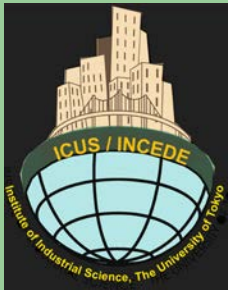


# International Center for Urban Safety Engineering (ICUS/INCEDE)

Annual Report -2003-





# Staff Members (ICUS/INCEDE) (2003)

## **Sustainable Engineering Division**

- Prof. Taketo UOMOTO (Director and Professor)
- Prof. Sudhir MISRA (Visiting Professor)
- Dr. Yoshitaka KATO (Assistant Professor)

## **Urban Safety and Disaster Mitigation Division**

- Mr. Takefumi TAKAHASHI (Visiting Professor)
- Dr. Kimiro MEGURO (Associate Professor)
- Dr. Dushmanta DUTTA (Associate Professor)
- Miss Miho YOSHIMURA (Research Associate)

## **Infrastructure Information Dynamics Division**

- Prof. Yoshifumi YASUOKA (Professor)
- Dr. Masahiro SETOJIMA (Visiting Professor)
- Dr. Ryozo OOKA (Associate Professor)
- Dr. Takahiro ENDO (Research Associate)



# Staff Members (ICUS/INCEDE) (2003)





# Research Topics of ICUS (2003)

## **Sustainable Engineering Division**

- Deterioration mechanism of existing structures
- Nondestructive testing technology for evaluation of deterioration
- Retrofitting and strengthening of structures based on mechanism of deterioration
- Standard specification for design, construction and maintenance

## **Urban Safety and Disaster Mitigation Division**

- Urban safety and disaster mitigation strategy
- Development of a universal disaster environment simulator
- Disaster countermeasures for urban lifeline systems
- Use of earthquake-predicting information from an engineering viewpoint

## **Infrastructure Information Dynamics**

- Remote sensing/geographic information system
- Information network of urban infrastructure
- Space data analysis
- Urban warming/comprehensive environmental assessment



# Research Topics (2003)

## - Sustainable Engineering -

- Experimental study on strength and durability of pre-tension concrete using by FRP rods made of new materials to expose sea and reputation of wetting and drying
- Evaluation of long-term durability performance of concrete using epoxy-coated reinforcing steel bars
- Influence of various factors on deterioration of repaired concrete structures
- Effect of the various chemical admixtures on physical properties and microstructures of hardened mortar
- Research on strength and durability of GFRP rods made of new glass fiber
- Application of multi-spectral method to chloride detection on the concrete surface
- The elucidation of the fundamental theory of concrete conveyance system using DEM
- Fundamental study on various types of cement resistance to sulfuric acid attack
- The long-term continuous monitoring of concrete structures by using optical fiber
- Evaluation of quality of existing concrete structures by using thermograph method
- Modeling of mass transport property of cementitious materials
- Value evaluation of inspection information in deterioration diagnosis of concrete structures



# Research Topics (2003)

## - Urban Safety and Disaster Mitigation -

- Development of efficient supporting system for earthquake disaster countermeasures
- Next generation manual for total disaster management
- Quick estimation and monitoring of earthquake damage by using changes of the power supply
- System for proper personnel management during disasters
- System for promotion of retrofitting of existing low earthquake resistant structures
- Efficient and economic retrofitting method for masonry structures considering local availability of materials and workmanship
- Use of earthquake prediction information for engineering disaster mitigation measures
- Development of Integrated Information System for Total Disaster Management
- Numerical simulation of total collapse behavior of structures
- Simulation of Failure Behavior of RC Piles



# Research Topics (2003)

## - Urban Safety and Disaster Mitigation - (contd.)

- Development of methodology for deriving detailed urban land cover information using high-resolution satellite images for flood loss estimation
- Investigative research on flood forecasting
- Modeling for fresh water resources assessment
- Rainfall-Runoff Modeling for predictions in Ungaged river basins
- GIS based mathematical modeling for urban flood risk analysis
- Loss function developments for economic risk analysis of flood disasters



# Research Topics (2003)

## - Infrastructure Information Dynamics -

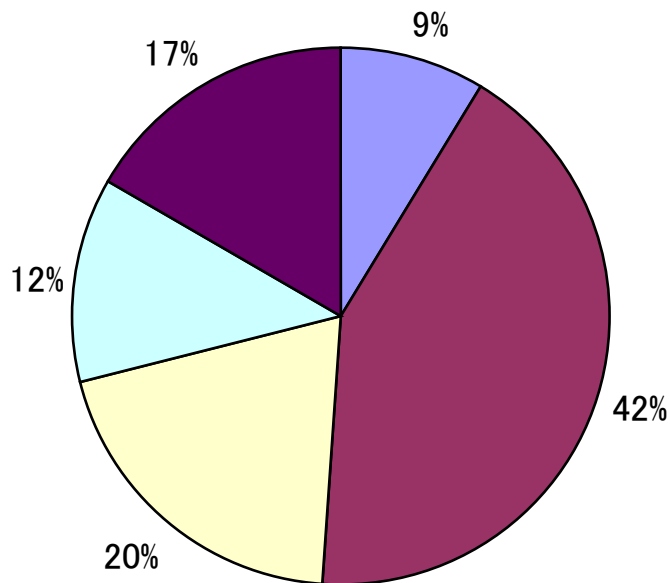
- Monitoring of the environment in East Asia using satellite data (TERRA/MODIS)
- 3D city modeling using airborne laser scanning data and high resolution satellite imagery
- Measurement of suburban forest using multi-temporal airborne laser scanner data
- Identification of greenery amount in urban area using High-Resolution Satellite and airborne laser scanner
- Development of estimation method for film damage on concrete using hyperspectral remote sensing
- Analysis of urban heat island structure in use of urban meteorological model
- Relaxation effect of urban greening on urban heat island
- Urban fire simulation in aid of CFD method
- Prediction of air pollution by wind tunnel experiment and numerical simulation
- Study on the mechanism of CO<sub>2</sub> emission in urban region





# Budget of ICUS

(2003)



- Standard Research Allowance
- Grant-Aid for Scientific Research
- Entrusted Research/ Collaborative Research Fund
- Research Promotion Fund
- Others



# Projects (2003)

## - Sustainable Engineering -

- **Grant-Aid for Scientific Research**
  - ✓ Development of high performance repair system of concrete structures based on environmental simulation
- **Collaborative Research with Industry**
  - ✓ Development of prediction method for deterioration of concrete structure
  - ✓ Study on the evaluation of the repair materials for concrete structure
  - ✓ Development of new type GFRP
  - ✓ Evaluation of transport performance of concrete by using DEM
  - ✓ Study on the new technique of NDT for inspection of concrete structures
  - ✓ Effect of the chemical admixtures on quality of concrete
  - ✓ Study on the evaluation of NDI applied to concrete structures
- **Others**
  - ✓ Development of the evaluation method for structural performance of concrete structures in consideration of materials deterioration



# Projects (2003)

## - Urban Safety and Disaster Mitigation-

- **Grant-in-Aid for scientific research**
  - ✓ US-Japan Cooperative Research on Urban Earthquake Disaster Mitigation “Study of Earthquake Disaster Response Process by Multi-media Technology”
  - ✓ Control of Failure Behavior of Structures Considering Spatial Deformation of Surface Ground Near Seismic Fault
  - ✓ Economic and Efficient Method for Retrofitting of Unreinforced Masonry Structures
  - ✓ Development of Integrated Numerical Simulator for Tsunami Disaster in Coastal Region
  - ✓ Development of high precision computational techniques of evapotranspiration in urban areas using for water and energy balance methods
  - ✓ Modelling for Fresh Water Resources Assessment in Mekong River Basin
- **Cooperative research with the private sector**
  - ✓ Failure mechanism of seismic fault using Applied Element Method
  - ✓ Dynamic large deformation analysis of railway structures
  - ✓ Development of next generation of disaster manuals for increasing total disaster management capacity
  - ✓ Effects of power outage on urban social systems



# Projects (2003)

## - Urban Safety and Disaster Mitigation-

- **Special Coordination Funds for Promoting Science and Technology (RR2002)**
  - Special Project for Urban Earthquake Disaster Mitigation IV-1
  - ✓ 「Study for Integration of Earthquake Disaster Reduction Countermeasures, - Pre-Event Measures」
  
- **Social Technology Research System**
  - ✓ 「New Technology for Earthquake Risk Assessment and Disaster Mitigation and Crisis Management」
  
- **The Development of Earthquake and Tsunami Disaster Mitigation Technologies and Their Integration For the Asia-Pacific Region**
  - ✓ Survey Method for Earthquake and Tsunami Disasters



# Projects (2003)

## - Infrastructure Information Dynamics-

- **Grant-Aid for Scientific Research**
  - ✓ Development of Network for Monitoring Natural Disasters in ASIA using Satellite Remote Sensing (JST)
  - ✓ Development of Urban Design Method for Fifty Percent Reduction of CO<sub>2</sub> Emission
- **Collaborative Research with Industry**
  - ✓ Development of Geothermal Air Conditioning Method using the Foundation Pile



# Workshop and Open Lecture (2003)

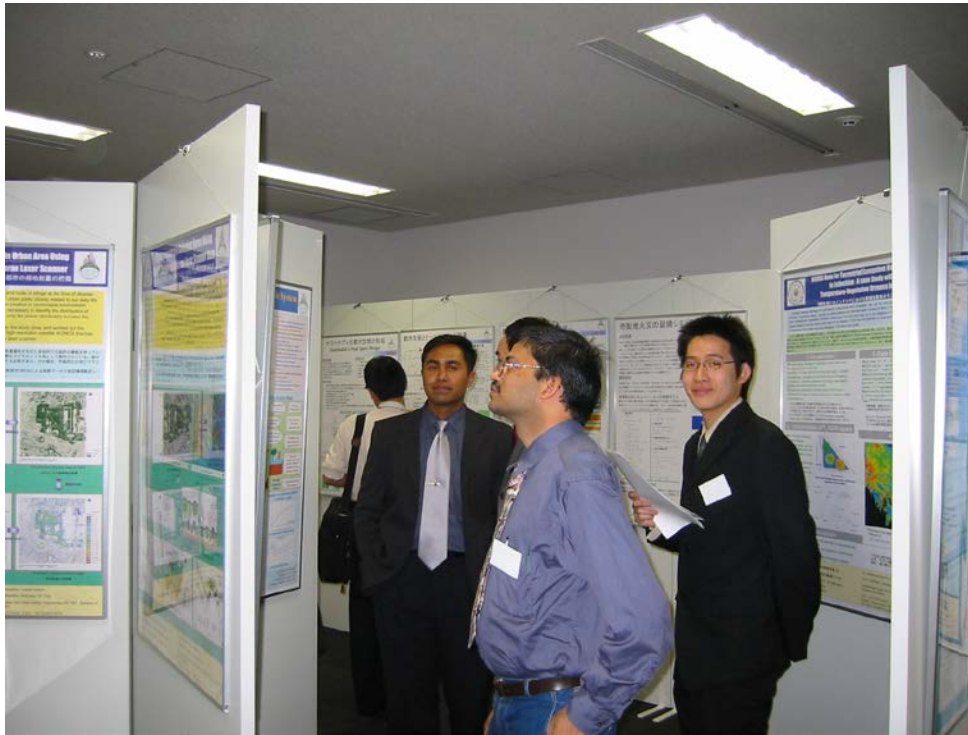
## - Domestic

- SEIKEN Open House (June 5-6, 2003) IIS
- 5th ICUS Open Lecture (July 3, 2003) IIS

## - International

- The 2<sup>nd</sup> International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (October 30-31, 2003)  
Tokyo, Japan (Sanjo-kaikan)

# SEIKEN Open House (June 5-6, 2003)





# 5th ICUS Open Lecture (July 3, 2003)

- **「Current Situation of Urban Fire and Preparedness in Japan」**
  - Mr. Toshi Kitazato (Representative of Research Association for Regional Development and Disaster Management)
- **「Fire Prevention in Tunnels of Metropolitan Expressway」**
  - Mr. Toshiaki Tachimori (Executive Director, Metropolitan Expressway Public Corporation)
- **「Issues Raised by the Recent Subway Fire in South Korea」**
  - Prof. Makoto Tujimoto (Professor, Nagoya University)
- **「Urban Fire and Evacuation Strategies」**
  - Dr. Kimiro Meguro (Associate Professor, ICUS)



# 5th ICUS Open Lecture (July 3, 2003)



# The 2<sup>nd</sup> International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (October 30-31, 2003)





# RC39 - Research Committee on Sustainable Engineering for Urban Safety -

Five Working Groups have been organized for conducting the activities of RC39. The themes of these Working Groups are as follows;

- Study on methods to handle an aging infrastructure; nondestructive testing and monitoring , retrofitting, etc.
- Study on relationship between human activities and emission of carbon dioxide
- Study on the distribution and formation of heat-island in urban environments
- Study on disaster prevention and response, including development and dissemination of suitable literature
- Study on investigation of applications and developments for urban safety in sensing technology



# Publications

(2003)

## 1) News Letter

- Volume3 Number1 April - June
- Volume3 Number2 July - September
- Volume3 Number3 October - December
- Volume3 Number4 January - March

## 2) ICUS Report 2003-02

“Construction of a Database for Deteriorated Concrete Bridges”

## 3) ICUS Report 2003-03

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

## 4) ICUS Committee Report 2003-1 ~ 2003-5

## 5) ICUS Activities Report 2003



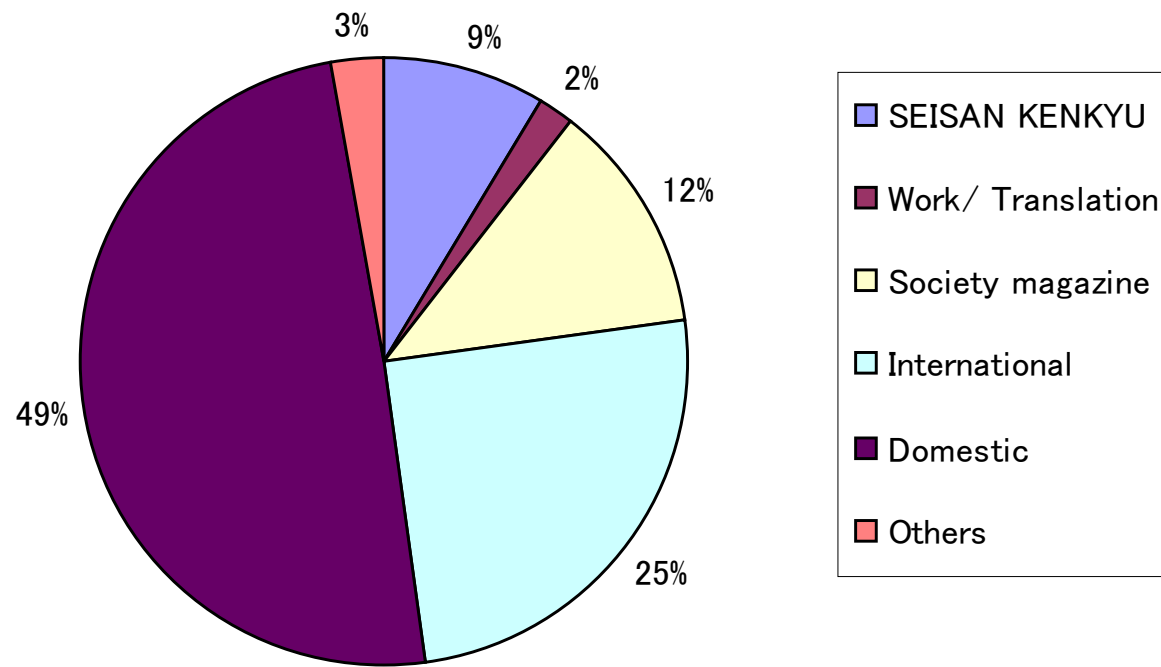
# Research Papers

(2003)

	Sustainable Engineering	Urban Safety and Disaster Mitigation	Infrastructure Information Dynamics
SEISAN KENKYU	14	6	11
Work/Translation	1	0	6
Society magazine	18	9	17
International	19	15	57
Domestic	27	18	134
Investigate	2	1	2
Others	5	0	5
<b>Total</b>	<b>86</b>	<b>49</b>	<b>232</b>

# Research Papers

(2003)





# ICUS Activities Recognized (2003)

Name	Date	Prize Name	Organization	Supervisor
H. Kanada	Sept-03	Young Researches Award	NDTC	Prof. Uomoto
K. Shirase	Sept-03	Excellent presentation	JSCE	Prof. Uomoto
K. Okuyama	Sept-03	Excellent presentation	JSCE	Prof. Uomoto
H. Kanada	Sept-03	Excellent presentation	JSCE	Prof. Uomoto
T. Sugiyama	Sept-03	Excellent presentation	JSCE	Prof. Uomoto
K. Oda	Sept-03	Excellent presentation	JSCE	Dr. Meguro
Y. Sugano	Sept-03	Excellent presentation	JSCE	Dr. Meguro
M. Yoshimura	Sept-03	Excellent presentation	JSCE	Dr. Meguro

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