



STUDY TOUR GRANT REPORT

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Mongolian Association of Civil Engineers

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1. Introduction

1.1 About JSCE

Japan Society of Civil Engineers (JSCE) was established as an incorporated association in 1914 entrusted with the mission to contribute to the advancement of scientific culture by promoting the field of civil engineering and the expansion of civil engineering activities. Since its establishment, JSCE has endeavored to achieve the above mission, through extensive activities including scientific exchange among members, researchers / promotion of science and technologies relating to the field of civil engineering, social involvement, etc. Over the years, the JSCE membership has increased significantly from the initial 443 members to approximately 39,000 members at present, and is currently engaged in various wide-ranged activities around the world.

With the birth of the 21st century, JSCE has reconfirmed its goals to exert perpetual efforts

- 1) to propose an idea for social infrastructure development in the future from civil engineers' perspective.
- 2) to acquire a steadfast relationship of mutual trust with the society,
- 3) to promote scientific and technological researches/studies with a high degree of transparency, and
- 4) to evaluate public works from a neutral standpoint, and to reach a social consensus on those proper standards.

1.2 About Study Tour Grant (STG)

JSCE Study Tour Grant (STG), supported by International Scientific Exchange Fund (ISEF), is a unique program for young civil engineers to learn Japanese civil engineering technology and projects. The STG program invites the civil engineering students who are nominated by the AOC societies to Japan to stay for about one week. During their stay, those students visit project sites and research institutes, meet leading civil engineering professionals and academics, and share their projects with other students. At the end of the program they are requested to submit a report on their experience gained in Japan to JSCE and also to the AOC to which they belong home. This program gives a chance not only to see technological innovations, but also to experience them in the environment that they are achieved.

1.3 Participants of 2018 STG

There are 7 participants from different countries in STG 2018.

Table 1. Participants in study tour grant 2018

No.	Country	Name	Affiliation
1	Vietnam	Mr. Ngoc Lan Nguyen	Vietnam-Japan and Development Center (University of Transport and Communications), Hanoi, Vietnam
2	Mongolia	Ms. Khaliunaa Darkhanbat	University of Seoul, Reinforced structure laboratory (fulltime student, assistant)
3	Myanmar	Ms. Khin Phyu Phyu Thanda	UN-Habitat Programme Associate (Structural)
4	Turkey	Mr. Ali Gurkan GENC	Istanbul Technical University, Structural Engineering Graduate Program, Istanbul-Turkey
5	Philippines	Ms. Amie Lou G. Cisneros	Program Head – Civil Engineering, College of Engineering and Technology, Cor Jesu College, Digos City
6	Thailand	Mr. Jetsada Kumphong	2 nd year PhD. Student, Department of Civil Engineering, Faculty of Engineering, Khon Kean University, Thailand
7	Bangladesh	Mr. Anindya Samya Saha	Lecturer, Department of Civil Engineering, Bangladesh University of Engineering and Technology

**Fig1.** JSCE-STG 2018 participants

2. Study Tour Activities

2.1 Itinerary

Main Schedule of STG 2018: Aug.26th (Sun) – Sep.1st (Sat)

Table 2. Schedule of STG 2018

	Date	Time	Event	Attend
1	8/26, Sun	-	Arrive at Narita Airport Check in Nishitetsu Inn Shinjuku	Ms. Suzuki
2	8/27, Mon	7:30~12:00	Visit KAJIMA Technical Research Institute	Mr. Yoshizawa, Ms. Suzuki
		12:00~15:55	Go to Tokyo Outer Ring Road JCT North Ramp Project Site	Mr. Yoshizawa, Ms. Suzuki
		17:00	Arrive at Nishitetsu Inn Shinjuku	Mr. Yoshizawa, Ms. Suzuki
3	8/28, Tue	9:00~12:00	Visit Railway Technical Research Institute	Mr. Yoshizawa, Ms. Suzuki,
		12:00~16:00	Go to SHIMIZU Institute of Technology	Mr. Yoshizawa, Ms. Suzuki, Mr. Arai
		18:00~19:30	Leave HENADA Airport for New Chitose Airport by Flight ANA075	Mr. Yoshizawa, Ms. Suzuki
		19:30~21:00	Go to Sapporo Sumire Hotel	Mr. Yoshizawa, Ms. Suzuki
4	8/29, Wed	8:00	Go to Hokkaido University	Mr. Yoshizawa, Ms. Suzuki
		9:00~12:00	Participate in the International Summer Symposium, JSCE Annual Meeting in Hokkaido University	Mr. Yoshizawa, Prof. Ishozaka, Ms. Suzuki
		13:00~18:30	Depart from Hokkaido University Toya-usu Tour Arrive at Hokkaido University, Participate in the Networking Reception	Mr. Yoshizawa, Prof. Ishozaka, Ms. Suzuki
5	8/30, Thu	8:10	Leave the hotel for Ishikari Port Ishikari LNG Terminal Station	Mr. Yoshizawa, Ms. Suzuki, Mr. Yamamura, Mr. Nakayama, Ms. Ito
		9:00~10:30	Ishikari Port Ishikari LNG Terminal Station	Mr. Yoshizawa, Ms. Suzuki, Mr. Yamamura, Mr. Nakayama, Ms. Ito
		13:30~15:30	Tayo-Unesco Global Geopark	Mr. Yoshizawa, Ms. Suzuki, Mr.

				Yamamura, Mr. Nakayama, Ms. Ito
		18:00~19:35	Leave New Chitose Airport for HANEDA Airport by Flight ANA4723	Mr. Yoshizawa, Ms. Suzuki, Mr. Yamamura, Mr. Nakayama, Ms. Ito
		20:30	Arrive at Keio Presso Inn Otemachi and check in the hotel	Ms. Suzuki
6	8/31, Fri	~13:00	Free time	Mr. Arai, Ms. Suzuki
		13:30~15:00	Asakusa	Mr. Arai, Ms. Suzuki
		15:30~17:0	Tokyo Skytree	Mr. Arai, Ms. Suzuki
		19:00~21:00	Dinner at Tokyo Station Buffet “Gochiso Zanmai” with the ISEF members	Mr. Arai, Ms. Suzuki
7	9/1, Sat	-	Check out the hotel and go to Narita International Airport	Ms. Suzuki

2.2 Day 1 (27th August)

I flight from Incheon International Airport to Narita Airport at 12:30 pm. This is my first time to visit in Japan. After passing the immigration procedure, I took an airport bus and when I arrived the bus stop, Ms. Suzuki fetch me up and bring me to the hotel: Nishitetsu Inn where I will stay for a night.

2.3 Day 2 (28th August)

At 7:30 am, we checked out the hotel and visited to KAJIMA Technical Research Institute by chartered bus. Ms. Suzuki made introduction among the participants and explained the detail schedules for the study tour on the bus.

At 9:00am, we arrived at KAJIMA Technical Research Institute, Mr. Yoshizawa warmly welcome out study team. After his introduction and presentation, we explored around Nishichofu Complex. In this complex, we visited some laboratories:

- (a) Shaking Table Laboratory
- (b) Wind-tunnel Laboratory
- (c) Concrete Laboratory
- (d) Large-Size Structural Testing Laboratory

(a) Shaking Table Laboratory

The new high-performance 3-D shaking table system provides the Japan's best performance in reproducing the large earthquake motions observed in Japan in recent

years. The system also possesses the capability of producing the world's largest amplitude of displacement in long-period motion. The key design of the system is the double-deck shaking tables, the larger, main table is to reproduce usual earthquake ground motion and the smaller, upper table, which is detachable, is to reproduce large amplitude displacements of a super high-rise building caused by long-period ground motion.

A specimen up to 60 tons can be loaded on the main shaking table (5 m x 7m). About for Long-Period shaking table, a specimen up to 5 tons can be loaded on the table (2m x 2m).

(b) Wind-tunnel Laboratory

In this laboratory developing the wind-resistant design and safety of structural members or claddings of the wind-sensitive structures such as the high-rise buildings, large space structures and the long span bridges, using the highest class wind tunnel facilities and numerical simulation techniques of the trades.

(c) Concrete Laboratory

Concrete laboratory developing the comprehensively evaluating concrete properties such as workability, durability, and strength.

(d) Large-Size Structural Testing Laboratory

This testing laboratory, which is used to examine the strength and quake-resisting behavior to be applied in civil engineering and various other construction works. Using its reaction wall and reaction floor, large-scale loading tests can be conducted. Comprehensive facilities, including a combined load testing system for large panel elements and auxiliary equipment (large crane, specimen preparation yard), are provided.

We moved to Tokyo Outer Ring Road JCT North Ramp Project Site after having lunch at KAJIMA.

The Tokyo Outer Ring Road (GAIKAN) is approximately 85km long and connects area within an approximate 15km radius from the center of Tokyo. By dispersing the inflow of traffic that passes through the center of Tokyo, the Tokyo Outer Ring Road will eliminate the chronic traffic jam in the Greater Tokyo Area.

For the 16.2km section, a deep-bore tunnel structure has been adopted in order to minimize effects on the living and natural environment in the area along this section. The project was initiated in 2009, the central government, East Nippon Expressway Company, and Central Nippon Expressway Company are moving forward with construction. Effect of the Project:

- Reduction of travelling time
- Safety improvement of the community road
- Environmental improvement

- Security of the transportation network that functions at the time of the disaster

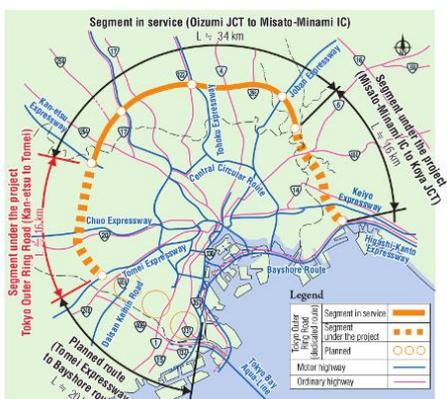


Fig2. Outer Ring Road in construction



Fig3. After finishing the tour

After finishing the construction side tour, we went to back Nishitetsu Grand Hotel.

2.4 Day 3 (29th August)

In the morning, we went to Railway Technical Research Institute by charter bus. We arrived at 9:00 am, they introduced about of RTRI and we started facility tour.

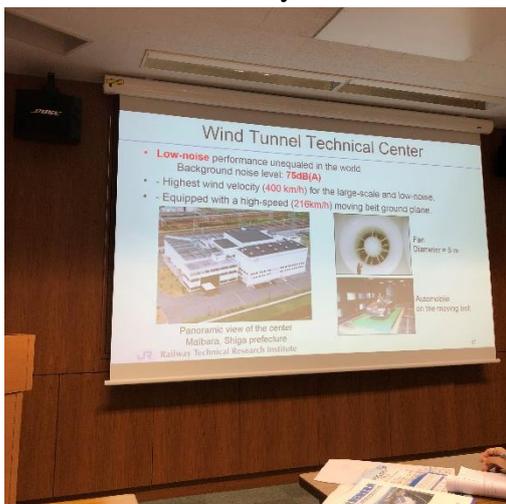


Fig4. Introduction of RTRI



Fig5. MLX01-3 train

We visited:

- Track and Roadbed Testing Equipment
- Large-scale Shaking Table
- Rolling Stock Test Plant
- Large-scale Rainfall Simulator

(a) Track and Roadbed Testing Equipment

The railway roadbed testing equipment is used to repeatedly apply simulated train loads on a full-scale roadbed apply simulated train loads on a full-scale roadbed or track. This contributes significantly to the development of new roadbed structures and

roadbed improvement works as well as investigation into the mudpumping phenomenon.



Fig6. Roadbed testing area



Fig7. Full-scale roadbed

(b) Large-scale Shaking Table

This is a large-scale two-dimensional vibration test machine to simulate earthquake motion at a seismic intensity in the order of 7, mounted with structure models under actual track and truck conditions. It has an excitation stroke of ± 100 cm and a maximum load capacity of 50 tons. In addition, it is placed on a floating foundation to prevent vibration from propagating to nearby residential areas.

(c) Rolling Stock Test Plant

The rolling stock test plant simulates the conditions of tracks and running trains at a maximum speed of 500km/h. This enables tests under various conditions that cannot be reproduced on actual lines. It is also used for the investigation of the related effect and problems of the set track conditions.

(d) Large-scale Rainfall Simulator

The large-scale rainfall simulator reproduces the phenomenon of rainfall up to an hourly rate of 200 mm under conditions similar to actuality. The simulator is used to perform slope failure tests and evaluate the performance of various sensors in rain.



Fig8. Large-scale Rainfall Simulator



Fig9. STG 2018 participants

After laboratory tour, we moved to SHIMIZU Institute of Technology. First they gave us introduction and presentation. We explored around SHIMIZU complex, in this tour:

- (a) Geotechnical Centrifuge Laboratory
- (b) Materials Laboratory
- (c) Structural Testing Laboratory
- (f) Advanced Earthquake Engineering Laboratory

(a) Geotechnical Centrifuge Laboratory

In this laboratory, they conduct experiments related to ground and structures. The behavior of actual ground and structures can be simulated in small-scale models by applying centrifugal force. Using the centrifuge, they are able to simulate liquefaction, slope failure, and other ground-related disasters, and based on the test results, they develop countermeasures against them. They also work on the development of practical foundations such as piled raft foundations and soil improvement.

(b) Materials Laboratory

The Materials Laboratory is an R&D facility dedicated to research and development on advanced and sustainable materials. The lab has established the technology for evaluating the performance of construction materials from multiple perspectives.

(c) Structural Testing Laboratory

Fully investigating a building's structural performance is necessary for safe and economical building construction, maintenance, and management. The Structural Testing Laboratory is equipped with large-scale testing facilities to accommodate testing equipment for large structures, highly flexible and complex loading system, and highly reliable high-speed measuring equipment.

(d) Advanced Earthquake Engineering Laboratory

This laboratory is equipped with E-Beetle, most advanced large-scale shaking table in the construction industry, which is capable of simulating the ground motion during a major earthquake. It is also equipped with E-Spider, the world's most advanced large-stroke shaking table, which is capable of simulating the seismic response of structures during a long-period earthquake.

After finishing the laboratory tour, we went to HANEDA airport to go to Hokkaido. When we arrived Hokkaido, we went to Sapporo Sumire Hotel. At night, I prepared for my presentation at 20th Summer Symposium tomorrow.

2.5 Day 4 (30th August)

In the morning, we went to Hokkaido University by charter bus and attended the 20th International Summer Symposium. All the presentations were separated by the

subjects. I am allocated to make my presentation “Development of Ground Movement prediction program for CS-H wall, implemented Deep Excavation”. My speech was successfully delivered and this was one of my greatest experience, knowledge and communications in this Study Tour Grand.



Fig10. At the 20th International Summer Symposium

After having lunch, we went to Project sites by charter bus and visited:

- **Museum of Ishikari River**

The Ishikari River, at 268 kilometers long, is the third longest in Japan and the longest in Hokkaido. The river drains an area of 14,330 square kilometers making it the second largest in Japan, with a total discharge of around 14.8 cubic kilometers per year.



Fig11. At River Museum

- **Makunbetsu Marsh**

The Makunbetsu Marsh is a wetland of Ishikari city in Hokkaido. It is divided into two main parts: alder forest and reed community.



Fig12. At Makunbetsu Marsh

- **Canal Sluice**

The canals have been constructed in the area, oxbow lakes in the Ishikari River basin are utilized as primary and auxiliary irrigation resources and as reservoirs for circulating irrigation systems.



Fig13. At Canal Sluice in Ishigari River

We moved to again Hokkaido University after tour. We joined JSCE Networking Reception. At the network reception, I got a chance to meet JSCE members, and project manager, civil engineering, Chair Person of Mongolian MCS corporations. Then we stayed at Sapporo Sumire Hotel.

2.6 Day 5 (31st August)

We left the hotel in the early morning as usual and the very first place we visited on that Ishigari Port Ishikari LNG Terminal Station.

Hokkaido Electric Power Company plans to build its first LNG-fired thermal power station in western area of Ishikari New Port Region in fiscal year 2021 or later. As the first phase, a gas turbine combined cycle power plant with capacity of 500,000 KW will be constructed. The region is the largest industry complex in central Hokkaido area, which

is located in northern part of Japan. In association with the plan, the company concluded a basic agreement with Hokkaido Gas Co., Ltd. concerning the shared use of the Ishikari LNG Terminal that will be constructed by Hokkaido Gas.

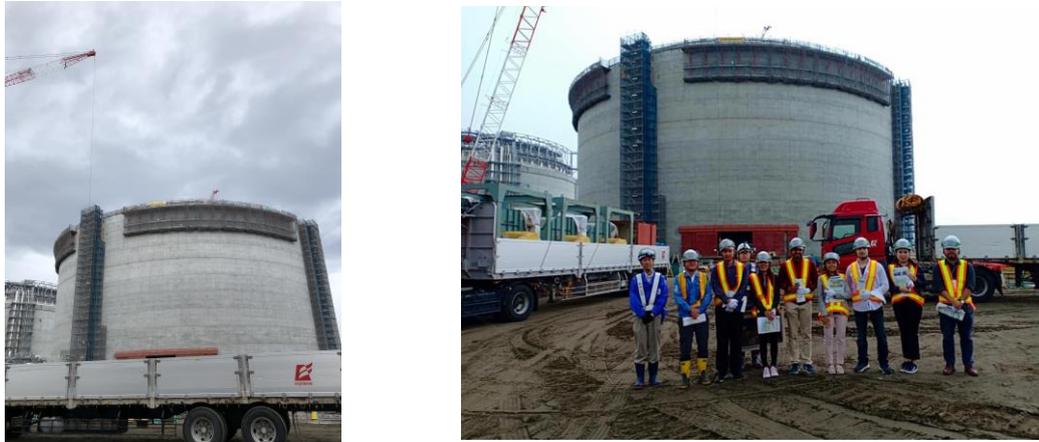


Fig14. At Ishigari Port Ishigari LNG Terminal Station

We moved to Volcano Science Museum in Toyako Town after construction side tour. Volcano Science Museum is a comprehensive learning facility of Mount Usu, which has been erupting repeatedly since the prehistoric times.

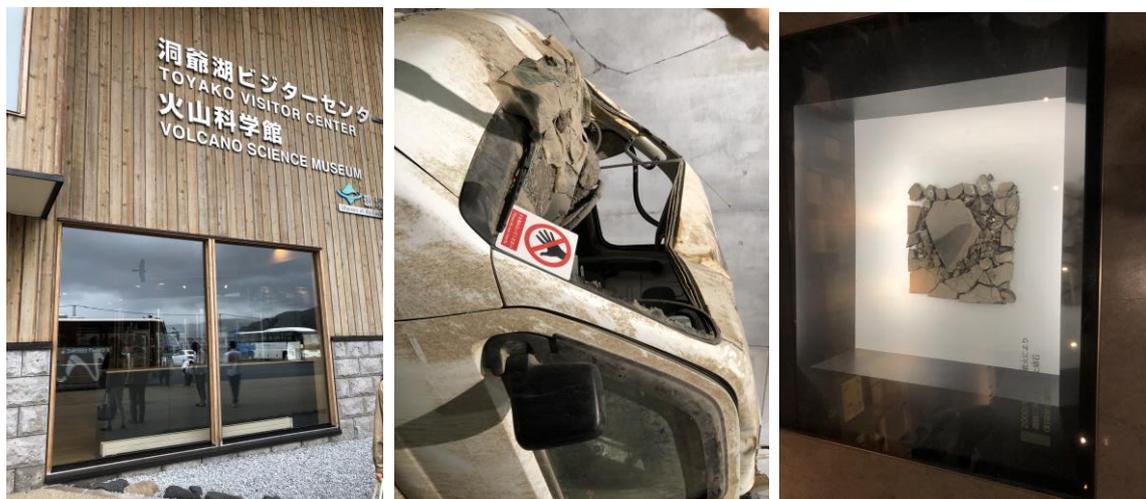


Fig15. At Volcano Science Museum

Tracing the history of Mount Usu, they introduce the mechanism of volcanic eruptions, exhibit the actual damages caused by the eruptions in the past, and show preventive measures against disasters using photos, models, diorama, and various other audiovisual materials mainly focusing on the eruptions.



Fig16. Raw scars of damaged by the eruption



Fig17. Group photo at Volcano Science Museum

In the evening, we left New Chitose Airport to HANEDA Airport by Flight ANA4723 and checked in at Hotel KEIO PRESSO INN Otemachi in Tokyo.

2.7 Day 6 (1st September)

We had some free time in the morning until 13:00 pm. Mr. Arai, Ms. Suzuki came to pick us up at noon to go sightseeing in Tokyo. Our first destination was the Asakusa Kannon Temple.



Fig18. At Asakusa Kannon Temple

Then, we moved to the Tokyo Sky Tree. The city scape of Tokyo from the sky tree is awesome. After visiting the sky tree, we went back to the hotel by bus.



Fig19. At Tokyo Sky Tree

3. Conclusion

Firstly, I would like to express my gratitude to Japan Society of Civil Engineering (JSCE). I would like to thank all JSCE staffs for their effort in making all the necessary arrangements during Study Tour Grant 2018. As this is my first trip to Japan, I got many changes to explore the developments and technologies of Japan. I also studied a lot of new things and international conference was also good experiences and memories for me.

Special thanks to Ms. Yuki who were connected with us for the application and preparation process. And thanks to Mr. Yoshizawa, Mr. Arai and Ms. Suzuki.

The STG program of JSCE was indeed very helpful for studying more experiences from technical tour and international conference.