# **IISEE**



- An International Base for Seismology and Earthquake Engineering -



## Toshiaki YOKOI **Director**

International Institute of Seismology and Earthquake Engineering (IISEE), **Building Research Institute (BRI)** 

# Organization of BRI

**Chief Executive** Dr. Yuzo Sakamoto

### **Deputy Chief Executive Auditors**

**Executive Director for Building Research Research Coordinator of Building Technology** 

## Departments for research support

**General Affairs Research Planning** & Management

# **Research Departments**

(Director: Dr. T. Yokoi) Structural Eng. **Environmental Eng.** Fire Eng.

**Building Materials &** Component s Eng. **Production Eng.** 

House & Urban Planning Eng.

### URL

**IISEE:** http://iisee.kenken.go.jp/

BRI: http://www.kenken.go.jp/english/

## **IISEE** consists of:

- 2 Permanent Staffs for Administration,
- 10 Permanent Staffs for Training & Research,
- 5 Visiting Research Fellows,
- 13 Part-time Office Workers.

# **Group Training Courses of IISEE**

## One-year Course

- 11.5 months (October to September)
- Three sub-courses: (2014-2015)
  - 1. Seismology (7)
  - 2. Earthquake Engineering (10)
  - 3. Tsunami (6) in total (23 participants)
- Global Seismological Observation
- Course (2015 Jan.-Mar.)Earthquake-Resistant Construction in Latin America Course (2015 Jun.-Jul.)

#### **Group Training Courses of IISEE: History** 1960 1968 1980 1995 2005 2006 2009 2012 2014 International Training in Seismology and Earthquake Seismology 1960 ~ 2005 Master Degree Course Course One Year Courses Earthquake 1960 ~ 2005 Master Degree Course Engineering (Regular Courses) Course Tsunami Disaster 2006 ~ Master Degree Course Mitigation Course China Seismic 2009 ~ 2012 **Building Course Seminar Courses** Earthquake Resistant Construction in Latir 2014 ~ Earthquake Engineering **America Course** Others 1980 ~ Engineering Global Seismological Observation Course 1995 ~ 1968 ~ **Individual Courses**

# Cooperation with MLIT and JICA

- In January 1962, IISEE was established at BRI as the implementing organization.
- Today, IISEE's training courses are implemented by the cooperation with MLIT and JICA.



Courtesy visit to Mr. A. Ohta, Minister of Land, Infrastructure, Transport and Tourism (MLIT), Sep. 8, 2014



Visit by Ms. S. Ogata Ex-president of Japan International Cooperation Agency (JICA) to the course

# Support by UNESCO

- In cooperation with UNESCO, the Government of Japan offered one-year training courses from 1963 to 1972.
- Since 1972, the Government of Japan has continued to offer these courses independently.
- UNESCO sent experts to IISEE from 1985 to 1995.
- UNESCO resumed cooperation in 2006.
   Dispatch 2 experts in 2007.
   Donated textbooks.



Tsunami Course Lecturer: Dr. Laura Kong



United Nations Educational, Scientific and Cultural Organization

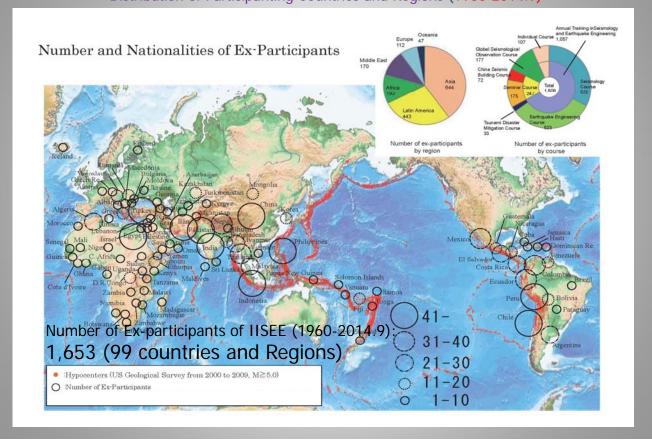
Logo, granted by UNESCO



Meeting with Mr. Matsu'ura, Director General of UNESCO

## **Ex-Participants of IISEE Training Courses**

Distribution of Participanting Countries and Regions (1960-2014.9)



## **Countries and Decade of Ex-Participants in IISEE**

Statistics of One Year Course up to 2011

Country	Region	1960s	1970s	1980s	1990s	2000s	2010- 2011	Total
India	Asia	17	14	4	3 ☆☆	5 🛨	0	43
Indonesia		8	16 ☆☆	21 🛨	11 🖈	15★☆☆	4	75
Korea		3	2	6	4		0	15
Sri Lanka						3	0	3
Thailand		4	6	11	4	7	0	32
China		5 🖈	3★★☆☆	6	8	17 🛨	2	41
Nepal		2	3	6 ☆	8	8	0	27
Pakistan		5	8 🖈	9	10	11 🛨	0	43
Philippines		28	12 🛨	14	11 🛨	7	2	74
Bangladesh			1			7	0	8
Bhutan						1	0	1
Vietnam		1			2		0	3
Malaysia			1	1		7	4	13
Myanmar		1	8	8		5	1	23
Mongolia					2	6	0	8
Argentina		5	3	7	3		0	18
Ecuador		6	11	7	3		0	27
El Salvador		2	2	7 ☆	2	11	1	25
Cuba					1		0	1
Guatemala		2	1 🛨	5	1	1	0	10
Costa Rica		2	6	5	5	2	0	20
Colombia		4	8	3	10 🛨	6	0	31
Jamaica	Latin						1	1
Chile	America	11 ☆	6	4	4	2	0	27
Nicaragua			4 🛨	2	4	4	1	15
Brazil		1		2			0	3
Venezuela		3	3	5	2	1	0	14
Peru		13	21 🛨	17	11	13	2	77
Bolivia		7	7		1		0	15
Mexico		7	7	4 🖈	6	2	0	26
The Dominican Republic			1			3	0	4
Samoa (former Western Samoa)					1		0	1
Tonga					3		0	3
Vanuatu	Oceania					1	0	1
Papua New Guinea				3	<b>*</b>	1	0	4
Fiji		1	2		2	5	0	10
Algeria				4 🖈	9	5 ☆	0	18
Uganda						3	0	3
Egypt	Africa	6	8	8	14	7	0	43
Ethiopia			5	6	4		0	15

Country	Region	1960s	1970s	1980s	1990s	2000s	2010- 2011	Total
Ghana	Africa	2			2	2	0	6
Kenya					1		0	1
Guinea					1		0	1
D.R.Congo (former Zaire)			3	4	5		0	12
Zambia					1		0	1
Djibouti					1		0	1
Zimbabwe						1	0	1
Sudan			1				0	1
Tanzania			1				0	1
Tunisia				1			0	1
Madagascar					1		0	1
Malawi					2		0	2
Mozambique						2	0	2
Morocco		*			3	1	0	4
Iceland		1					0	1
Azerbaidjan	_					2	0	2
Albania	_				3	1	0	4
Armenia	_			*		1	0	1
Uzbekistan					1	3	0	4
Kazakhstan	1 1				3	5	0	8
Greece	_		1	7	2		0	10
Kyrgyz	Europe					2	0	2
Georgia					1	2	0	3
Finland		1	1				0	2
Bulgaria		1	1		1		0	3
Macedonia					1		0	1
Moldova						1	0	1
Former Yugoslavia		6		1			0	7
Romania		1			1	7	0	9
Afghanistan		3				1	0	4
Yemen				*	2	2	0	4
Israel		1					0	1
Iraq		1	6	2			0	9
Iran	Middle East	17 ★★	5 ★☆	5 ☆☆	8 ★☆☆	*	0	35
Saudi Arabia						4	0	4
Syria					3	3	0	6
Turkey		14 ☆	13 ☆☆☆	4 ☆	9 🛨	12	2	54
Jordan			2				0	2
Lebanon		1					0	1
al		193	203	199	201	218	20	1034

akes caused more than 1,000 deaths other than those above: Italy 1980, Japan 1995, Russia 1995, Taiwan 1999 That is, 95% of the earthquakes in the last 50 years which caused more than 1,000 deaths oc IISEE has been accepting participants from all these countries.

<sup>:</sup>Earthquakes caused more than 1,000 deaths (58 Earthquakes)

## **Change in Demand for the Training**

- According to the international situation, economic conditions, furthermore the devastating earthquakes and occurrence of earthquake-related disasters in the 21st century, the trend of the demands for the IISEE has been changed.
- For instance, countries in Central Asia and Caucasus, which are on the way to
  emerge from their political and economic confusion caused by the collapse of the
  Soviet Union after the end of the Cold War, are eager to switch from previous
  academic and technological systems to those of western countries.
- By receiving benefit of world economic globalization, the attention to earthquake disaster mitigation is being developed in least developed countries such as Bangladesh, Myanmar, etc., which previously placed a great importance only on the basic human needs such as food production increase, etc., and the demands for the IISEE training have been risen in those countries.
- Besides, Chile, Mexico and other so-called medium-developed countries have already grown to be international joint research partners owing to the efforts for the Japan's past technology transfer.
- On the other hand, Malaysia and Sri Lanka started sending participants to the training course although they do not have damaging earthquakes in their own countries, the turning point of which was the 2004 Gigantic Tsunami in Indian Ocean.
- In addition to these countries, Turkey, China and others keep on sending participants for the capacity development of young core researchers of their seismology-related research institutions.

# One-year Course: Objective

■ To give the advanced technologies and knowledge in the fields of seismology, earthquake engineering and tsunami disaster mitigation so as to encourage the participants to establish, utilize, and disseminate earthquake and tsunami disaster mitigation technologies to their countries in consideration of their respective circumstances, regulations and people.

# Seismology Course and Earthquake Engineering Course

- The needs of the training on Seismology and Earthquake Engineering was recognized in late 50' and also emphasized at the 2<sup>nd</sup> WCEE (World Conference on Earthquake Engineering) in 1960.
- The training course on Seismology and Earthquake Engineering was held at the University of Tokyo in 1960 and at the Waseda Univ. in 1961.
- IISEE was settled in BRI in 1962 by the Government of Japan for securing continuous implementation of the training.

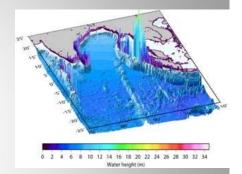


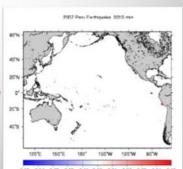
The 2nd Annual Training Courses
Participants on Seismology and
Earthquake Engineering (1961 - 1962)

Prof. Julio Kuroiwa (Peru)

# Tsunami Disaster Mitigation Course

- Gigantic tsunami generated by a major earthquake off Sumatra in 2004 wreaked havoc in the coastal areas of the Indian Ocean.
- In response, the Tsunami Disaster Mitigation Course was established in October 2006.



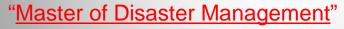


Height of tsunami along the coastlines devastated following the earthquake off Sumatra in 2004 (simulation result)

Tsunami Propagation (animation)

## Master of Disaster Management

From **2005-2006** course, the curriculum of the one-year course is approved as a master's degree program by **National Graduate Institute** for Policy Studies (GRIPS) and BRI.



Up to now, 197 participants took the MA degrees.



Awarding of master's degree by Dr. Y. Sakamoto, Chief Executive of BRI, Sep. 12, 2014

# One-year Course: Program

- October May
  - 8 months
  - Group training on lectures, study trips, colloquiums
- June August





- September
  - Presentation & discussion on the results of individual studies
  - Closing Ceremony: Certificate, Diploma and Master's degree



**General meeting** 



study trip

# One-year Course Lectures

## Seismology Course

- Computer
- Mathematics
- Theory of Seismic Wave
- Earthquake Observation
- Analyses of Teleseismic Records
- Source Mechanics
- Plate Tectonics
- Geophysical Exploration
   Seismic Micro Zonation
- Seismic Micro Zonation etc.
- etc.

## **Earthquake Eng. Course**

- Computer
- Structural Analysis & **Dynamics**
- RC & S Structures
- Foundation Engineering
- Structural Testing
- Limit Analysis
- Design Code

## One-year Course Lectures cont.

## **Tsunami Disaster Mitigation Course**

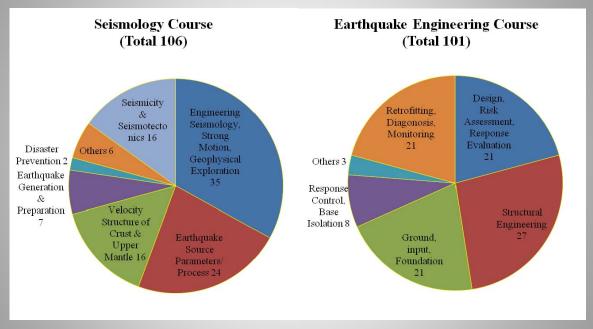
- Computer \*
- Mathematics \*
- Theory of Seismic Wave \*
- Source Mechanics \*
- Plate Tectonics \*
- Hydrodynamics
- Tsunami Propagation
- Tsunami Simulation
- Tsunami Early Warning System
- etc.



<sup>\*</sup> Joint Lectures with Seismology Course

## **Topics of the individual study**

(Master Theses from 2005-2006 course)



Number of participants sorted by topics of the individual study (Master Report from 2005-2006 course) for the period from the course 2001-2002 to the course 2011-2012 for Seismology & Earthquake Engineering Courses

## Degree, Diploma, Certificate, Awards and Honors

 IISEE: Post Graduate Diploma & Certificate

JICA: Certificate

GRIPS & BRI: Master Degree

IISEE: Director's Award\*

GRIPS: Dean's Award\*
 Best Research Award\*

 Speech in the Courtesy Visit to the Minister of MLIT\*

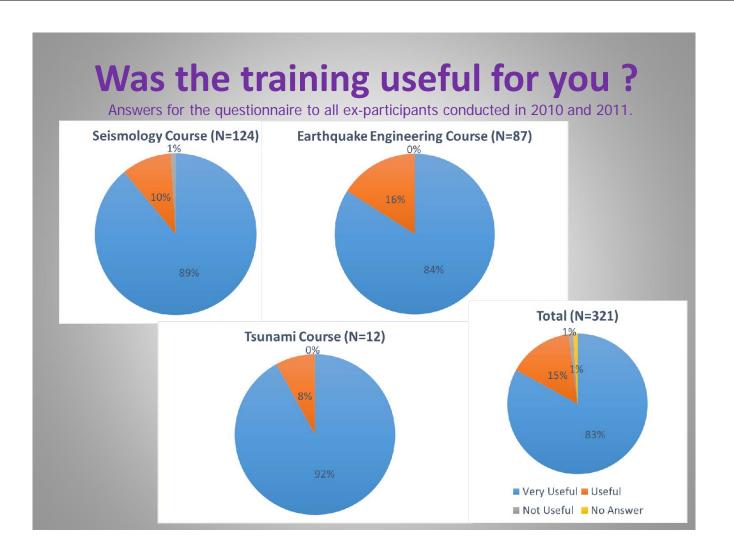
Speech in the Closing Ceremony\*

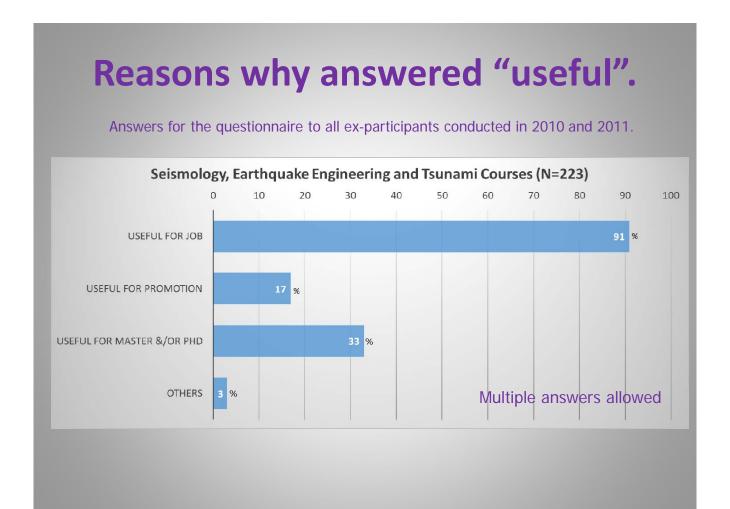
\* They will be selected among those of better performance.



Courtesy visit to Mr. A. Ohta, Minister of Land, Infrastructure, Transport and Tourism (MLIT), Sep. 8, 2014



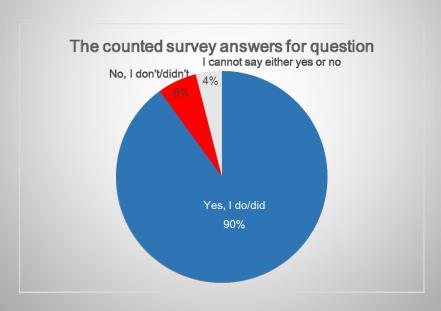




Do you (or did you) work in line with the training fields which you have joined in IISEE such as seismology, earthquake engineering, and/or tsunami disaster mitigation?

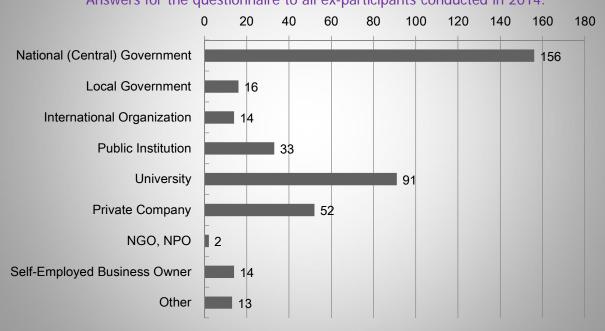
Answers for the questionnaire to all ex-participants conducted in 2014.

N = 327





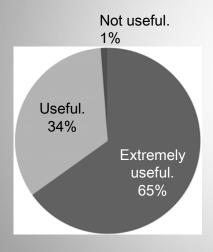
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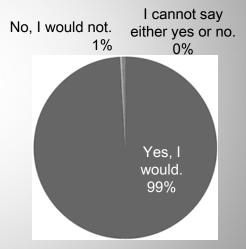


Answers for the questionnaire to all ex-participants conducted in 2014.

Was the outcome of the IISEE training program useful for your job?

Would you recommend IISEE training program to other office or professional colleagues?





# IISEE alumni play important roles in in their own countries &/or fields

Researchers who have been sent to the IISEE by their governments, national research institutes and universities from various countries contribute to the mitigation of earthquake disasters in their native countries after completing their training. Some IISEE graduates have become ministers, institution directors, or university rectors, and many actively participate as leaders in the fields of seismology and earthquake engineering. Following are some examples: Dr. Harsh Gupta of India (1966-67 Seismological Course) held the post of Secretary to the Government of India for the Department of Oceanic Development, the Director of the Indian National Geophysical Research Institute, and he was the first Chairman of the Asian Seismological Society. At the end of 2008, he received a Waldo E. Smith medal from the American Geophysical Union. Dr. Djoko Santoso of Indonesia (1978-79 Seismological Course) is the current rector of The Bandung Institute of Technology in Indonesia.

Many researchers have come to Japan from the National Research Institute of Astronomy & Geophysics (NRIAG) in Egypt. Dr. Rashad Kebeasy (1965-66 Seismological Course) is the former President of the NRIAG and was also Head of the International Data Center in Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organization (CTBTO). Dr. Salah Mohamed (1982-83 Seismological Course) is the current President of the NRIAG in Egypt. The largest number of researchers has come from Peru, with 107 participants to date. Dr. Julio Kuroiwa (1961-62 Earthquake Engineering Course) is a leader in the field of earthquake engineering in his country. He appeared on television as a commentator every day during the Peru Pisco earthquake in 2007. Dr. Robert Morales (1970-71 Earthquake Engineering Course) was the rector of the National University of Engineering in Peru until 2008. Dr. Federico David Guendel Umana (1975-76 Seismological Course) from Costa Rica is now the Head of the International Monitoring System (IMS) in the Provisional Technical Secretariat of the CTBTO. . (As of 2008)

These are just few examples among numerous IISEE alumni who play important roles in their own fields



Dr. Gupta at an alumni meeting held during a meeting of the Asian Seismological Society



Prof. Kuroiwa on television (courtesy by the United Nations Center for Regional Development)

# Global Seismological Observation Course

- The course commenced in 1995 one year before the Comprehensive Nuclear-Test-Ban Treaty (CTBT) was concluded in Disarmament Council at Geneva.
- The purpose is to train young people in order to obtain seismological knowledge and technologies for identification and detection of signals originated in underground nuclear tests.
- 186 persons from 70 countries have attended.
- The next term will be held Jan. 18– Mar. 14, 2015.



With Dr. R. Bell, Lecturer, Director of IMS, CTBTO



Lecture in Japan Meteorological Agency



countries on the Annex II States.

In light of 2010 NPT Review Conference, Japan will send high level envoys to non-signatories of CTBT and non-ratified States of Annex II, to encourage those States to sign and ratify as soon as possible.

#### 2. Contribution to establishing a strong verification regime

(1) Enhancement of JICA Global Seismological Observation Training

Since 1995, in cooperation with the Japan Meteorological Agency, Japan Weather Association and the Building Research Institute, Japan has been offering Global Seismological Observation Training. To date, one hundred thirty seven (137) experts coming from over sixty nine (69) countries were trained. Japan will enhance this technical training to increase the number of competent technical experts who will play key roles in strengthening the IMS. Details of the training are as follows:

Purpose: to increase the number of competent technical experts who will play key roles in strengthening the IMS through knowledge-sharing and offering technical expertise in the area of global earthquake observation and data analysis.

Requirements: More than three-year-experience in seismology and working in the field of earthquake observation and data analysis.

Preference will be given to those who are currently working or are planning to work at the IMS Observatory or the National Data Centres.

<sup>\*</sup>Target Countries: Mainly CTBT non-signatories and non-ratified States.

# Earthquake-Resistant Construction in Latin America Course

Mejoramiento y Difusión de la Tecnología para la Construcción Sismo-resistente en Latinoamérica

- Started in 2014
- Teaching language: Spanish
- Specialized for the Earthquake-Resistant Construction in Latin America
- Duration: two months (June-July) including two weeks in El Salvador
- Structural Experiment in UCA y UES,
   San Salvador
- The next term will be held in Jun. Jul., 2015.



Practice in a Concrete Block Factory



## China Seismic Building Course (2009-2012)

to assist recovery from Sichuan Earthquake

One yea after

Sichuan (Wenchuan) Earthquake 14:28 May 12, 2008 (local time)



Collapsed dormitory for students (Sichuan)



Collapsed brick masonry structure (Sichuan)

Wenchuan Earthquake occurred on May 12, 2008 claimed huge damage more than 87,000 casualties and missing, with 6,500,000 collapsed buildings.

"Human Resources Development Project for Earthquake Engineering and Construction of Buildings" initiated in China on May 12, 2009, just one year after the big disaster. IISEE of BRI manages one of the training courses titled "Design, Assessment, Retrofit of seismically resistant buildings (China Seismic Building Course)" Oct., 2009.



First participants in China course in Oct. 2009

Training in Japan aims at deeper understanding of Chinese engineers to seismic technology and hope to apply it to houses, schools, hospital and to disseminate in China. 72 leading structural engineers joined the training during 4 years. They learned at IISEE for two months on design, assessment and retrofit of earthquake resistant buildings. They returned to China and gave the lectures 10 times to 324 core engineers in 8 cities. These core engineers gave the lectures 33 times to 8,833 general engineers in 23 municipalities.

## **Together with Alumni: News Letters**



## **IISEE** Newsletter





IISEE Welcomes 23 Participants from 12 Countries

The IISEE opening ceremony of the 2014-2015 training course was held at JICA Tsukuba from 16:00 to 16:30 on Friday, October 3. They are 7 participants of Seismology Course, 10 participants of Earthquake Engineering Course and 6 participants of Tsunami Disaster Mitigation Course. For most of them it is the first time to come to Japan.

At the ceremony, Mr. Senichi Kimura, Director General of JICA Tsukuba International Center made an opening address. Next, Dr. Yuzo Sakamoto, BRI Chief Executive made a velcome speech. He told the new participants that the BRI has been conducting the training program over 50 years and he still felt sympathy with the people suffered from earthquakes and tsunamis. He hoped that they would learn how people in the devastated areas themselves. And, Dr. Sholich Indo, Professor for Policy Studies (GRIPS) delivered a dolle of the ceremony, each participant made

over to Japan. New Participants and a 1,121 from 81 countries. Counting this course, the participants of 115Et training program are 1,676 from 95 countries altogether. We are now looking forward to seeing a participant from a country of the entry number 100.

GRIPS Entrance Guidance and Orientation By Ms. Yoriko Iiba, Head of IISEE Administration Division





Call for Papers

Basically their lectures are carried out in Tsukuba. Through this new challer by the professors, we hope the participants have excellent experiences GRIPS, Tokyo in two weeks.



#### Visit to Edo-Tokyo Museum and Honjo Life Safety Learning Center, Octber 10, 2014

By Dr. Toshiaki Yokoi, Director of IISEE

It was the first chance for the Seismology course and Earthquake Engineering course participants to go to Tokyo Metropolis after they have come to Tsukuba. In the morning at Edo-Tokyo Museum, they learned the geological history of Tokyo Low Land, namely, the formation of thick soft soils in the eastern part of the metropolis and also the damage due to the 1923 Kanto Earthquake.



In the afternoon at Honjo Life Safety Learning Center, they got experiences of "Evacuation from smoke and fire," "Heavy storm and rain," "Devastating Ground Shaking on Simulator" and "Firefighting with fire extinguishers,"

# **Together with Alumni: IISEE Home Page & IISEE-Net**





## **Together with Almuni**

Earthquake Disaster Management Center Projects in the World (All are supported by IISEE & BRI through ODA with JICA)

Country	Organization/Project (abbreviation)	Counterpart	Period
Indonesia	Research Institute for Human Settlements (RIHS)	Ministry of Public Works (PU), Indonesia	〔1982-2003〕 1993-1998
Peru	Japan-Peru Center for Earthquake Engineering and Disaster Mitigation (CISMID)	National Engineering University (UNI), Peru	1986-1993 [1989-2004]
Chile	Earthquake Disaster Mitigation of Structures	Catholic University of Chile	1988-1991 1994-1998
Mexico	National Center for Disaster Prevention (CENAPRED)	National Autonomous University (UNAM)	1990-1997 [1997-2001]
Turkey	Project for Earthquake Disaster Mitigation Research Center in Turkey (ITU and Ancara)	Istanbul Technical University (ITU)	1993-2000
Egypt	National Research Institute of Astronomy and Geophysics (NRIAG)	NRIAG	〔1992-1999〕 1993-1996
Kazakhstan	Seismic Risk Evaluation Monitoring project in Almaty	Institute of Seismology	2000-2003
Romania	National Center for Seismic Risk Reduction (CNRRS) INCERC and Technical University of Civil Engineering	CNRRS - INCERC	2002-2008
El Salvador	Taishin project (Earthquake-resistant popular housing project)	Ministry of Housing and UD /El Salvador Univ.	2003-2008 2010-2012

## **Together with Alumni**

**International Platform for Reducing Earthquake Disasters (UNESCO-IPRED)** 

## **IPRED**

#### **UNESCO**

Japan: Building Research Institute (BRI),

**IISEE (COE of IPRED)** 





Chile: Universiad Catolica de Chile

**Egypt**: National Research Institute of Astronomy and Geophysics (NRIAG)

El Salvador: University of El Salvador

**Indonesia**: Research Institute for Human Settlements (RIHS)

Kazakhstan: Institute of Seismology

**Mexico**: National Center for Disaster Prevention (CENAPRED)

**Peru**: Japan-Peru Center for Earthquake Engineering and Disaster Mitigation (CISMID)

**Romania**: National Center for Seismic Risk Reduction (CNRRS)

Turkey: Istanbul Technical University (ITU)

### Proposals, Social activities

- Joint proposals to participating countries
- Joint advise on request from participating countries
- Joint proposals to international organizations
- Acceptance and implementation of joint research for solving national or local issues
- Cooperation in restoration following disasters

### Research

- Plan and implement joint research
- Mutual dispatch of researchers
- Sharing research achievement
- Joint presentation of research achievements
- (seminars and symposiums, etc)
- Sharing information of damages from earthquakes

### Training

- Fostering of lecturers for training
- Vertical specialization in training
- Mutual dispatch of lecturers for training
- Cooperative development and sharing of learning materials and curriculums
- Sharing and publishing training information
- Cooperation and nomination in offering trainees

### Database

- Information on researchers
- Information on research institutes
- Information on research achievements
- Information on utilization of research achievements
- Associated information of each country (Building codes, related standards)

