

## Recent Collaborative Activities between Japan and Mongolian Organizations

### I. JSCE-MCA Joint Seminar: Seminar on the JSCE Standard Specifications for Concrete Structures and lessons for quality control from infrastructure maintenance in Japan

June 9, 2017

Ulaanbaatar, Mongolia

#### 1. Summary

The Japan Society of Civil Engineers (JSCE) Concrete Committee and the Mongolian Concrete Association (MCA) held a joint seminar on June 9, 2017, in Ulaanbaatar, Mongolia. Organized as part of the MCA Annual International Conference 2017, “Concrete Industry – Current and Future,” the seminar included two lecturers by representatives from Japan on the JSCE Standard Specifications for Concrete Structures and related research and international activities. Dr. Yoshinobu Oshima (Public Works Research Institute) introduced the Standard Specifications and its history, before discussing the quality control of concrete materials and structures, and the role it plays in assuring the long-term performance of road bridges in Japan. Dr. Michael Henry (Hokkaido University) then introduced the Standard Specifications for maintenance, and talked about Japanese activities for promoting maintenance management of concrete structures in Asian countries. Both presentations from Japan were simulatenously translated to Mongolian by representatives from the MCA for ease of understanding. Their presentations were then followed by 10 presentations from various Mongolian industry and academic representatives, as well as one presenter from Norway, who introduced the usage of admixtures for sprayed concrete. Roughly 100 people were in attendance during the seminar.

The representatives from Japan would like to express their gratitude to Dr. Narantuya Batmunkh, Vice Director of the MCA, for her cooperation and support in arranging this joint seminar.

#### 2. Schedule

<b>Time</b>	<b>Presentation</b>	<b>Affiliation</b>
10:00-10:05	Welcome and Introduction MCA President Navaandorj .L	Mongolian Concrete Association
10:05-10:10	Magnaisuren .S State Secretary	The Ministry of Construction and Urban Development, Mongolia
10:10-11:10	Yoshinobu Oshima	Public Work

	Introductions to the JSCE Standart, Specifications for concrete structures and the current situation of road bridges in Japan	Research Institute
11:10-12:10	Dr Michael Henry Overview of the JSCE Standard Specifications for maintenance and an international strategy for reducing maintenance through improved quality control	Hokkaido University
12:10-12:30	Tsermaa Ya Concrete industry developing process and quality in Mongolia and goals for the future	The Ministry of Construction and Urban Development, Mongolia, Division of Quality Controlling of construction materials
12:30-13:30	Lunch	
13:30-13:50	Lkharvadorj .O Overview of the construction material industry in Mongolia	Mongolian Construction Material Association
13:50-14:10	Tsoodol .E The current review of cement industry in Mongolia	'MonCement" LLC Consultant Engineering
14:10-14:30	Batjargal .B Characteristics of aggregates in concrete	Mongolian Quarry Industry Association
14:30-14:50	Oyunbileg .B Research on characteristics of component binder material by using local raw materials	MUST, School of Technology at Darkhan
14:50-15:10	Roar Myrdal Admixtures for Concrete and Sprayed Concrete	Norwegian University of Science and Technology
15:10-15:30	Gerelmaa .B Improving resource-efficiency and cleaner production in the Mongolian construction sector through materials recovery	Caritas Czech Republic in Mongolia
15:30-15:50	Р.Хишигээ The using method of maturity	MUST, SCA
15:50-16:10	Enkhbaatar .D Calculation of kinetics of heating and setting of strength of	University of Novosibirskii

	concrete nin construction modified by balance method	
16:10-16:30	Janchivdorj .H The physical -mechanical properties of self compacting concrete	MUST, School of Technology at Darkhan
16:30-16:50	Ankhubayar .U Research on characteristics of concrete with various waterproofing admixtures	MUST, SCA
16:50-17:00	Conclusions and closing remarks	
18:00-20:00	Farewell dinner	

### 3. Photos



Dr. Oshima discussing the role of quality control in assuring the performance of concrete



Dr. Henry introducing the Standard Specifications for maintenance and repair of concrete structures



The conference hall during the seminar



Simultaneous translation to Mongolian by Dr. Batmunkh



Dr. Henry being interviewed regarding the quality control of concrete



Dr. Oshima and Dr. Henry with counterparts from the MCA

## II. Brief Report on Visit to Ulaanbaatar

Visitors:

Dr. Yoshinobu Ooshima (Chief secretary, PWRI) and Dr. Yuta Yamada (Nihon University)

Period:

28th February 2018-2nd March, 2018

### 1. Objective

The investigations carried out in Mongolia related to concrete technology. These investigations have been continued since the joint seminar on last June. The objectives of the investigations were as follows:

- To grasp the technical needs of Mongolia and the issues facing the country
- To expand the applicability of Japanese technologies with practical use of the JSCE Standard Specifications for Concrete Structures




The main points of focus were quality control and issues relating to concrete production in winter. Other points considered were the applicability of fly ash and blast furnace slag in the Mongolian context as well as the current status of decision-making regarding the Mongolian standards.

### Reference

Michael Henry: Current state and sustainable prospects in the Mongolian Concrete Industry, *Proceedings of the Japan Concrete Institute*, Vol. 34, No. 1, pp. 1846-1851, 2012.

## 2. Schedule

28th Feb.			Departure from Narita Airport
1st March	9:00 am -11:30 am		<p>Visit to Roads and Transportation Development Center (an institute dedicated mainly to pavement research)</p> <ul style="list-style-type: none"> <li>• Introductions by each institute</li> <li>• Interview on the current status of decision-making for the Mongolian standards</li> <li>• Site visit to laboratories</li> </ul>
	12:30 pm -13:30 pm		<p>Visit to the Mongolian University of Science and Technology (a national university with eight departments and two research institutes)</p> <ul style="list-style-type: none"> <li>• Interview on the current status of cement plants in Mongolia, concrete quality control and the possibility of cooperation with JSCE</li> </ul>
	14:00 pm -15:00 pm		<p>Visit to the Construction Materials Testing and Analysis Laboratory (a national testing center established by KOICA)</p> <ul style="list-style-type: none"> <li>• Site visit to laboratories</li> </ul>

		
15:30 pm -16:00 pm		Visit to the precast concrete factory of PREMIUM CONCRETE company • Site visit to the precast concrete structural member production facility
16:30 pm -17:30 pm		Visit to a batcher plant of the PREMIUM CONCRETE company • Site visit to batcher plant and test facilities
3/2		Return to Narita Airport

### 3. Outline of investigation findings

#### 3.1 Materials

- High quality aggregate is difficult to obtain because aggregate grading by size is inadequate.  
→More knowledge about materials engineering is required.
- Temperatures in Mongolia are extremely low. Low hydration heat cement is one material that can be useful for reducing the temperature gradient between cast concrete and the ambient air. From the viewpoint of utilizing the by-products of coal-fired power plants, fly ash could be used as a concrete ingredient. However, there is little understanding regarding how to use high-quality fly ash, and bottom ash is used instead.  
→Additional technology needs to be introduced at coal-fired power plants to increase the applicable range of fly ash in concrete.
- There is only one iron and steel plant in Mongolia, so it is difficult to obtain the requisite amount

of blast furnace slag.

→Exportation of slag from Japan to Mongolia is not realistic.

### 3.2 Design codes

- A Mongolian standard has been established based on AASHTO, ASTM and so on.

→Prior to Mongolian independence, the Russian standard was in use. Thereafter, use of a standard was lost and designs were implemented individually. There is insufficient data to establish a domestic Mongolian standard.

### 3.3 Resources

- Support from Korea and China

→The test equipment required to collect data with a view to establishing a Mongolian standard is available in sufficient quantity because its cost is relatively low compared with in Japan.

### 3.4 Quality control

- Concrete temperature is increased by using warm water during mixing. Mixer vehicles are fitted with heat insulation to maintain the quality of the fresh concrete.

→With no suitable standards, there are large differences in quality between companies.

- Although plenty of equipment is available, there is an insufficient number of engineers able to operate it competently. A framework for training skilled engineers is required.

→The use of self-compacting concrete is being considered, but the cost increment has not been estimated. To utilize self-compacting concrete, quality control in the use of AE agents and training schemes for engineers are needed.

→There is a possibility that senior engineers are also more involved to the engineering works in this country.

## III. Report on the 17th International Conference of Concrete, on 15th June, 2018 in Ulaanbaatar, Mongolia

Dr. Yamada (Nihon University)

### 1. Outline

The 17th International Conference of Concrete sponsored by the Mongolian Concrete Association (MCA) was held at the Mongolian University of Science and Technology (MUST). Dr. Yamada participated in the conference as an invited speaker with the aim of creating a regular opportunity for technology exchange and to grasp the technological needs of Mongolia. The theme of the conference was “Concrete design and quality control for structures especially rigid pavements, thermal power plants, and water and waste water treatment plants”. There were approximately 50-70 participants and the conference included nineteen lectures presented in both Mongolian and English.



## 2. Notes

- Lectures on chemical admixtures and non-destructive testing techniques, in particular, attracted many participants. The set-up costs of non-destructive testing techniques is rather high for Mongolia, so some technical development is required. According to a presentation by the Xypex company, concrete durability can be enhanced using special admixtures that promote crystallization. In this area, admixture companies in other countries may be able to offer support.

- Lectures regarding the applicability of Mongolian fly ash seemed to suggest that research projects can strongly contribute as a technical support in Mongolia.

- Organizing regular opportunities for technology exchange among JSCE, MUST and MCA was discussed. Dr. Narantuya (MUST) would be a suitable counterpart on the Mongolian side. A workshop for a small number of participants would be suitable as a first opportunity for such an exchange.

## 3. Conference agenda

Time	Item	Presenter	Affiliation
09:15-10:00	Registration and reception		
10:00-10:05	Opening ceremony	Sh. Lkhamsuren, Vice Minister	Ministry of Construction and Urban Development Mongolia
10:05-10:20	Infrastructure projects and the market for concrete in the Mongolian construction sector 2017-2018	L. Batjargal	Ministry of Construction and Urban Development Mongolia
10:20-10:40	Rigid pavement expansion in Mongolia and its characteristics	Ch. Dendevdorj, Honorary Professor	Mongolian University of Science and Technology
10:40-11:00	Deterioration of civil engineering structures and the -T problem	D. Dashjamts, Professor	Mongolian Science Academy School of Civil Engineering and Architecture
11:00-11:20	Waste water and sewage projects worldwide	David Lynch, Technical Director	Xypex Chemical Corporation, Canada
11:20-11:40	Theoretical/practical issues on cement treated pavement in Mongolia	P. Bolormaa, Associate Professor	School of Civil Engineering and Architecture, MUST
11:40-12:00	Corrosion resistance of mineral fibers for fiber-reinforced concrete	L. A. Urkhanova, Professor	East Siberia State University of Technology and Management
12:00-12:20	Sawed joints in concrete slabs Concrete Consultant	Luke M Snell, Professor	American Concrete Institute, USA
12:20-13:30	Lunch		
13:30-13:50	Study on properties and batching of concrete of hydro-technical structure for road construction in Mongolia's extremely harsh climate	B. Battsetseg	Dean of Materials Laboratory, Institute of Engineering and Technology
13:50-14:10	Special cement additives	Dinil Pushpalal, Professor	Graduate School of International Cultural Studies, Tohoku University, Japan
14:10-14:30	Mineral analysis of ultra-high performance fiber-reinforced concrete 50M composite box girder	M. Tsas-Orgilmaa, Doctoral student	Kumoh National Institute of Technology, Gumi, Korea
14:30-14:50	Plasma-chemical synthesis	N. N. Smirnyagina,	Buryat Science Center,



	of carbon nano modifiers under helium pressure for modification of ordinary concrete	Prof.	Institute of Physical Materials Science
14:50-15:10	Research on an effective usage of waste crushed sand from quarry around Ulaanbaatar city	T. Hajidsuren, Senior Lecturer	School of Civil Engineering and Architecture, MUST
15:10-15:30	Effect of crack lengths along tensile rebars on shear fatigue behavior of RC beams	Yuta Yamada, Assistant Prof.	Nihon University, Japan
15:30-15:50	Prediction model for compressive strength of concrete incorporating Mongolian fly ash	Atsushi Suzuki, JSPS Research Fellow	Graduate School of Engineering, Tohoku University
15:50-16:10	Performance of various waterproofing admixtures in medium grade concrete	A. Indra, Master student	School of Civil Engineering and Architecture, MUST
16:10-16:30	Chemical admixtures for special concrete structures	Liu Zhaoyang, Deputy General Manager	Shijiazhuang Chang'an Yusai Building Material LTD.
16:30-16:50	Controlling seismic damage of reinforced concrete columns	Sh. Enkhtur, Doctoral student	School of Civil Engineering and Architecture, MUST
16:50-17:10	New NDT technology for reinforced concrete imaging	Peter Lim, General Manager	Proceq company, Switzerland
17:10-17:25	Challenges faced by the concrete industry	B. Narantuya, Vice President/Professor	Mongolian Concrete Association & School of Civil Engineering and Architecture, MUST
17:25-18:00	Closing Ceremony		
18:00-20:30	Banquet		

Moderators:

- 1) B. Narantuya, Mongolian University of Science and Technology and Vice President, Mongolian Concrete Association (MCA)
- 2) S. Uuganbayar, Doctoral student, Mongolian University of Science and Technology

#### 4. Photos

