



# International Center for Urban Safety Engineering (ICUS)

Annual Report -2008-

# Staff Members (2008)

## Sustainable Engineering Division

- Prof. Hiroshi YOKOTA (Visiting Professor)
- Dr. Reiko KUWANO (Associate Professor)
- Dr. Yoshitaka KATO (Associate Professor)

## Urban Safety and Disaster Mitigation Division

- Prof. Kimiro MEGURO (Professor)
- Dr. Miho OHARA (Associate Prpfessor)

## Infrastructure Information Dynamics Division

- Prof. Haruo SAWADA (Professor)
- Dr. Sanae MIYAZAKI (Visiting Associate Professor)
- Dr. Mikio KOSHIHARA (Associate Professor)
- Dr. Hong HUANG (Associate Professor)
- Dr. Shinji TANAKA (Lecturer)
- Dr. Takahiro ENDO (Research Associate)

## Project Researchers and Secretary

- Dr. Paola MAYORCA (Project Research Associate)
- Dr. Pranab Jyoti BARUAH (Project Research Associate)
- Dr. Kawin WORAKANCHANA (Project Researcher)
- Ms. Eiko YOSHIMOTO (Secretary)



ICUS structure

# Research Topics (2008)

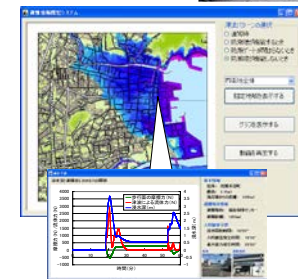
## Sustainable Engineering Division

The Sustainable Engineering Division carries out evaluation of structural safety of urban infrastructure ranging from materials of structures to entire structures that deteriorate with time and also research for development of maintenance management technologies.



## Urban Safety and Disaster Mitigation Division

The Urban Safety and Disaster Mitigation Division carries out development of management technologies to ensure structural safety of urban infrastructure from earthquake, floods and so on, and the safe use of the urban infrastructure during a disaster.



## Infrastructure Information Dynamics Division

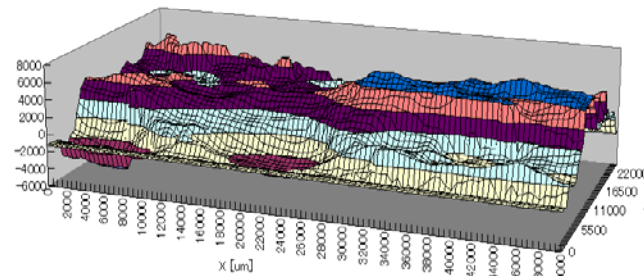
The Infrastructure Information Dynamics Division constantly monitors various kinds of information related to urban infrastructure, and performs evaluation and development of dynamic control technologies to ensure safe operation of urban infrastructure during normal conditions and during emergencies.



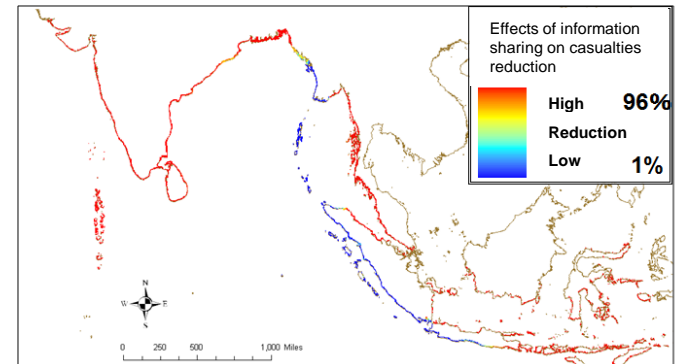
# Researches (2008)



**Green concrete**



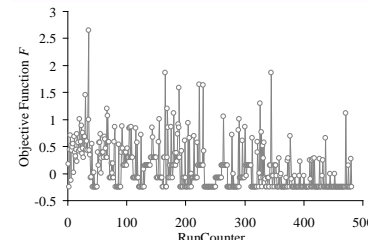
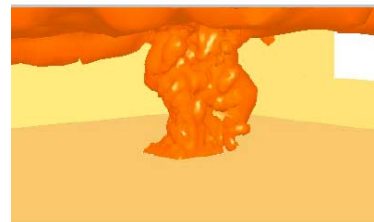
**Corrosion quantification  
of steel reinforcement**



**Effect of reducing casualties  
by multipurpose buoy system  
for tsunami monitoring and warning**



**Video observation of traffic flow**



**Optimization of smoke  
control system in fire**



**Seismic evaluation  
of timber houses  
in preserved  
historic districts**



# Staff Members (2008)



# Research Topics (2008)

## - Sustainable Engineering -



- Developmental framework and triple bottom line assessment for sustainable concrete materials
- Clarification and practical techniques for measurement of corrosion in RC structures
- RC structures maintenance planning based on risk evaluation
- Development of low cost and ecological repair method for RC structures damaged by fire
- Clarification of carbonation progress in RC structures
- Development of safe, easy and emergency repair method for structures damaged by disaster
- Inspection system during construction process for quality assurance of structural concrete
- Study on lifecycle management for civil infrastructure
- Development of rehabilitation techniques for old deteriorated buried pipes
- Study on long term behavior of buried structures
- Soil improvement by microbially induced cementation
- Study on the mechanism of underground cavity expansion
- Effects of repeated infiltration on volume change in earth structure

# Projects (2008)

## - Sustainable Engineering -



### Grant-in-Aid for Scientific Research

- Maintenance planning and risk evaluation for deterioration of cracked RC structures
- Reliability on the lifetime prediction of deteriorated reinforced concrete structures
- Proposal of economic and rational techniques for construction, renewal and maintenance of buried pipes
- Study on the soil improvement by microbially induced cementation

### Research Promotion Fund

- Study of the influence of crack and environmental conditions on carbonation progress

### Collaborative Research

- Development of on-site judgment system for concrete volume stability
- Development of safe, easy and emergency repair method for disaster damaged structures

### Others

- Durability-based life-cycle management of coastal concrete infrastructure
- Time dependency property of macro-cell corrosion in RC structure due to environmental and material non-homogeneity

# Research Topics (2008)



## - Urban Safety and Disaster Mitigation

- Development of integrated information system for total disaster management
- Development of next generation disaster management manual for implementation of efficient countermeasures
- Quick estimation and monitoring of earthquake damage using the power supply changes
- System for promotion of retrofitting of low earthquake resistant structures
- Numerical simulation of total collapse behavior of structures
- Efficient and economic retrofitting method for masonry structures considering local availability of materials and workmanship
- Development of human evacuation model for tsunami disaster mitigation
- Study on functions of key disaster hospital and its disaster management manual system
- Earthquake-resistant assessment of wooden houses using dynamic properties evaluated through exciter induced vibration
- Assessment on capability of multipurpose buoy system for tsunami monitoring and warning
- Research on a regional child crime prevention support system for crime prevention leader



# Projects (2008)



## - Urban Safety and Disaster Mitigation -

### Grant-in-Aid for Scientific Research

- Proposal of integrated tsunami disaster mitigation strategies for long-term maintenance of tsunami monitoring and its application to developing countries
- Development of training simulator for disaster response
- Development of integrated assessment model of water resources for supporting sustainable water security policies
- Seismic capacity evaluation of RC building with unretrofitted concrete block walls
- Development of a design tool and educational materials for the promotion of economic retrofitting of low earthquake resistant masonry houses
- Development of package system of disaster response e-learning for hospitals

### Research Promotion Fund

- Project for mitigation of metropolitan earthquake disaster: Study on widespread crisis management and establishment of disaster mitigation

### Cooperative Research

- Development of references of examples of seismic evaluation and retrofitting for local government personnel
- Research project with Japan Bank for International Cooperation funding: Proposal of retrofitting technique of masonry structures with PP-band meshes
- Dynamic and large deformation analysis of railway structures
- Research project for safe and secure scientific technology: Ubiquitous Disaster Mitigation Information System with collaboration between citizens and local governments

### Others

- Development of disaster management manual system for Tokyo University Hospital considering its functions as emergency base hospital



# Research Topics (2008)

## - Infrastructure Information Dynamics -

- Estimation of GPP and NPP for deciduous tree using TERRA MODIS data and a Plant growth model (3-PG)
- Growth prediction of coniferous tree using ALOS PRISM data and a plant growth model (3-PG)
- Reconstruction of tree crown shape using LiDAR data
- Evaluation of forest creation and examination about application to landscape policy
- Investigation report on the use of remote sensing technology in large-scale disaster assessment
- Relaxation effect of urban greening on urban heat island
- Urban fire simulation using computational fluid dynamics (CFD) method
- Prediction of air pollution by wind tunnel experiments and numerical simulations
- Study on the mechanism of CO<sub>2</sub> emission in urban regions
- Seismic evaluation and reinforcement of detached timber houses
- Observation of the seismic performance of detached timber house
- Study of the spatial distribution of disaster logistics by GIS
- Verification of mixed reality traffic experiment system for driving behavior analysis
- Feasibility study of multi-purpose lane in urban arterial street
- Evaluation of traffic congestion alleviation policy by temporal demand distribution
- Evaluation of inter-green lost-time for appropriate signal control

# Projects (2008)



## - Infrastructure Information Dynamics

-

### Grant-Aid for Scientific Research

- Road plan and design based on hierarchical network structure
- Development of LES model coupled with chemical reaction model and the analysis of air pollutant behavior in micro-scale area

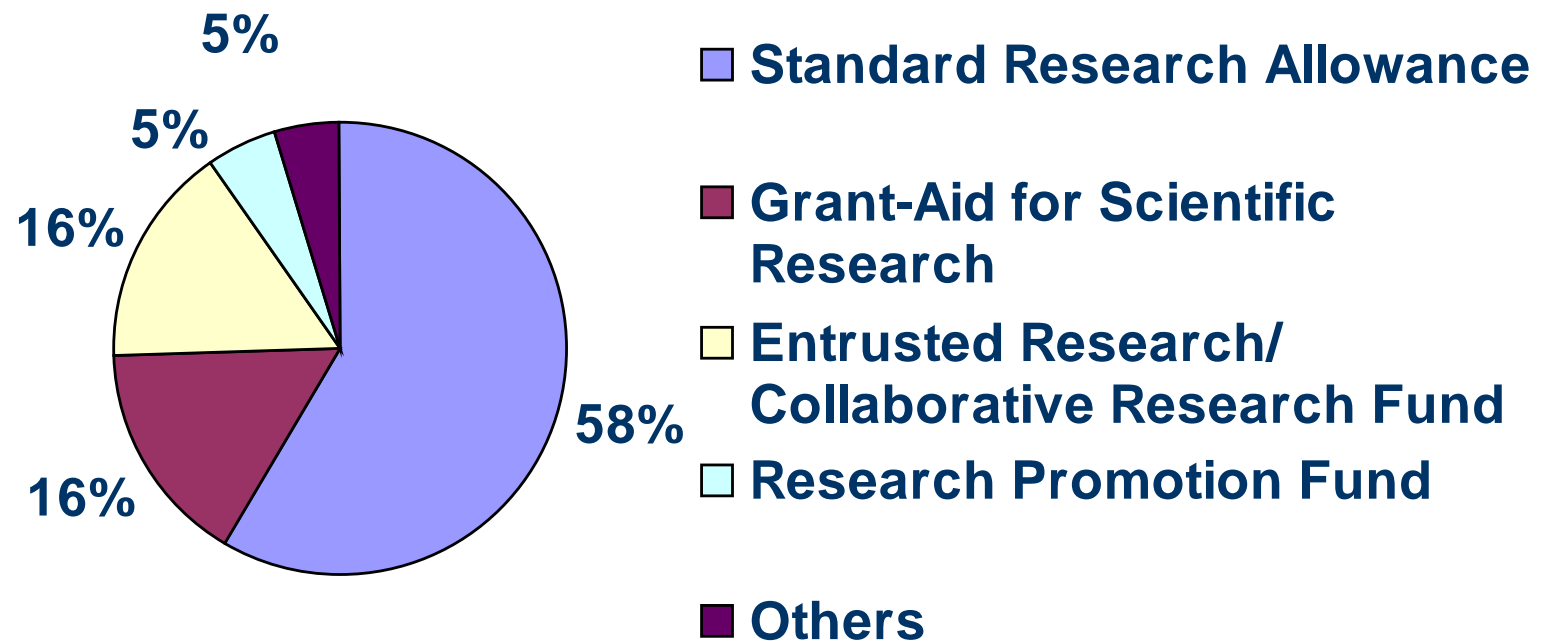
### Research Promotion Fund

- Development of hybrid heat pump system for air and ground water source
- Study on human thermal physiological response to urban heat island effect
- Seismic evaluation for detached timber houses
- Observation of the yearly change for the Kintai-kyo bridge
- Research using integrated traffic simulator for dissemination of advanced ITS services

### Collaborative Research

- Numerical prediction of thermal energy for geothermal heat pump system
- Effect of heat and pollutant release on urban climate
- Proposal of new model house design with energy efficiency for Riyadh in Saudi Arabia
- Deployment research of sustainable ITS
- Development of advanced ITS measurement vehicle

# Budget (2008)



# Memorandum of Understandings (2008)



- Asian Institute of Technology	(Thailand)
- National Centre for Earthquake Engineering	(Bangladesh)
- Bangladesh Earthquake Society	(Bangladesh)
- Indian Institute of Technology Kanpur	(India)
- College of Engineering, Nanyang Technological University	(Singapore)
- Protective Technology Research Centre, School of Civil Environmental Engineering, Nanyang Technological University	(Singapore)
- Dept. of Civil Engineering, National University of Singapore	(Singapore)
- LCM Research Center, The Port and Airport Research Institute	(Japan)
- Dept. of Civil Engineering, Bangladesh University of Engineering and Technology	(Bangladesh)
- Siridorn International Institute of Technology, Thammasat University	(Thailand)
- Dept. of Civil Engineering Shibaura Institute of Technology	(Japan)
- Global U-City Construction & Information, Hub Dept. of Civil Engineering, Han Yang University	(Korea)
- Dept. of Construction Engineering, National Kaohsiung First University of Science and Technology	(Chinese Taipei)
- Center for Public Safety Research, Tsinghua University	(P.R.China)
- School of Applied Sciences and Engineering, Monash University, Gippsland Campus	(Australia)





# Global Network (2008)

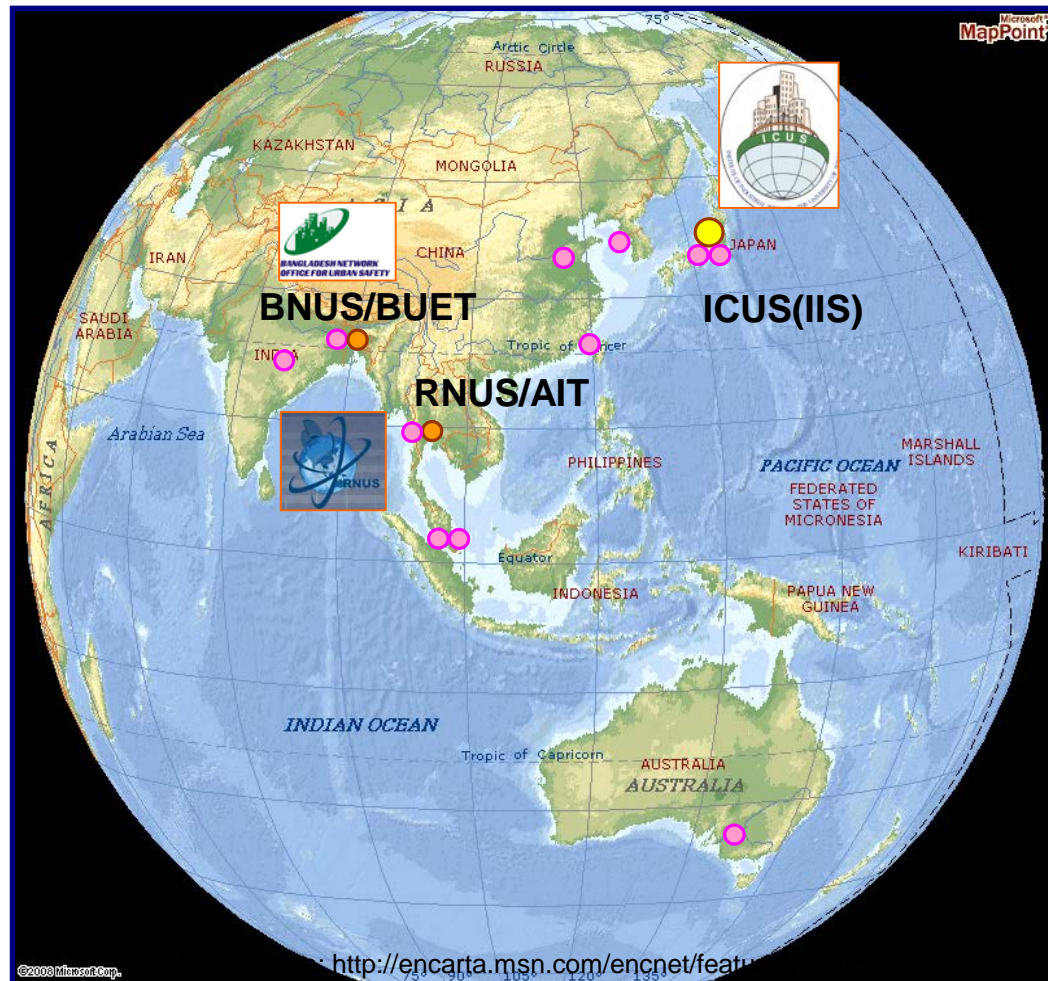


## Overseas Offices

- **RNUS at AIT, Thailand**  
(Regional Network Office  
for Urban Safety)

- **BNUS at BUET, Bangladesh**  
(Bangladesh Network Office  
for Urban Safety)

-  ICUS
-  Oversea office
-  MOU



# International Activities (BNUS, 2008)



## Projects

- Seismic microzonation for Cox's Bazar Municipality
- Rain induced hill-slope erosion/landslide and probable control measure in Chittagong hilly areas
- Natural slope stability analysis of some existing livestock shelters (Killas) for cyclones in Bangladesh
- Post disaster survey for cyclone SIDR 2007
- Macroseismic survey of two recent earthquakes (Rajshahi & Mymensingh) in Bangladesh in 2008
- Strong motion monitoring system in Bangladesh
- Mason training regarding earthquake resistant construction
- School Earthquake Safety Awareness Program (SESAP)
- Rethinking the public buildings as post disaster shelters – in the context of old Dhaka
- Earthquake vulnerability reduction strategies for unplanned urban areas
- Sharing knowledge on disaster warning: community-based Last-Mile warning system

## Workshops

- A training program for masons on “How to Build Earthquake Resistant Buildings” was conducted on October 16-18 (theoretical) and October 23-26 (practical), 2008.

## Publications

- Cyclone SIDR report
- Mason training manual
- Annual report 2008

# International Activities (RNUS,2008)



## Projects

- Seismic Hazard and Vulnerability Mapping of Dhaka, Chitagong & Sylhet City Corporation
- Master Plan for Earthquake and Building Collapse Hazard Prevention and Mitigation (Phase 1)

## Seminars

- Joint Student Seminar on Civil Infrastructure on July 3-4, 2008
- Seminar on “Remote Sensing” and “Urban Public Transport” on Sept. 16, 2008
- Workshop on Transportation Researches for Urban Safety on December 11, 2008

## Activities

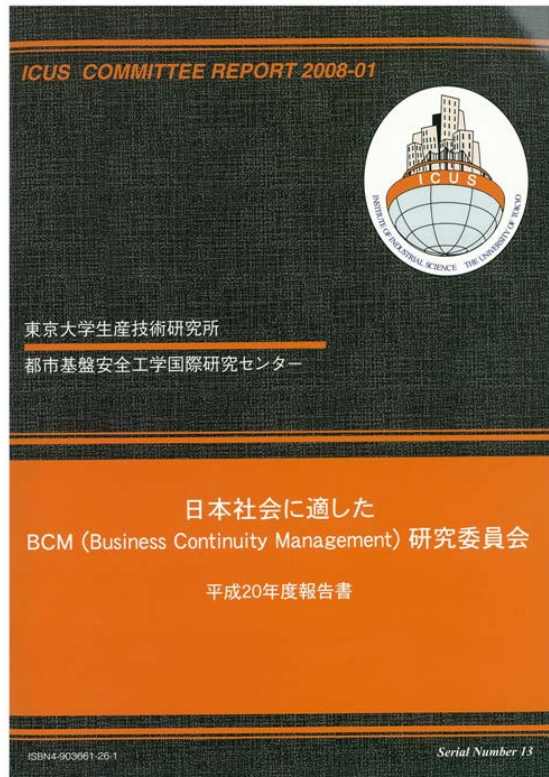
- RNUS signed contract on professional consulting services for one of its projects.
- Dr. Tanaka attended 1<sup>st</sup> and 2<sup>nd</sup> liaison meeting held in the Japanese embassies on June 20, September 19, 2008.
- RNUS team visited Bangladesh from June 29 to July 2, 2008 to investigate project progress and field assessment.
- Prof. Meguro joined Expert Group Meeting at UN-ESCAP in Thailand on November 19, 2008 and gave presentation .

# RC58 & RC62 (2008)

- Business Continuity Management (BCM) systems suitable for Japan Society
- Technologies for evaluation of aging infrastructure performance degradation



The final report of The Research Committee 58 (RC58) was published and held a forum on April 21 to report its result. The Research Committee 62 (RC62) was established to consider technologies for evaluation of aging infrastructure performance degradation.



RC58 meeting





# Activities and Events (1) (2008)

## Domestic

- |   |                    |     |
|---|--------------------|-----|
| - 14th ICUS Open Lecture  | (May 9, 2008)      | IIS |
| “What impact does global warming have on the city?”                             |                    |     |
| - SEIKEN Open House   | (May 29- 31, 2008) | IIS |
| - 15th ICUS Open Lecture  | (October 6, 2008)  | IIS |
| “Strategy for ports and airports as bases of traffic and physical distribution” |                    |     |
| - Research Committee 58 (RC58) Meeting  | (5 times/year)     | IIS |
| - Research Committee 62 (RC62) Meeting  | (5 times/year)     | IIS |

## International

- |  |                        |               |
|--|------------------------|---------------|
| - Japan-Korea-Thailand Joint Student Seminar   | (July 3-4, 2008)       | AIT/Thailand  |
| - The 14th WCEE: World Conference on Earthquake Engineering                                  | (October 12- 17, 2008) | Beijing/China |
| - 7th International Symposium on<br>New Technologies for Urban Safety of Mega Cities in Asia | (October 21-22, 2008)  | Beijing/China |



# Activities and Events (2) (2008)

## Open House and Open Lectures



**14<sup>th</sup> ICUS Open Lecture**  
May 9, 2008



**15<sup>th</sup> ICUS Open Lecture**  
Oct. 6, 2008



**IIS Open House**  
May 29-31, 2008

# Activities and Events (3) (2008)

## Symposium



**7th International Symposium  
on New Technologies for Urban Safety of Mega Cities in Asia  
in Beijing, China (Oct. 21-22, 2008)**



**Participants : 106 persons (Japanese : 28 persons)** <sup>20</sup>



# Publications (2008)

## ICUS Newsletter

Volume 8, Numbers 1- 4

## ICUS Report

2008 - 01 – 2008 - 08

“RNUS ANNUAL REPORT 2007”

“Joint Student Seminar on Civil Infrastructures July 3-4, 2008”

“2008 New Technologies for Urban Safety of Mega Cities in Asia”

“Report on the 14<sup>th</sup> ICUS Open Lecture”

“Report on the 15<sup>th</sup> ICUS Open Lecture”

“Investigation report on the use of remote sensing technology in large-scale disaster assessment”

“Workshop on Transportation Researches for Urban Safety”

“BNUS ANNUAL REPORT 2008”

## ICUS Research Committee Report

2008 - 01

“Report on the Business Continuity Management truly suitable for Japan Society”

## Annual Report

*ICUS Newsletters were sent to over 1,500 network members from about 150 countries, such as, foreign embassies, consultants, researchers, engineers and practitioners. The newsletters can be freely downloaded from “<http://icus.iis.u-tokyo.ac.jp/>”.*



# Research Publications (2008)

	Sustainable Engineering Division	Urban Safety and Disaster Mitigation Division	Infrastructure Information Dynamics Division
IIS Bi-monthly Research Report (SEISAN KENKYU)	19	13	13
Books/Translated Books	3	4	4
Reviewed Papers/Journal Papers	9	8	15
Conference Papers (International)	38	20	20
Conference Papers (Domestic)	30	14	28
Survey Reports	0	0	2
Others	7	9	9
Total	106	68	91



# ICUS Activities Recognized (2008)



<b>Micheal Henry Word</b>	<b>July, 2008</b>	<b>The encouragement award</b>	<b>Japan Concrete Institute</b>	<b>Kato Lab.</b>
<b>Navaratnarajah Sathiparan</b>	<b>October, 2008</b>	<b>Young Award USMCA2008</b>	<b>USMCA2008</b>	<b>Meguro Lab.</b>
<b>Akiyuki Kawasaki</b>	<b>October, 2008</b>	<b>Young Award USMCA2008</b>	<b>USMCA2008</b>	<b>Meguro Lab.</b>
<b>Mayorca Arellano Paola</b>	<b>October, 2008</b>	<b>Outstanding Paper Award</b>	<b>14<sup>th</sup> World Conference on Earthquake Engineering</b>	<b>ICUS</b>
<b>Mari Sato</b>	<b>March, 2009</b>	<b>Dean's Prize of School of Engineering</b>	<b>The University of Tokyo</b>	<b>Kuwano Lab.</b>





**International Center  
for Urban Safety Engineering (ICUS)  
Institute of Industrial Science, The University of Tokyo**

4-6-1 Komaba, Meguro-ku

Tokyo 153-8505, Japan

Tel: (+81-3) 5452-6472

Fax: (+81-3) 5452-6476

E-mail: [icus@iis.u-tokyo.ac.jp](mailto:icus@iis.u-tokyo.ac.jp)

URL: <http://icus.iis.u-tokyo.ac.jp/>