



# REPORT FOR STUDY TOUR GRANT 2019



MUNKHSAIKHAN Battumur

Mongolian University of Science and Technology

September 1-7, 2019

# TABLE OF CONTENTS

## Contents

TABLE OF CONTENTS .....	1
1. PREFACE .....	2
About JSCE (Japan Society of Civil Engineers).....	2
Participants of JSCE STG 2019 .....	2
STG 2019 Itinerary.....	3
Day 1 (1st of September, 2019, Sunday).....	3
Day 2 (2nd of September, 2019, Monday).....	4
Shaking Table Laboratory .....	4
Wind- Tunnel Laboratory.....	4
Base isolated building .....	5
Day 3 (3rd of September, 2019, Tuesday) .....	6
Teshima Island .....	7
Day 4 (4th of September, 2019, Wednesday) .....	8
Kabagawa dam .....	8
Day 5 (5th of September, 2019, Thursday).....	9
Disaster affected areas in Hiroshima.....	9
Day 6 (6th of September, 2019, Friday).....	11
ACKNOWLEDGEMENT .....	12

## 1. PREFACE

### About JSCE (Japan Society of Civil Engineers)

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. Furthermore, JSCE will implement such new indispensable programs as Civil Engineers' Qualification System, Continuing Professional Development, etc., for the benefit of creating an environment where civil engineers can widely take on an active role in the international community, and where civil engineering technologies may contribute to the amenity of the people both in and outside of Japan.

### Participants of JSCE STG 2019

Organization	Name	Affiliation	Presentation Title
VFCEA	Mr. Nguyen Bao Lam	Road and Bridge Dept., Faculty of Civil Engineering, University of Transport and Communications (bridge: maintenance, aging)	Bridge Damages and Maintenance Methods in Vietnam
MACE	Mr. Munkhsaikhan Battumur	School of Construction and Architecture, Mongolian University of Science and Technology (seismic)	Seismic Design of Light Gauge Framed Steel Structure
MES	Mr. Wai Yar Aung	Technical Research Engineer, Myanmar Earthquake Committee (seismic, geotechnology)	Earthquake Risk Assessment of Selected RC Building in Yangon
JSCE Turkey Section	Ms. Göl Pinar Avci	Civil Engineering Dept., Istanbul Technical University (seismic, geotech)	Tempo City Residence Project
PICE	Mr. Mark Allen T. Zapanta	Aboitizland Inc. Civil Engineering Major in Structural Engineering Tarlac State University (Structure)	Structural Design Analysis and Assessment of Earthquake Algorithms on Balog-Balog Multipurpose dam
JSCE Thailand Section	Mr. Washirawat Praphatsorn	Dept. of Civil Engineering, faculty of Engineering, Kasetsart University (geotech, geosynthetic)	A Long Term Study of Pore Water Pressure Behaviors in MSE Wall
IEB	Mr. Omar Faruqe	Master Student Civil and	Application of AcciMap

	Hamim	Structural Engineering Bangladesh University of Engineering and Technology, Lecturere, Dept. of Civil Engineering, BUET (transport, urban planning, pavement)	Methodology to Investigate the Bus Accident at Salehpur Bridge
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Study Tour Grant Program is an annually organized program for young civil engineers supported by the International Scientific Exchange Fund (ISEF). I attended STG 2019 program that was held September 1st to September 7th. The Program provides the young civil engineers with the opportunity to communicate other civil engineers from different countries.

### STG 2019 Itinerary

Date		Itinerary
Sept. 1 (Sun)		Arrive in Japan. Stay at a hotel in Tokyo
Sept. 2 (Mon)	Forenoon	9:00~11:30 Attend a STG orientation session, Visit KAJIMA Technical Research Institute
	Afternoon	14:30~ Visit tunnel construction site of Tokyo International Airport, and then fly to Kagawa Pref., Shihoku
Sept. 3 (Tue)	Forenoon	8:40~11:55 Participate in the 21st International Summer Symposium, JSCE Annual Meeting at Kagawa University
	Afternoon	13:00~17:30 Visit illegal Dumping Site of Industrial Waste in TeshimaIsland 18:40~ participate in IAC Networking Reception in the evening
Sept. 4 (Wed)	Forenoon	9:00~11:20 Visit Kabagawa Dam Construction site and SanukiMannou Park
	Afternoon	13:00~17:00 Visit Honen'ike Dam and KurushimaKaikyou Bridge
Sept. 5 (Thu)	Forenoon	9:05~12:00 Visit Sewerage disaster point, Disaster waste disposal, Sediment disaster location et. al.
	Afternoon	13:10~15:15 Visit Hiroshima Peace Memorial Park, Misasa River Stricken sport and Water supply construction
Sept. 6 (Fri)	Forenoon	9:30~12:00 Visit Disaster Reduction and Human Renovation Institution
	Afternoon	13:00~14:30 Visit Akashi Kaikyoo Bridge
Sept. 7 (Sat)		Return home from the Kansai International Airport

#### Day 1 (1st of September, 2019, Sunday)

07:10 am, I was ready to board MIAT Mongolian airlines flight from Ulaanbaatar to Tokyo. The flight took nearly 4 hours and I felt little bit excited. After I landed, it was totally different feeling because Japan is the second foreign country that I have visited. I always fascinated by Japanese culture ever since before. I arrived to the Narita airport at 01:40 pm; Ms. Tomomi and 1 other staff are waiting for me. They sent me to Shinjuku city by bus, then I arrived Shinjuku around 17:30pm, Ms. Suzuki warmly welcomed me. She explained me about upcoming days while we walking to Nishitetsu Inn Hotel. Despite arriving in Tokyo, there was no activity to do according to itinerary, so I roamed around bustling Shinjuku city and did a bit of shopping. The journey begins!



*STG 2019 orientation*

In the morning, I met other members of the STG program in the hotel lobby. After knowing each other, we left the hotel to go to KAJIMA Technical Research Institute, NishiChofu complex by mini-bus. When arriving at the Institute, Mr.Yoshizawa and Ms.Umehara warmly welcomed us and they made a brief speech about Study Tour Program and provided a video introduction of Kajima Cooperation and Research Institute. The institute complex has 8 buildings,

### **Shaking Table Laboratory**

It was my first time in my life to see such laboratory. The facility has control room, main testing room and hydraulic pump which located underneath the control room. As I heard, hydraulic pump produces up to 2G max acceleration both vertical and horizontal. The main shaking table (5mx7m) is high-performance 3D shaking table system that reproduce the historical earthquake ground motion accurately.

### **Wind- Tunnel Laboratory**

Wind-Tunnel Laboratory was a little bit different from other laboratories. In the laboratory, everything has to be super clean in order to protect from dusts, for instance, guests have to take off their shoes at the entrance. The monitoring room is surrounded by wind tunnel, and wind turbine is located the side of the wind tunnel. All the laboratories were not under operation due to the JSCE annual meeting. Fortunately, there was a round prototype model that was tested before, so we had a chance to survey the real model. The testing building is right in a center of the round table and a lot of nodes and cables under its model. The purposes of its cables were collecting the information of the wind characteristics in order to analyze the model as well as impact on the surrounding area.





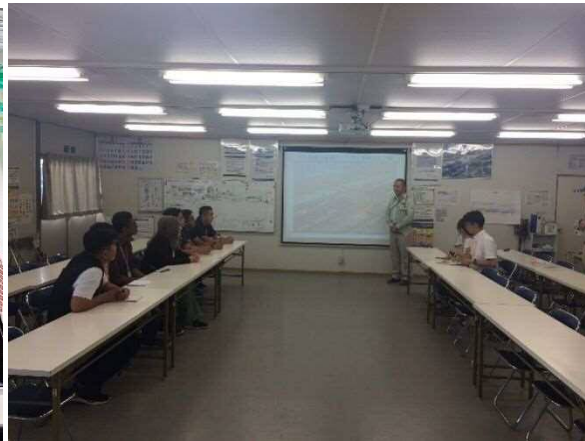
*Our first group photo in KAJIMA wind-tunnel laboratory*

### **Base isolated building**

Next facility was a low-rise building with base isolation, and its foundation was open to show. It was an amazing experience to show what I learnt in the university in real life. The building was originally constructed with rubber-steel laminated base isolation. As I heard, it is possible to isolate existing building by such base isolation, yet the budget is relatively expensive comparing to other earthquake proof technologies. Base isolation works by isolating the structure from the ground in order to prevent the lateral forces of an earthquake.



*Mouth-watering bento. Itadakimasu!*



*Tunnel construction site introduction*

After lunch at KAJIMA research institute, our group moved to the Haneda Airport to visit tunnel construction site. Mr.Araki and 2 other graduate students from Saitama University -Mr.Zuo and Ms.Wang were there to help for translation.

Haneda Airport (Tokyo International Airport) is situated Ota city, 14km away from south of Tokyo. The airport consists of 3 terminals, Terminal 1 and 2 are for domestic flights and third terminal is for International flight. As I heard, it takes 19 minutes from international terminal to domestic terminal. After the tunnel construction, the travel time decreases to 4-5 minutes. Before we entered to the tunnel, we learnt a lot of valuable information about tunnel boring from site manager. We walked about 10 minutes to reach current location of the tunnel boring machine. The technology was not familiar to me, and it was crucial technology for not only me but also Mongolians.



*Group photo with Mr.Zuo, Ms.Wang, Mr. Araki and manager of the project*

After the site visit, we went back to Haneda airport domestic terminal to depart to Kagawa Prefecture. Around 8:00pm, we checked in Hotel Pearl Garden which we will stay 2 days.

### **Day 3 (3rd of September, 2019, Tuesday)**

The big day starts at 7:30am; we arrived to Kagawa University to participate 21st Summer Symposium. We divided 3 different rooms based on the topic, me and Mr.Wai, Mr.Mark Allen, Mr.Washirawat were allocated to structure and seismic room, CS-1 in the first floor. Each speaker has 7 minutes for presentation, and the staff member set 3 alarms for each speaker, first alarm will ring on 6th minute and second will ring on 7th minute. After speaker has done, 3 minutes of question section will be start. I was little bit excited because it was my first time presenting in English in front of many people. My presentation title was "Seismic design review of light gauge framed steel structure".



*Presenting my research*



*The group reunited in front of Kagawa University*

After we finished our presentation, we went to Teshima Island from Takamatsu port around 12:20am; Professor Dong from Saitama University accompanied us. It took about 40 minutes by boat, and it was my first ocean experience as well as boat experience. After we landed Ieura port, we went through narrow roads for 15 minutes to northern coast of the island, and there was not any waste when we reached there.



## Teshima Island

Teshima Island was one of the biggest illegal industrial waste sites. Since 1978, over half million tons of industrial waste such as shredded automobiles, toxic oils and construction materials were dumped in the island. Teshima Island's soil and sea water became harmful as a result of poisonous such materials. After 8 years of local resident's contest, Government of Kagawa Prefecture decided to transport all wastes to nearby Naoshima Island after construction of waste treatment plant, and construct impermeable wall on the north of the Teshima Island in order to prevent polluted water from flowing out to sea. As I heard, local residents could not sell the vegetables and fruits that grow in Teshima Island, because of pollution. Also, he said events of Teshima Island have had a huge impact on the waste segregation in Japan.



*Our guide describing about Teshima Island.  
Thank you for an overwhelming history*



*Chilling at the north coast of Teshima Island*



*Waste dumping site now*

Around 18:00pm, our group came back to Kagawa University to participate IAC networking reception. It was precious moment, so many international specialists and professors all gathering together. Surprisingly, I met with my ex colleagues from Mongolia, we did not meet since 2017. Time was abundant to get to know some international experts, some of them advised me for my further research. Also we had opportunity to meet Ms. Shibuya Yukiko - san who guided us for the STG program last 4 months. I am pretty surprised that she knows all of us very well. Unfortunately, we have a very short time to talk with Ms. Yukiko and we all appreciated and said goodbye to her.





*At JSCE Annual Meeting Reception with Ms. Yukiko*

### Day 4 (4th of September, 2019, Wednesday)

We left Pearl Garden Hotel about 07:00 to visit Kabagawa dam construction site with other foreign JSCE guests by technical tour bus. Visiting dam construction site was a wonderful experience; such construction is completely alien to me. The purposes of the project are flood control, maintaining the normal function of river flow and water supply for Takamatsu city. The Kabagawa dam is a concrete arch dam with a height of 88.5m, crest length of 265.5m and 83.7m wide at its base. The dam has one spillway (2.9x3.7), near its center top which has a maximum discharge capacity of 260m<sup>3</sup>/s.

### Kabagawa dam



*Discussing about the dam*



*The Kabagawa Dam*

We get back to STG mini-bus to go Udon house around 10:00am. It was our most memorable time.



*Lunch at Udon House*



*Udon-ing at its finest*

After that, we went to Hiroshima prefecture for 4 hours, it was the longest trip among these days and we had a great chance to chat each other. On the way to Hiroshima, we had a chance to glance Kurushima Kaikyo Bridge. After the tour, the group stayed Kure Morisawa Hotel in Hiroshima.



*At sightseeing spot, near to Kurushima Kaikyo Bridge*

### Day 5 (5th of September, 2019, Thursday)

#### Disaster affected areas in Hiroshima

In the morning of September 5th, we moved disaster affected areas of Hiroshima prefecture. Hiroshima Prefecture is a region susceptible to sediment disasters because of its geological features. In June 2018 heavy rain resulted devastating floods and landslides in southwestern Japan. As a result of widespread floods, 12 people were killed and 589 houses were damaged by such disasters in Kure City Tenno district. Our first site was disaster waste disposal in Aga, Kure city area where the bulk stones were crushed and transported to Dejima Island.

Our next stop was sediment-related disaster area in Kureshiritsu Tenno Junior high school in Kure city. The previous boulder trapping net was knocked down by debris flow, and a large amount of earth and sand flowed and damaged the junior high school. The new Sabo dam traps deposit sediments to prevent debris flow in local areas, and installed sandbags along the valley side. In addition, mechanism reachable boulders crushed and removed in order to secure safety.

Third site was damaged areas of national highway 31 in Mizujiri, Sakacho. In July 8th, national route 31 and JR Hiroshima Kure road were closed due to land slide.



*Sediment-related disaster area in Tenno*



*Temporal housing project, Sakacho.*



Next point was Sakacho, director and manager of the organization, Mr.Araki and Mr.Honke explained about temporary houses that are using during a disaster. During the disaster, total numbers of 78 temporary houses were constructed within 3 months in nearby parks. Every spot we arrived, there were a engineers or managers who work for the project are prepared for us with photos and brochures about the project.

After lunch at local Italian restaurant, we visited Hiroshima Peace Memorial Park. Hiroshima was the first city where an atomic bomb was dropped.



*In front of the Cenotaph*



*Faculties were under the earthquake proofing works*

The following 2 spots are the Asami Kita-Ku area in Hiroshima. Due to the massive flood in 2019, the bridge that supports the water supply pipes are destructed. The main objects of the project are to build a new coastal defenses as well as main and temporary bridge for the pipes.

We learned a lot of valuable things about disaster, disaster management and mitigation on a day 5. In the evening, we headed towards Kobe city from Hiroshima by Shinkansen (Bullet Train), at 3:50pm and reached there around 5:00pm. The distance between Hiroshima to Kobe is over 300km and it took only an hour to reach Kobe. It is the true meaning of super-fast! Kobe seemed a little bit crowded like Tokyo comparing to Takamatsu city. We took taxi to move to our next as well as last hotel- Kobe Sannomiya Tokyu Rei Hotel. After check in, Ms.Suzuki well explained our tomorrow's activity, and the group went to local Japanese cuisine to have a dinner.



*The group waiting for their dinner*

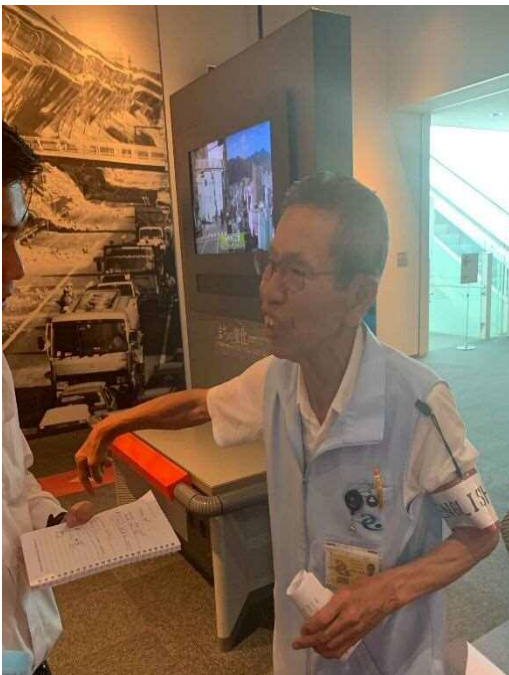
## Day 6 (6th of September, 2019, Friday)

On the final day, the group went to Disaster Reduction and Human Renovation Institute in Kobe. The institution is not only providing information about what happened in Kobe area after The Great Hanshin-Awaji Earthquake but also prepare people for further disaster as well as disaster management.

The institution has 4 sections:

1. Relive the Earthquake
2. Exhibits of Earthquake memories
3. Disaster management & mitigation activities
4. Water & disaster mitigation learning

We watched three documentaries in first section- the first and second were the real footages of the earthquake and third one is for 3D cinema for 2011 Tohoku earthquake and Tsunami. Between the cinema halls there are a corridor decorated as realistic exhibition that reproduces the city streets in the earthquake's aftermath. After that the group went to watch exhibits of earthquake memories. Earthquakes often cause disaster in Japan and take many lives of its citizens; however, how they help each other and reconstruct its building after the disaster, it was both miserable and amazing.



*86 years old Gentleman who works as a translator in the institute*

It is interesting to note that translators of the institution are all elders who have experienced massive earthquakes in their lifetime. It was very impressive to hear the real experience about Kobe earthquake. Furthermore, the institution was crowded by primary school children, they always noting what they learnt about the disaster. It was also amazing to see how Japanese people teaching about disaster from their childhood.

After lunch, we went to look over Akashi Kaikyo bridge- the longest central span (approximately 2km) of any suspension bridge in the world which connects the Kobe city to Awaji Island. An one noteworthy feature is that the half built bridge survived the Great Hanshin earthquake which devastated Kobe in 1995, although the bridge span increased by 1 meter. The bridge has many sightseeing spots and gifts shops that sell Akashi Kaikyo candies.





*It was hard to say goodbye! The journey ends here.*

## ACKNOWLEDGEMENT

To be honest I do not know how to describe my appreciation and feelings.

I would like to express my sincere gratitude from deepest bottom from my heart to JSCE, ISEF and all my professors for giving me such a great opportunity to learn from Japan and international experienced engineers. Besides, I would like appreciate to Ganzorig. E (Professor of MUST), Khongorzul. KH (President of MACE), Hiroshi Takagi (ISEF Advisor, Professor) and whom to allow me this opportunity for their precious time in supporting the STG program. Also, thank you so much for everyone who guided for us.

I want to express my appreciation to my friends G♦l Pinar Avcı (Turkey), Mark Allen T. Zapanta (Philippines), Nguyen Bao Lam (Vietnam), Omar Faruq Hamim (Bangladesh), and Wai Yar Aung (Myanmar) and Washirawat Praphatsorn (Thailand) who became friends with me throughout the STG. Thank you so much for your all friendship and wish you good luck for your further study and goals. Thank you again for all, Arigato Gozaimasu!

