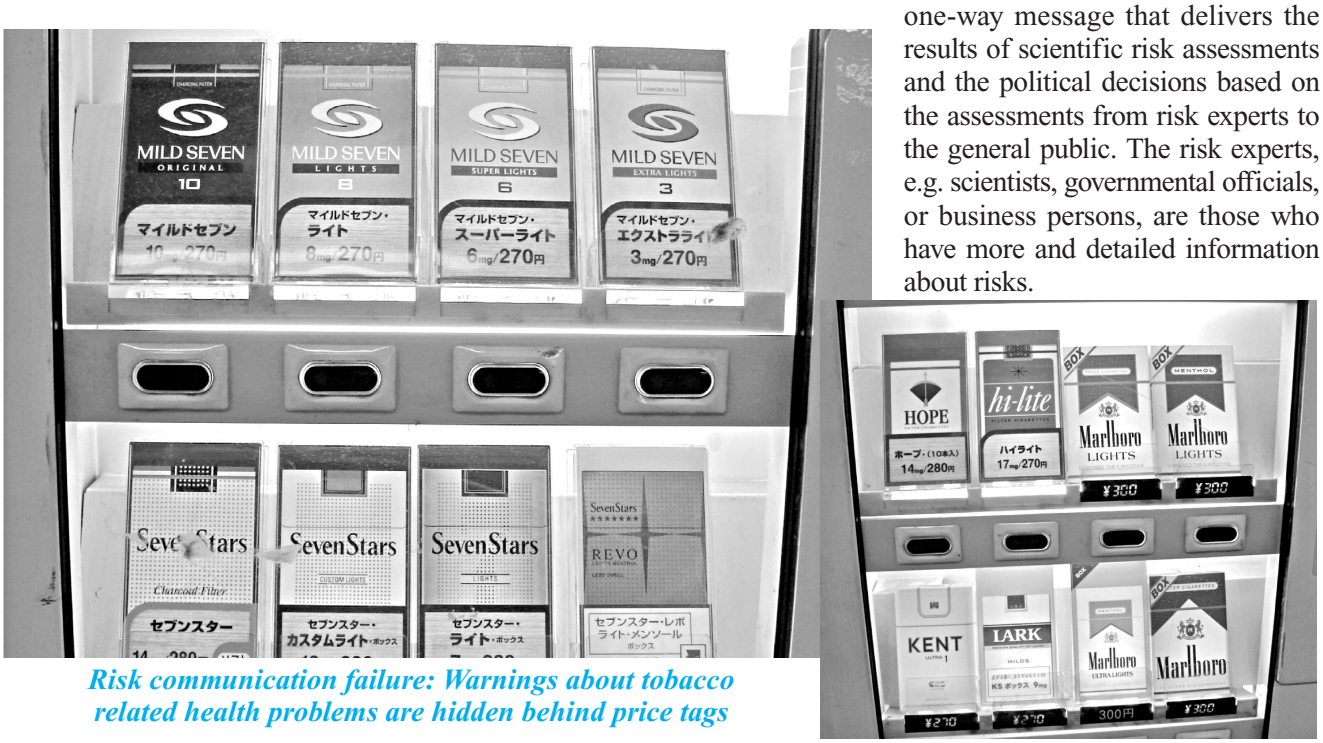
WHAT IS RISK COMMUNICATION?

Definitions of risk and risk communication

Although there are some variants of the definition of risk and risk communication, the most accepted one was given by the National Research Council in the United States which is a part of the National Academies providing science, technology and health policy advice under a congressional charter. In its epoch-making report on risk communication, it is stated that "an act or phenomenon is said to pose a hazard when it has the potential to produce harm or other undesirable consequences to some person or thing" and that "the concept of risk further quantifies hazards by attaching the probability of being realized to each level of potential harm." In short, risk can be defined as a probability of hazard occurrence.

The report defined risk communication as: "an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, reactions to risk messages or to legal and institutional arrangements to risk management."

The emphasis of the definition is on the interactive process of communication among interested parties. Risk communication is not a one-way message that delivers the results of scientific risk assessments and the political decisions based on the assessments from risk experts to the general public. The risk experts, e.g. scientists, governmental officials, or business persons, are those who have more and detailed information about risks.



Risk communication failure: Warnings about tobacco related health problems are hidden behind price tags

The figure on this page gives a graphical representation of risk communication. Risk messages are delivered from risk experts to interested people and concerns, opinions, or reactions to risk messages or to risk management are delivered from interested people to risk experts.

In the past, only risk experts could have access to the information and were assumed to make appropriate decisions based on reasonable evidence. This meant, on the contrary, that the general public had little access to information and was excluded from decision-making.

Risk Communication

Historical background of risk communication

The word "risk communication" is a relatively new concept in the field of risk management. It has emerged and drawn attention since late 70's or early 80's. The reasons for this might be three: the increase in risk problems, changes in nature of risks, and rises in concerns for people's rights to know and participate in democratic societies. The former two deal with risks themselves and the last one deals with a social aspect.

Firstly, risk problems have increased. Fair examples of this are environmental pollution and infectious diseases. Environmental pollution has been increasing presumably because of the urbanization and population growth. The spreading of infectious diseases such as AIDS has also become a serious problem partly because of the development of transportation systems that enable a world-wide interaction of people. The increase of risk problems would imply that risks are ubiquitous in our society. Therefore, for people who want to avoid these increasing risks as much as possible, information concerning them has become more important than ever before.

Secondly, the nature of risks has changed, thus the importance of risk communication has increased. Even experts may sometimes find difficulties in assessing risks because either the hazard or the risk probability is uncertain or both of them are uncertain. The word "uncertain" implies that certain substances may have adverse effects in the long run, but currently, tools for measuring risks are not well developed or there is little or no available data. Risks can also be said to be uncertain in case that there are disputes among experts about how to interpret the data or estimate the probability.

Let me take some examples. Natural hazards such as earthquakes or volcanic eruptions will cause catastrophic consequences but the probabilities of such natural hazards can not be exactly estimated. They may occur once in every fifty years, or perhaps more or less frequently. Bovine Spongiform Encephalopathy (BSE), commonly known as mad cow disease, is another example whose consequence is cruel but its pathogenic probability is still unclear.

The vague nature of these risks makes risk communication more difficult and thus sometimes leads to inappropriate political decisions of risk experts. For example, in case of the Minamata disease in Japan, where serious mercury poisoning was caused by eating contaminated fish, victims were left unattended during the dispute on the cause of the symptom among medical professionals and governmental officials. The situation became more serious during the dispute and the resulting inaction cost dearly in the long run.

The BSE crisis in the United Kingdom is another example of failure in risk communication, which led to mismanagement. The first discovery of the disease in British cattle was in 1986. However, it was not until 1996 that the British Government officially recognized the link between a new variant of Creutzfeld-Jakob disease and the consumption of beef from cattle with BSE. During this inaction period, from the perspective of risk communication, the Government took a position that seemed to support the beef industry rather than admitting to, and informing about, the risk, however small it might be. This bureaucratic mismanagement finally led to the overnight collapse of the British beef market after the official recognition. Beef consumption across the European Union dropped 11% in 1996, and the EU spent 2.8 billion US dollars in subsidies alone for the beef industry. The U.K. cost is estimated over 4 billion pounds.

In addition, there are social costs which are slower and more difficult to account for than economic ones. The examples of them are management distrust, collapse of farmers' lives, and so on. Although risk experts, especially business persons and governmental officials, often focus only on short term economic cost, it might be wiser to approach these risk situations from a wider perspective, including social aspects. Risk communication is one of the promising approaches for dealing with such situations as it requires a long-range perspective of scientific, economic, and social risk management.

Lastly, there has been increasing concern on the peoples' rights to know and participate in political decision-making in democratic societies. As the former has been widely recognized, people are more carefully scrutinizing the political process as to whether information is censored or not. Furthermore, they ask to participate in the decision-making process from the very beginning stage of the planning, something they had never been involved in before. If risk experts such as governmental officials and business persons ignore this desire, serious and persistent resistance that can not be resolved in the short term is likely. To avoid such hopeless confusion in advance, it might be better to build a system for public participation.

Examples of them are 'public involvement' or 'public counseling' plans which are realized and, in some cases, institutionalized in the US, Europe, Japan, and so on.

Misconceptions about risk communication

At the very beginning when the concept of risk communication was proposed, it might have been thought of as a tool for communicating the results of scientific risk assessments to lay persons. It was sometimes used as a tool to persuade laypersons to accept risks.

However, there can be an inherent flaw in this assumption. Risk experts are sometimes wrong in the sense that they underestimate risks. Unfortunately, some risks are found to be higher than their estimation as in the above mentioned BSE case. The problem is that they often wish to persuade lay persons to accept these risks as being so low as to be negligible. This situation may prove to be not only wrong, but also disastrous. The tragic consequence of the negligence ended with huge loss of lives, as in the cases of HIV-contaminated blood, September 11 terrorism, and so on. Governmental officials might have received some underestimated forewarnings and the number of victims increased as a result of the underestimation.

Furthermore, there is conflict between risk experts and the public when the officials are slow to react to the increasing public concerns and interpret these as public overreaction. The possible result of the conflict may be that the risk experts are undermined.

Let me again take the case of BSE. For nearly 10 years, the British government insisted there was no risk, or the risk was so small that it could be neglected. The persuasion might have been effective at first, but slowly lost its effectiveness as contradictory data prevailed. At the end of this story, it achieved adverse effects on the attitudes of people and the society. Once trust in management is destroyed, it becomes difficult to inform people even if the information is true the subsequent time. Destroying trust is easy, but rebuilding it needs a ceaseless and tremendous effort. It might be easier to disclose information and properly inform people from the very beginning rather than to make a, long, huge communication effort afterwards.

Risk communication is a trust-building process in the ideal and practical sense. It requires disclosure of communication among interested parties in democratic societies and it really works as a kind of 'insurance' for the future as well.

Personal choice	Public debate
• Consumer products • Health/Medical problems • Disasters (Natural disasters and technological accidents)	• Advanced technology (nuclear power, biotechnology, etc.) • Environmental problems

Settings of Risk Communication

SETTINGS OF RISK COMMUNICATION

Risk communication of personal choice

The National Research Council distinguished two types of risk communication settings: personal choice and public debate.

The figure on this page gives the typology of risk communication settings. Examples of personal choice setting are risk communication of consumer products, health problems, and disasters. Examples of the public debate setting are risk communication of nuclear energy, genetically modified food, environmental problems, etc.

In the personal choice setting, a person is informed of risks and, whether he/she will accept the risks is determined by his/her own choice. It is known that one of the biggest problems of personal choice setting is that people underestimate risks and are reluctant to avoid risks, although being fully informed of them. This psychological tendency is called 'unrealistic optimism.' Because of this tendency, more continuous and truthful communication efforts are necessary to let people know and avoid risks.

One solution to this problem is to plan educational programs to properly inform about risks using some persuasive techniques. An example of them is fear-arousing appeal, which causes a strong emotional state of fear by showing, for example, a dramatic film of victims, and then recommending taking protective measures.

Risk communication of the public debate

In the public debate setting, many interested parties will try to reach a consensus through many paths of communication. In this setting, risk communication requires all the interested parties to participate in the decision-making from the very beginning of the process.

It is unfortunate but possible, that, even if being properly informed of risks and having thoroughly discussed them, people involved may not reach a consensus. This is partially because people have their own values and cultures to which they adhere.

Toward a successful risk communication

To make risk communication successful, two crucial factors, that is, disclosure of information and transparency should be guaranteed in the decision-making process.

Firstly, disclosing all information regarding risks to the public increases the probability that additional risks or flaws in management approaches are found. As the number of people who are involved increases, there might be more chances to find previously unidentified risks. It can be an efficient way of detecting risks.

Secondly, the whole process of decision-making is recorded and opened to the public. It can be reviewed and alternative decisions be taken when it becomes clear that the first decision proved to be wrong. This situation is possible merely because of time constraints in the first decision-making process or because new scientific evidence is found and added.

**Associate Professor, Keio University*

Elementary school students discover the value of their town

From April to May of this year, sixth grade students from Uehara Elementary School, located close to ICUS, have been exploring Uehara town under the guidance of university students mainly from Muramatsu laboratory, IIS. The title of this special project is "We are the town explorers" and has been carried out from the last year under the initiative of Muramatsu Laboratory based on the premise that it is necessary to start teaching early the importance of preserving our urban cultural heritage, resources, etc.

The participants were divided in seven groups of five to six students each of them with one university student leader. Each group chose one topic suggested by the leader, and explored the neighborhood looking for it. I was the leader of Team Red and decided to search for the "town guardians" or elements that take care of several town aspects such as safety, beauty, convenience, etc. I wanted the children to think about various town elements and their interaction. During our explorations we identified several guardians based on many discussions. Finally, we prepared our images and presented them on June 2 at the IIS Open House.

Uehara town "guardians"

Because I have not been in contact with young children for a long time, it was a tough but exciting experience for me. I discovered Uehara town and also different aspects of children.

(By Mariko Abe, Graduate student, Meguro Laboratory)

ICUS joined IIS Open House

ICUS joined the Institute of Industrial Science Open House which was held from June 1 to 3. In this event, our institute is open to the public to share with the visitors its research outcomes. This year ICUS topic was "Towards the Establishment of a Sustainable Urban System." As every year, all laboratory members participated and displayed their panels. Topics varied in a wide range from diagnosis, repair, and strengthening of concrete structures to diffusion of contaminants in urban areas. The problem of formation of cavities and loose ground above old underground pipes, the need of disaster resilient water cycle systems for sustainable societies, and the challenge to integrate countermeasures to achieve earthquake disaster resilient urban systems were also addressed. The open house was also an opportunity to introduce the 2005 Annual Report as well as RNUS activities. Reports and newsletters were given away to visitors.

An ICUS Quiz was prepared following the success of last year issue. Twenty one questions were proposed and based on the number of correct answers, ICUS calendars and pen cases were offered as prizes. Almost 60 persons participated in the quiz and 25 calendars were distributed. This year it was the first time that the open house was held on a Saturday giving the opportunity to whole families to visit our campus. Many children were enthusiastic about the ICUS Quiz and put their parents under pressure to help them get the correct answers.

(By P. Mayorca)

ICUS quiz drew attention of the open house participants. In the photo, three calendar awardees.

RNUS Activities

Inspection on Short Span Traffic Bridges in Bangkok Metropolitan Administration Area

The Regional Network Office for Urban Safety (RNUS), in cooperation with the Sirindhorn International Institute of Technology (SIIT), launched the infrastructure inspection program for the Bangkok Metropolitan Administration Area (BMA).

The program started with the inspection of short-span concrete bridges across canals in western Bangkok. The inspection aimed at evaluating the condition of these bridges regarding to its serviceability and durability. Smidth's hammer was used to measure the structure strength while the carbonation depth and reinforcing bar corrosion were closely observed.

The inspection results will be used to determine the required maintenance and how to efficiently allocate the available budget. In addition, a group of students from AIT and the SIIT joined this activity as a part of their training.

(By R. Sahamitmongkol)

Students measuring concrete strength using Smidth's hammer

Structure deterioration was investigated from a boat

Prof. Meguro promotes safer communities in Algeria and Pakistan

As a part of ICUS international activities, Prof. Meguro visited Algeria and Pakistan from March 17 to 26. The Japan International Cooperation Agency (JICA) is carrying out a microzonation study for the capital city Algiers and Prof. Meguro is the chairperson of the advisory committee. The project objective is to prepare the basic data needed for the establishment of a comprehensive disaster management plan for Great Algiers. On this occasion, Prof. Meguro reported on the project progress and helped outlining its next stage.

In Pakistan, Prof. Meguro visited Muzaffarabad, the most affected region during the 2005 Kashimir Earthquake. During his first trip to the area last year, he introduced the PP-band method to retrofit masonry structures. Due to the great interest that the technique generated on the local people, JICA decided to carry out a demonstration project at the site. A typical house was constructed and then retrofitted with PP-band meshes. The cost of the material needed to retrofit one ordinary house was US$30 and the total retrofitting cost, including installation, was approximately 5% of the total construction cost. This value is expected to reduce as workers' skill improves.

Shaking table demonstration carried out in Muzaffarabad, Pakistan

In order to effectively explain the benefits of retrofitting, demonstrations for the public and decision makers are powerful tools. The Nepalese NGO National Society for Earthquake Technology (NSET) has been carrying out shaking table demonstrations in many countries for this purpose and joined this project. Two 1/6 model replicating the full size house, one retrofitted and the other non-retrofitted, were prepared and shaken. The non-retrofitted specimen collapsed whereas the other stood. The demonstration was carried out in front on governmental authorities, NGO representatives, mass media people, and the general public and had a strong impact on them. Before the demonstration, Prof. Meguro explained the background and principles of PP-band retrofitting and Mr. Amod M. Dixit, Executive Director of NSET, translated the presentation to the local language.

(By K. Meguro)

Pilot model constructed to show PP-band retrofitting method

ICUS members visited BUET, Dhaka, Bangladesh

Prof. K. Meguro, Dr. M. Yoshimura, Dr. H. Kanada, and Mr. K. Tsukimoto, graduate student of Meguro laboratory, visited Bangladesh University of Engineering & Technology (BUET) from June 14 to 19, 2006.

On 14, ICUS signed the contract for the establishment of the Bangladesh Network Office for Urban Safety (BNUS) with the Department of Civil Engineering, BUET. The new office will open in September 2006.

Ceremony participants

A short course on Evaluation of Concrete Structures was held on 14-15, Prof. Meguro, Dr. Yoshimura, and Dr. Kanada delivered presentations on the importance of earthquake disaster prevention, seismic vulnerability assessment using microtremor measurements and introduction of non-destructive inspection (NDT) methods for concrete structures, respectively. On the afternoon of the second day, a demonstration using actual equipments was performed for the participants.

Dr. Yoshimura explains how to operate equipment

On 15, Prof. Meguro was invited as a guest speaker to the seminar organized by the Engineer Staff College Bangladesh and the Bangladesh Earthquake Society. He introduced recent developments of earthquake related activities in Japan. After his presentation, Bangladeshi engineers asked many questions on how to adopt these technologies to their country.

From 16 to 19, many structures (BUET facilities, fire stations and buildings under construction) were surveyed with BUET members. Dr. Yoshimura and Mr. Tsukimoto measured their dynamic properties using microtremor measurement equipment and Dr. Kanada investigated rebar arrangement using NDT equipments.

(By H. Kanada)

Seminar organized by Bangladesh Earthquake Society

Investigation of bar arrangement of RC slab using NDT equipment

Dr. Tan visited ICUS under JSPS Scientific Exchange Program 2006

Dr. Kiang Hwee Tan, Associate Professor in the Department of Civil Engineering at the National University of Singapore (NUS), visited ICUS from 10 to 24 June 2006, under the JSPS Scientific Exchange Program. The visit is a significant step towards further academic exchange and cooperation between the two institutions, which signed a memorandum of understanding on joint research in March 2005.

Dr. Tan obtained his doctorate degree from the University of Tokyo in 1985. He has carried out research on beams with openings, fiber-reinforced concrete and ferrocement, external post-tensioning, and fiber-reinforced polymer reinforcement. He has published more than 150 refereed papers and a book on "Beams with Openings: Analysis & Design." Dr. Tan is a member of the editorial/advisory board for six international journals, including ASCE Journal of Composites for Construction (USA), JCI Journal of Advanced Concrete Technology (Japan), and ICE Structures & Buildings Journal (UK). He is also the Vice-Chairman (Technical) for the International Committee for Concrete Model Code for Asia. He was the organizing chair for the Sixth International Symposium on FRP Reinforcement for Concrete Structures (FRPRCS-6), held in Singapore in July 2003.

During his visit, Dr. Tan gave a lecture on "Rational Approaches to Structural Strengthening." In the lecture, he explained the use of strut-and-tie models and strip method for beam and slab strengthening using fiber-reinforced polymer (FRP) systems, and illustrated them with tests on dapped beams, beams with recess or opening, and slabs with an opening. Dr. Tan discussed the use of the load-balancing method in structural strengthening using external tendons for both simple-span and continuous RC beams. It was evident that these approaches that are based on principle of statics are versatile and safe for application, especially for complex structures.

Dr. Tan shared his other research interests with researchers at ICUS. He is currently doing research on blast resistance of masonry and reinforced concrete walls, sprayed polymer and sprayed FRP, and fire-resistance of FRP systems and FRP-strengthened beams. He was impressed with the test facilities at ICUS, especially the wind tunnel and the tri-axial shake table, and with the work carried out at ICUS, in particular on the use of polypropylene bands as a cheap strengthening material. He hopes to initiate joint research in these areas with ICUS, and looks forward to ICUS researchers visiting his department at NUS in the near future.

Dr. Tan receives certificate from Prof. Uomoto after delivering a lecture at ICUS

Dr. Tan also visited three construction sites dealing with FRP strengthening and tunnel boring, and had discussion with researchers from the research institutes of Kajima Corporation and Obayashi Corporation. He also met members of the Association for Advanced Composite Technology on Construction Field (ACC) and Information Technology Building System (ITBS) Group. He is grateful to his host, Prof. T. Uomoto, and his staff for the arrangement and for making his visit a memorable and fruitful one.

(By K. H. Tan, ICUS Network member)

Prof. Hayashi left ICUS after two-year appointment

After holding the position of Visiting Professor at ICUS, Prof. Shogo Hayashi, former Commissioner of the Fire Disaster Prevention Agency, retired from our center this June. Recently, he was appointed Vice-Minister of the Ministry of Internal Affairs and Communications, Japanese Government. During his stay, he lectured at the course entitled Fire Defense and Disaster Prevention Administration and Techniques of Disaster Prevention given during the Summer Semester at the Graduate School of Civil Engineering, the University of Tokyo. He focused on fire disaster management, particularly on the importance of efficient personnel management. He also led visits to the "Fire Research Institute" and the "Fire Defense College".

Prof. Hayashi participated in the preparation of a website to promote seismic retrofitting of public buildings. The site compiles and presents information related to seismic activity in Japan, importance of structure retrofitting, available vulnerability evaluation methods, and recommended retrofitting alternatives. It also includes a database of past retrofitting examples, company names, construction costs and duration of the required works. The website is hosted at the Fire Disaster Management Agency webpage.

Prof. Hayashi gave speeches at the 8th Open Lecture and the 31st Seiken Evening Seminar. We would like to thank very much Prof. Hayashi for his fruitful stay and great contributions to our center.

(By K. Meguro)

Prof. Hayashi delivered several lectures during his stay at ICUS

Two new members joined ICUS

We would like to welcome warmly Drs. Reiko Kuwano and Paola Mayorca who joined ICUS on April 1st, 2006 as Associate Professor and Project Research Associate, respectively.

Dr. Kuwano, formerly a senior researcher in the Public Works Research Institute, received her Master degree from the Department of Civil Engineering at the University of Tokyo in 1988. After she gained practical work experience in a construction company for some years, she obtained her PhD from the Imperial College, London University in 1999. Her research interest is geotechnical engineering, including characterization of mechanical behaviour of geomaterials, long-term behaviour of underground structures, remediation of contaminated ground, etc.

Dr. Mayorca got her undergraduate degree from the Pontifical Catholic University of Peru in 1994 and worked as a structural engineer in Peru for three years. In 2000, she got her Master Degree and in 2003 she got her PhD both from the Department of Civil Engineering at the University of Tokyo. She has been working on the development of retrofitting techniques to improve the seismic performance of unreinforced masonry structures with particular focus on housing in developing countries. In her PhD dissertation, she investigated experimentally and numerically the use of PP-bands, which are commonly used for packing, as a feasible method to prevent collapse of masonry houses during earthquakes and reduce fatalities in future seismic events.

(By T. Uomoto)

Dr. Reiko Kuwano

Dr. Paola Mayorca

ICUS Activities

- *Prof. Meguro attended the 100th Anniversary Earthquake Conference commemorating the 1906 San Francisco Earthquake, which was held at San Francisco, US, together with Drs. Yoshimura and Mayorca (April 16-23).*
- *Prof. Meguro, Dr. Yoshimura, and Dr. Kanada visited BUET, Dhaka, Bangladesh (April 13 - 20).*
- *Dr. Oki attended the Hydrology 2020 Conference in Delft, Holland (June 27-July 1).*
- *Dr. Ooka participated in the 10th International Conference on Thermal Energy Storage at the Richard Stockton College of New Jersey, in Philadelphia, US (May 30-June 4), the 6th International Conference on Urban Climate at the Technical University of Denmark in Sweden and Denmark (June 11-18), and the 2006 ASHRAE Annual Meeting in Quebec, Canada (June 24-29).*
- *Dr. Kato stayed at AIT for his research work and teaching duties at RNUS (April 17-May 17, June 21-July 7). He participated in Concrete Solutions 2006, 2nd International Conference on Concrete Repair at St. Malo, France (June 26-July 1).*
- *Dr. Sahamitmongkol stayed at AIT for his research work and teaching duties at RNUS (April 10-May 29, June 9-July 5). He joined the 11th National Convention on Civil Engineering at Phuket, Tailand (April 20-23).*
- *The RC-39 Committee met on May 23. After each working group reported on their activities, Prof. Tachibana, Prof. Emeritus of the University of Tokyo, gave the presentation entitled "Estimation of current traffic noise conditions"*
- *ICUS Student seminar was held on May 30. Students from all ICUS related laboratories participated and gave presentations.*
- *ICUS Open House was held together with IIS Open House during June 1-3.*
- *Metropolitan Highway Watching was held on June 9.*
- *Prof. Tan visited ICUS (June 10-24) supported by the Japan Society for Promotion of Science Scientific Exchange Program 2006.*
- *ICUS seminar, in which Prof. Tan delivered the lecture: "Rational approaches to Structural Strengthening," was held on June 19.*

Awards

- *Dr. Kato received the "Incentive Award" from the "Japan Concrete Society" for his paper "Study of a Method for Deciding the Inspection Program to Assess the Risk of Material Heterogeneity and Uncertainties."*
- *Dr. Kanada received the "Incentive Award" from the "Japan Concrete Society" for his paper "Application of Near-infrared Spectroscopy for Inspection of Concrete."*
- *Drs. Ema Kato, Kato, and Prof. Uomoto received the "Best Paper Award" from the "Japan Concrete Society" for their paper "Development of Simulation Model of Chloride Ion Transportation in Cracked Concrete."*
- *Prof. Meguro received the "Excellent Paper Award" from the "Japanese Geotechnical Society" for his paper "What I have been thinking for the last 10 years since the 1995 Kobe Earthquake."*

Editor's Note

On April 27, 2006 a magnitude 6.3 earthquake hit Java, Indonesia killing nearly 5,800 people and injuring almost 38,000. We would like to convey our deepest condolences to the affected population. What makes this event even sadder is that most of the casualties and destruction could have been prevented.

Reportedly, the seismic strength of the houses in the stricken area was very low which translated into more than 350,000 dwellings damaged beyond usability. If these structures would have been sufficiently strong, most of the fatalities could have been prevented. Furthermore, the resources needed for reconstruction could have been smaller. This tragic event reminded us of similar situations faced at Gujurat (India, 2001), Bam (Iran, 2003), and Kashmir (Pakistan-India, 2005).

The Java Earthquake put on the spotlight again the issue of existing low earthquake resistant masonry houses. Because 60% of the world's population lives in this type of structures, even in earthquake prone regions, future earthquakes will have similar devastating consequences. It also exposed our failure, as earthquake experts, to communicate risk to the general public as discussed by Dr. Kikkawa in this Newsletter edition. These problems should be tackled with two approaches: technical and social. The first one means that any proposed retrofitting method should consider local availability, applicability, and acceptability. At my research group we are recommending the use of Polypropylene band (PP-band) meshes for retrofitting because the material is locally available at a very low price and the installation process is very simple and can be carried out by the house owners. We have performed several shaking table tests and confirmed the excellent behavior of structures retrofitted by PP-band meshes.

A devastating earthquake hit Java, Indonesia on April 27 2006 showing again the urgent need to strengthen the existing low earthquake resistant housing stock (Photo by Masasuke Takashima, ICUS network member)

A viable technical solution alone is not enough to solve the problem of existing weak structures. It should come together with a social program which encourages its implementation. This program should focus on raising seismic risk awareness among the population with adequate risk communication tools coupled with policies to promote reinforcement through incentives. We are also working on this type of schemes at my laboratory. If you would like more information on PP-band retrofitting method or our proposed social system to foster retrofitting, please do not hesitate to contact us at ppmethod@iis.u-tokyo.ac.jp.

(By K. Meguro)

If you would like to contribute an article to ICUS newsletter or have any comment or suggestion, please contact the editorial committee at icus@iis.u-tokyo.ac.jp.

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