JSCE Study Tour Grant 2006 Report

Taweep Chaisomphob

Recipient of JSCE Study Tour Grant, 2006

Advisor, Civil Engineering Technical Committee, The Engineering Institute of Thailand under H.M. The King's Patronage (EIT), Thailand
and Vice Rector for Academic Affairs, Thammasat University, Thailand

It is my great honor to receive the 2006 Japan Society of Civil Engineers (JSCE) Study Tour Grant (STG), which is one of the grants under the Fund for the International Cooperation and Exchange of Engineers established in commemoration of JSCE's 75th Anniversary. I was nominated by of the Civil Engineering Technical Committee, The Engineering Institute of Thailand under H.M. The King's Patronage (EIT). I wish to express my deepest appreciation to both societies, JSCE and EIT, for providing me the opportunity to study the latest technology and science of civil engineering in Japan.

During September 19-23, 2006, I have been accompanied by JSCE International Activities Committee members and JSCE staff members to visit various research institutes, universities and construction sites. The concise report on my visits is given as follows :

Kyoto University Graduate School of Engineering at the Katsura Campus

I have visited Kyoto University's newly established campus, the Katsura Campus. This campus is conceived as a "Techno-science Hill" and consists of four Clusters : Cluster A, B, C, and D. I have been introduced to Department of Urban Management and Department of Urban and Environmental Engineering in the Graduate School of Engineering. These two departments are located inside the Cluster C, which is equipped with the advanced facilities such as faculty offices, classrooms, conference/seminar rooms, laboratories. I was impressed by the well-established research facilities in the Structural Dynamics Group of the Lifeline Engineering Division and the Composite Structures Engineering Division, for example, sophisticated dynamic loading test, modern wind tunnel test. In addition, I have learnt that Graduate School of Engineering at Kyoto University have restructured the former Department of Civil Engineering and related ones by establishing three new Departments, namely, Department of Civil and Earth Resource Engineering, Department of Urban Management, and Department of Urban and Environmental Engineering. This concept of integrating various

fields of civil/environmental engineering, life sciences and social sciences in the three Departments is the recent trend in most of the leading School of Engineering.

Kyoto University Disaster Prevention Research Institute at the Uji Campus

The Disaster Prevention Research Institute (DPRI) is one of unique research institutes in Kyoto University which aims to perform researches on reduction and prevention of nearly all aspects of natural disasters including earthquake, volcanic eruptions, landslides, debris flows, floods, storm surges and strong winds. DPRI has almost 100 researchers and is located at the Uji Campus of Kyoto University. It also has several research facilities throughout Japan such as Ogata Wave Observatory in the north, Sakurajima Volcanological Observatory in the south. During my visit to DPRI, I have seen a quite impressive experimental facility, named Strong Earthquake Response Simulator by Parallel-Distributed Control, consisting of a 3-dimensional earthquake shaking table, actuators, control and data acquisition system. This facility is capable of reproducing multi-axial ground motion, including one of the largest records : the 1995 Hyogoken-Nanbu (Kobe) Earthquake. I have also observed the research on the wind resistance performance of structures and the wind environment around buildings and structures by using wind tunnel test.

JSCE Annual Meeting International Program at Ritsumeikan University

During the 2006 JSCE Annual Meeting held at Ritsumeikan University in Shiga, I have participated in two events : JSCE-KSCE Concrete Joint Seminar “Maintenance and Management Strategy of Infrastructures in Japan and Korea” and the Roundtable Meeting “Restoration and Reconstruction from Natural Disasters”. In the JSCE-KSCE Joint Seminar, there are four presentations on the latest trend of maintenance and management strategy and technology of infrastructures in both countries. From this seminar, I have obtained the useful information on advanced R&D results. In the Roundtable Meeting, JSCE has invited the overseas Societies in cooperation with JSCE to join this meeting as follows : 1) The Institution of Engineers Bangladesh (IEB), 2) The Civil Engineering Chapter of The Institute of Engineers Indonesia (PII), 3) Korean Society of Civil Engineers (KSCE), 4) Mongolian Association of Civil Engineers (MACE), 5) The Chinese Institute of Civil and Hydraulic Engineering (CICHE), 6) Turkish Chamber of Civil Engineers (TCCE), 7) Asian Civil Engineering Coordinating Council (ACECC), 8) the Engineering Institute of Thailand (EIT). The representatives from 8 different countries including Japan have made the presentations on the situations of natural disasters and restoration/reconstruction in their countries. From the presentation by Prof.

Masanori Hamada, President of JSCE, I have learnt that the Asian region has been exposed to the threats of damaging earthquakes and tsunamis, and damaging storms and floods more often than any other part of the world. JSCE has proposed that there is a need for international collaboration in order to minimize the impact of natural disasters on any part of the region, and more concrete plan should be worked out in the near future.

New Meishin Expressway Rittoh Bridge Construction Site, Kayaogawa Bridge Construction Site and Sugitanigawa Bridge Construction Site

The New Meishin Expressway, currently under construction, is intended to share the transport needs with the First Meishin Expressway. This Expressway, leading from Nagoya, Aichi Prefecture to Kobe, Hyogo Prefecture, is under a responsibility of West Nippon Expressway Company Limited (NEXCO), formerly known as Japan Highway Public Corporation. I have visited one part of the New Meishin Expressway, named the Otsu construction sites in Shiga Prefecture, where there are quite a few bridge and tunnel construction. I have seen the so-called Rittoh Bridge, which is a forerunner composite bridge, utilizing the two new technologies : a corrugated steel web PC bridge, and an extradosed bridge. The corrugated steel web bridge with multiple cells of main girder is adopted for the first time in the world. These innovations are introduced to enable long span of 170 meter, to reduce weight of structures, and to improve construction efficiency. I have also observed other two corrugated steel web PC bridges, namely Kayaogawa Bridge consisting of 5-span continuous girder with 79 meter largest span, and Sugitanigawa Bridge consisting of 6-span continuous girder with 94 meter largest span. The section of both bridges is a single box, consisting of top and bottom concrete slab, and corrugated steel web. In order to improve the construction quality and reduce the construction time, some advanced construction techniques are introduced in these two bridges. For example, the precast PC planks are used as the formwork for casting top or bottom concrete slab, the corrugated steel web is used as the temporary structure for supporting erection equipment.

Nakanoshima New Line Shin-Kitahama Station Construction Site

Nakanoshima New Line is located on the Nakanoshima Island of about 3 km in length, which is the symbolic island of water metropolis of Osaka. This underground railway line will link with the existing Keihan Main Line leading from Osaka to Kyoto. The new line construction project consists of four subway stations and shield tunneling. I have visited the Shin-Kitahama Station construction site. The construction of this subway station, with

excavation depth of about 34 meter, utilizes the open-cut method with steel concrete diaphragm walls and installation of 11 layers of excavation support system. Structure of the station is 4 stories RC rigid frame of 170.4 meter length. Since there are a few historical buildings, existing natural parks and rivers nearby the project site, the environmental protection issue is the key point during the construction of the Nakanoshima New Line. For example, by taking advantage of the riverside location, barges instead of trucks are used to transport the excavated materials in order to reduce the pollution. In addition, as the mitigation plans of the construction activities, the fancy painted construction fence against the street and temporary flood protection wall made of real bricks on the riverside are installed, and during the night time, illumination of the fence around the project site is made.

Last but not least, I wish to express my sincere gratitude to the following persons for their hospitalities during my stay in Japan :

1. JSCE : Mr. Moriyasu Furuki, Mr. Kozo Katayama, Mr. Hiroyuki Yanagawa and Ms. Yukiko Shibuya
2. JSCE International Activities Committee and JSCE Committee on Asian Civil Engineering Coordinating Council (ACECC) : Mr. Yasuyuki Tanaka, Mr. Osamu Takahashi, Mr. Hideki Kawamura, Mr. Katsuji Fukumoto, Dr. Tsuyoshi Ikeya, Mr. Masaru Noda, Dr. Fuminao Okumura, Dr. Yukihiko Sumiyoshi
3. Kyoto University Disaster Prevention Research Institute and Kyoto University Graduate School of Engineering : Prof. Hitoshi Tanaka, Prof. Hiromasa Kawai, Prof. Hirokazu Iemura, Dr. Akira Igarashi, Dr. Kunitomo Sugiura
4. West Nippon Expressway Company Limited (NEXCO), New Meishin Expressway Rittoh Bridge Construction Joint Venture, Kayaogawa Bridge Construction Joint Venture and Sugitanigawa Bridge Construction Joint Venture : Mr. M. Suzuki, Mr. Takashi Suda, Mr. Tetsuo Hashino, Mr. M. Tohma, Dr. Songkram Piyamahant
5. Nakanoshima New Line Shin-Kitahama Station Construction Joint Venture : Mr. Naoya Shoji, Mr. Kazunari Yamamoto

STG Schedule during Sep. 19-23, 2006

Date		Time	Itinerary
Sep. 19	**A.M.**	**7:30**	Arrival: Kansai Int'l Airport/ TG 622
		10:00-12:00	Visiting Kyoto Univ. Katsura Campus
	P.M.	**12:00-12:50**	Lunch break
		12:50-13:30	Traveling Katsura Campus to Disaster Prevention Research Institute, Kyoto Univ.
		13:30-15:30	Visiting Disaster Prevention Research Institute, Kyoto Univ.
		15:30~	Traveling back to Otsu
Sep. 20	**A.M.**	**10:00-12:00**	Attending the JSCE-KSCE Joint Seminar at Ritsumeikan Univ.
	P.M.	**12:00-13:30**	Lunch with Mr. Tanaka, Chair, the Int'l Activites Committee, Mr. Furuki, JSCE Executive Director, Dr. Sumiyoshi, a JSCE rep. of ACECC, Dr. Okumura, Chair, the ACECC Committee, Mr. Kawamura, Secretary General, the Int'l Activites Committee
		14:00-20:00	Attending the JSCE Annual Meeting at Ritsumeikan Univ.
		14:00-16:00	Roundtable Meeting
		16:30-18:00	Discussion with Prof. Eiki Yamaguchi on joint research project and JSCE-EIT joint seminar
		18:30-20:00	Welcome Reception
Sep. 21	**A.M.**	**9:00-12:30**	International session at Ritsumeikan Univ.
	P.M.	**12:30-13:30**	Lunch break
		13:30-14:30	Traveling from Ritsumeikan Univ. to New Meishin Expressway construction site
		14:30-17:00	Visiting New Meishin Expressway construction site

		17:00-18:00	Traveling back to Ritsumenikan Univ.
		18:30-20:00	Banquet at Otsu Prince Hotel
Sep. 22	**A.M.**	**9:00-10:00**	Traveling to Nakanoshima New Railway Line construction site
		10:00-12:00	Visiting Nakanoshima New Railway Line construction site
	P.M.	**12:00-13:30**	Lunch break
		13:30~	Free time
Sep. 23	**A.M.**		Free time
	P.M.		Traveling to Kansai Int'l Airport at night
Sep. 24	**A.M.**	**1:25**	Returning to Bangkok, Thailand/Departure: Kansai Int'l Airport/TG637