Report for
2017 Japan Society of Civil Engineers
Study Tour Grant Program
Support by International Scientific Exchange Fund-ISEF

Prepared by

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Recommended by Japan Society of Civil Engineers

Thailand Section

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Introduction

Japan Society of Civil Engineers (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

- to propose an idea for social infrastructure development in the future from civil engineer's perspective,
- to acquire a steadfast relationship of mutual trust with the society
- to promote scientific and technological researches/studies with a high degree of transparency and
- 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 taka 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.

JSCE 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 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.

My Application

I February while I was looking for journal to publish my research paper in JSCE website and I found the interesting program which includes the international conference and technical tour to public and private organizations civil engineering project in Japan called "Study Tour Grant; STG". I was really interested and would like to apply in the STG program then I had made my decision

to asking for the application process from International Activities Center of JSCE and I had got quickly response by Ms. Yukiko Shibuya and she also introduced me to JSCE Thailand Section. Coincidently, I knew Prof Varameth Vichiensan the president of JSCE Thailand Section before which made everything more convenient to me.

As a Ph.D. student who got the scholarship from Expressway Authority of Thailand and my dissertation is the utilization of existing facilities on expressway to increase the mobility of expressway network with appropriate technology. My research is about how to utilize existing facilities on expressway to increase the mobility of expressway network with appropriate technology. The reasons that encourage me to apply for this program because the Japanese expressway network is one of major transportation mode and covered all of region in the country. The learning from how to facilitate the mobility of such a huge network is interesting. If I can be the one of participant in this program and have a chance to visit the local expressway operator in Japan. The learning from existing traffic operation technology will gain a lot of benefit to me.

Participants in STG 2017

In this year, there were six participants from different countries in STG 2017. The detail of each participants as illustrated in Table 1 and Figure 1

Table 1 Participants in STG 2017

The Participants	Affiliation	Country
1. Mr. Mai Hoang Bao	Ho Chi Minh City University of Technology	Vietnam
2. Mr. Ganzorig Tsevelsuren	Mongolian Engineering Construction LLC	Mongolia
3. Mr. Pau Sian Muan	JICA study team	Myanmar
4. Ms. Tugce Ceran	Istanbul Technical University	Turkey
5. Mr. Al-Adzhar P. Usman	DPWH-ARMM	Philippine
6. Mr. Pornnarong Lueanpech	King Mongkut's University of Technology North Bangkok	Thailand

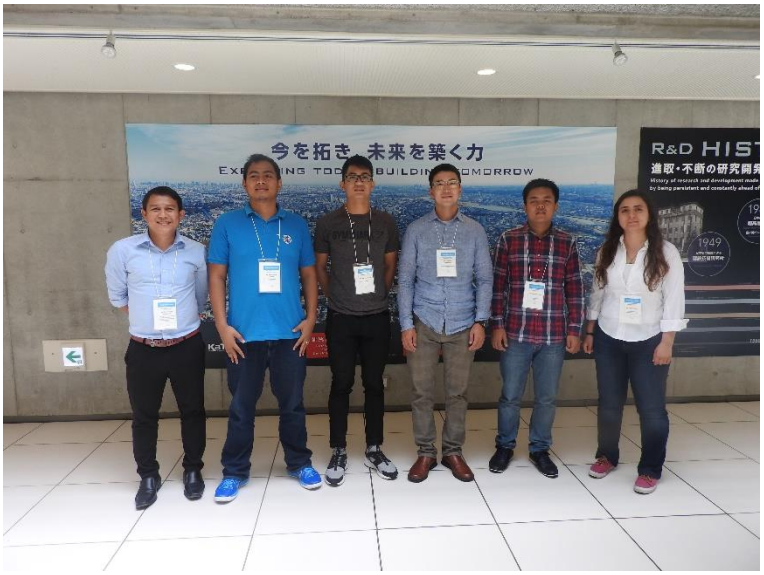


Figure 1 Participants in STG 2017

JSCE STG 2017 Activities

JSCE Study Tour Grant Schedule

This year, the study tour program included visiting an advanced technology research institute, attended in the international conference and visiting the construction site also in Tokyo and earthquake effected area in Kumamoto. Table 2 illustrated the schedule during the JSCE STG 2017 from September 10-16 2017.

Table 2 The schedule during the JSCE Study Tour Grant 2017

Day	Date	Activities
1	September 10 2017	Arrived at Narita International Airport NISHITETSU INN Shinjuku
2	September 11 2017	KAJIMA Technical Research Institute JSCE Networking at Kyushu University Fukuoka NISHITETSU Grand Hotel
3	September 12 2017	The 19th International Summer Symposium Yabegawa Bridge Yabe-river levee breakdown site Miike Coal Mine
4	September 13 2017	Kumamoto Castle reconstruction site Tsujun Bridge Shirakawa Springwater Aso Bridge Area Sabo works Hotel KEIO PRESSO INN Otemachi
5	September 14 2017	TAJIRI-Area Project Sumo Stadium SHIMIZU Institute of Technology JR Tokyo Station Dinner with ISEF Committee Members
6	September 15 2017	Sightseeing in Tokyo
7	September 16 2017	Departed from Narita International Airport

KAJIMA Technical Research Institute

KAJIMA Technical Research Institute (KaTRI) was established the industry's first research institute in 1949, then moved to locate in the Chofu city. KaTRI have mian three missions including research and development, technical cooperation & consultation and training & dissembling information. Furthermore, in term of famous research institute, KaTRI aspects have covered an extremely wide range in the field of technology; civil engineering, building science, disaster prevention and environmental consideration.

In the morning of September 11, we had opportunities to visit seven main laboratories and got the information about each work. First laboratory, we visited the shaking table laboratory which we can simulated the seismic response within high-rise building and we can estimated the damage inside the building during the earthquake. Then we walked to the nearby building to investigate the one of earthquake prevention using the seismic base isolation. The component of seismic base isolation included the layer of rubber and steel plate which can supported seismic wave from the earthquake better than conventional foundation. After that we moved to the large-scale structural testing laboratory which can modified for wide range of the strength testing such as column, beam or reaction wall.

Next, we moved to concrete material laboratory where was the manufacture and testing of high performance concrete product. Then went down to the wind-tunnel laboratory where was the laboratory to measured and evaluated the effect of wind to the infrastructure itself, surrounded building and ground area as well. Nearby the wind-tunnel laboratory we had an opportunity to visit concrete curing room and the last building we visited to the fire safety laboratory to investigate the fire resistance test. Before went back to the meeting room we had an opportunity to visit the "OPSODIS" 3D sound and technology which made surrounding sound to audience within the theater or concert hall. After that we also had lunch together at meeting room with the Japanese style box set call "Bento".

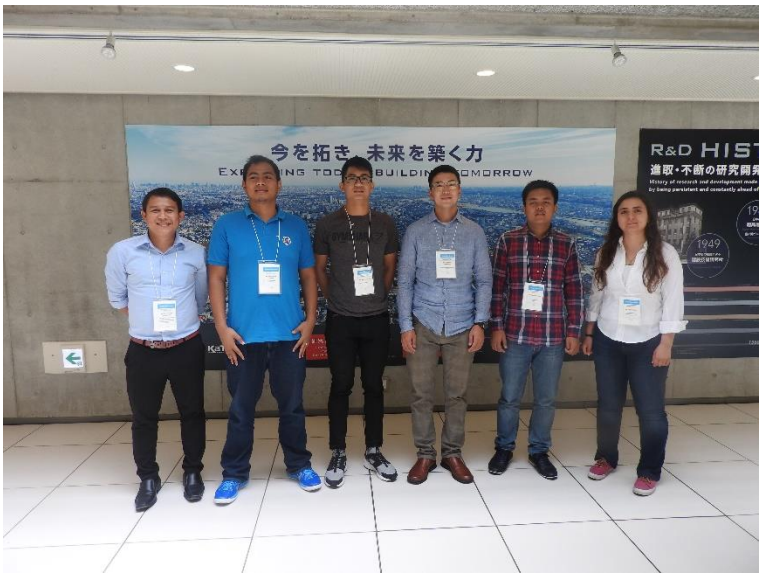


Figure 2 The Group Photo within KAJIMA Research Institute

JSCE Networking at Kyushu University Fukuoka

After lunch, we took a bus to the Haneda International airport and traveled to Fukuoka for the 19th International Summer Symposium at Kyushu University. We arrived at Fukuoka almost 17.00 then took a bus to Kyushu University for dinner and networking with the others researcher and professor those who attend in the symposium. I also had an opportunity to listened and shared experience with the others. After the party, we went to the Nishitetsu grand hotel in Fukuoka city and prepared ourselves for presentation in tomorrow.

Figure 3 The Atmosphere during JSCE Networking

The 19th International Summer Symposium

In the morning of September 12, all of participants had a great chance to attended in the 19th International Summer Symposium host by Kyushu University. After arrived, we walked to the presentation room and we were separated into two sessions. My session was the materials and concrete structure where most of all researcher presented the new theory and technology to provide benefit contributions in real work. Regarding my presentation, the title was “The Application of Microscopic Traffic Simulation Model to Lane Utilization Estimation on Expressway” which focusing on what is the appropriate value of parameter within the VISSIM simulation model that meet with local condition.

The finding also showed that the Wiedemann99 car-following model with local parameters provided a significantly better fit in terms of estimated lane utilization compared to the model with default parameters. The results emphasized an importance of the calibration of car-following model on application of microscopic traffic simulation model to the lane utilization estimation.

Figure 4 The picture while I was presenting my research

My presentation was the last presenter in the morning session and It seems inconsistency of my research title to this session which normally should be addressed in the infrastructure planning and management. In my opinion, it was a difficult to made audience from another field to understand the main idea of my research which mentioned to the different of driving behavior from each country. After presentation, I had a chance to discuss and share my experience with the graduate student form African country. Beyond that moment, it was an excellent activity lead me to discuss and share my experience and get the new friend from other country.

Yabegawa River (Seismic Bridge and Flood Area)

After lunch at Kyushu University canteen, we moved to the Yabegawa bridge for site visit. The Yabegawa bridge was the part of Ariake Seashore Highways and where was the largest span prestressed concrete cable stayed bridge in Japan. The bridge has 261 meters for main span and inclined pylon to alleviate the influence of curvature.

At first, I was surprised about the design of the pylon and I though that created only for landscape but after that I realized, there was the specific purpose within the design. The main idea of this bridge was to down the construction cost using innovative technology. Within the design included the earthquake prevention system with seismic isolation bearing, damper and stopper and during the construction there were used the deep pneumatic caisson foundation, sophisticated design for cross-section, installed the steel encourage box within the pylon and used the non-grout type multiple strand stay cable.

Figure 5 Yabegawa Bridge

Next, we moved to the nearby area along the Yanagawa river to visit the location of river levee breakdown site in 2014 cause by flood within this area. This river levee was made by compacted soil which is strong enough in normal situation but during the exceed rainfall in 2014 caused the water level in Yabe river was higher than normal. The river levee collapsed cause by to the level of underground water created the levee gap for 50 meters and flooding wide spread within 2 hours, more than 2,000 houses was affected.

After the temporary reinforcement, this area was secured within 2 days and 18 hours then the reconstruction work had begun. Nowadays, this area was planned to the "Victim Assistance Center" and it still under construction.

Figure 6 Yabegawa riverbank breakdown site

Miiki Coal Mine

The last site visit today was the Miiki Coal Mine, we took a bus for an hour to one of the world heritage site in Japan. Back to the Japan's Meiji industrial revolution from the mid-19th century to the early 20th century, Japan constructed its foundation to become an industrialized nation and rapidly industrialized the heavy industries, which were iron and steel manufacturing, shipbuilding and coal mine. The Miiki Coal Mine and Miiki Port was the site number 7 of the Japan's Meiji industrial revolution. The mining began in the region during the Kyoho era, with the Miike mine under the control of the Tachibana clan. The mine was nationalized in 1872 by the Meiji government and took control by the Mitsui zaibatsu in 1899.

The mine was closed in 1997, with devastating effects on the local economy and from now on it was promoted to the world heritage site in Japan. In this area, we had a chance to learn the history with local guide which encourage us to imagine the glory in the past from the number of pit and the connecting to port via railways.

Figure 7 Miiki Coal Mine

Kumamoto Castle Reconstructions

The 2016 Kumamoto earthquakes are a series of earthquakes including a magnitude 7.0 mainshock which struck at 01:25 JST on April 16, 2016 beneath Kumamoto City of Kumamoto Prefecture in Kyushu Region, Japan, at a depth of about 10 kilometers and a foreshock earthquake with a magnitude 6.2 at 21:26 JST on April 14, 2016, at a depth of about 11 kilometers.

Many of important cultural property officiated by the Japanese government was heavily damaged in the earthquake. The shrine's rōmon (tower gate) and the haiden (worshiping hall) both completely collapsed. Kumamoto Castle, which is another important cultural property sustained damage to its roof and exterior buildings and walls.

In the morning of September 13, all of participants had a chance to visit the Kumamoto Castle reconstruction site. This is my first time to see the damages and effects of earthquake, I had realized that enormously power from underground could destroy anything in second. In this reconstruction site we found the benefit of old picture which can be used in construction technique, the contractor used old picture of Kumamoto Castle to re-assign the stone wall back to the same position again. Figure 8 illustrated the damages of the Kumamoto Castle and reconstruction process.

Figure 8 Kumamoto Castle Reconstruction Site

Tsujun Bridge

This bridge proves the high level of stone bridge technology at the time it was built. Yasunosuke Futa (1801–1873), who was the head of the Yabe village, after planned and got funding, with the help of the group of stone technicians and many farmers, succeeded in building the bridge in 1854. Its purpose was to let water flow into a higher area for agriculture.

After visit the Kumamoto Castle reconstruction site, we took a bus to the Tsujun Bridge where was the maintenance and reinforcement site of ancient arch stone bridge. At first, I thought this bridge might be influenced from China and used for transportation from both side of the mountain but in fact it was built by local farmer and used for transporting the water in agriculture activities. It was amazing to me about technology and people in the ancient time. Figure 9 illustrated the process of maintenance and reinforcement site of Tsujun bridge

Figure 9 Tsujun Bridge

Shirakawa Springwater

After lunch on bus nearby Tsujun bridge, we got some announcement that this afternoon our group need to re-schedule. Due to the schedule changing, our group had a chance to visit the Shirakawa Springwater where is a place so well known that it has been selected as one of the Environmental Agency's one hundred best water sources (one hundred remarkable waters) in Japan. The water at the spring, which has an average temperature of 14C degrees, gushes forth at 60 tons per minute,

and serves as the source of the Shirakawa River, which runs through the center of Kumamoto city. Water from the spring can be taken for free, heat-treated and sold for public consumption.

I was not regret that we change schedule but rather feel exciting, I think that it not easy to get to know this location by ourselves and the testing of water from one of the best water sources in Japan was the wonderful part in the afternoon schedule. Figure 10 illustrated our activities in Shirakawa Springwater.

Figure 10 Shirakawa Springwater

Aso Bridge and Sabo Work

During the 2016 Kumamoto earthquake, the entire city of Kumamoto city was left without water. All residents of Nishihara Village in Kumamoto Prefecture were evacuated over fears that dam could collapse. Kumamoto Airport was also closed to all except the emergency flights and service of the Kyushu Shinkansen was suspended. After a train derailed due to the earthquake, numerous landslides took place across the mountains of Kyushu, covering roads inaccessible, The Great Aso Bridge of the Japan National Route 325 in Minamiaso collapsed into the Kurokawa river.

In this area, we and had seen the occurrence of massive slope failure (approximately 500,000 m^3) around Aso mountain which destroyed the Ohashi bridge and obstructed the highway route 57 and JR Honi main line. The main part of this construction included the soil retaining work and slope protection works. The hard part of this construction site was how to deal with the high slope area. According to this limitation, the unmanned construction system had been employ.

The unmanned construction system was the network operating system using the remote control for unmanned construction machine. By using this kind of technology, the construction work could be conducted safely even on such limitation of high slope surface and also no risky for worker.

Figure 11 Mt. Aso Landslide Protection and Bridge Reconstruction Site

Tokyo-Gaikan Expressway: TAJIRI-Area

In the morning of September 14, all of participants had a chance to visit the TAJIRI-Area project which is the part of Tokyo-Gaikan expressway in Chiba prefecture. In this project was the joint venture of TAISEI-TODA-DAIHO and this construction site was planned for interchange between Keiyo highway and Tokyo-Gaikan expressway. We listened to the presentation of this project in the meeting room. The construction method contained two types; cut and cover method that the earth retaining wall was used to support ground pressure and shield tunneling method that construct underground tunnel beneath the surface structure without disturbing existing structure.

After that we went to the cut and cover tunnel construction which almost finished only just the finishing work remain and moved to the underground construction site by walked down through the emergency path to see the shield tunneling section. My impression about this construction site was the traffic management during the construction which can produced the smooth traffic flow of existing road in such the complex area. Regarding this, the quality of temporary road which used for detouring the traffic during the construction seem to difference in my country.

Figure 12 TAJIRI-Area Project

Sumo Stadium

After we had an early lunch at the TAJIRI-Area, we took a bus to Shimizu Institute of Technology but because we came early of schedule, our group had a chance to visit the Ryogoku Kokugikan (sumo stadium) where was the professional sumo wrestlers grapple with each other in earnest.

This is my first time in sumo stadium and i was so exciting even though not within the real stadium and again I think that it not easy to get to know this location by ourselves and the touching of truly home of sumo was the wonderful part in the afternoon schedule. Figure 13 illustrated our activities in Ryogoku Kokugikan.

Figure 13 Waiting for schedule at Sumo Stadium

Shimizu Institute of Technology

In the afternoon of September 14, all of participants had a chance to visit the Shimizu Institute of Technology where was the research and development center of Shimizu Corporation. This facility contained so many laboratory, at first our group gathered in the meeting to listened the presentation of Shimizu Corporation businesses by Dr.Yutaka Naramura. After that we walk through the museum of building's model that constructed by Shimizu Corporation and had seen some demonstration about the seismic design building.

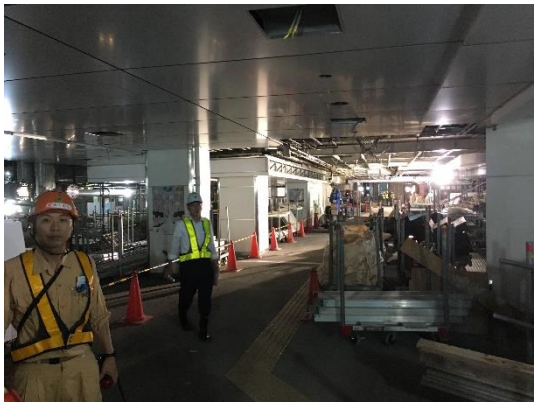
Our group also been to investigate the seismic isolation system which was the main structure of this facility and the core-suspended isolation system of the three stories office building. The last session within Shimizu Institute of Technology, we went to the wind tunnel laboratory and geotechnical laboratory and had seen the demonstration and listened to the operation of each laboratory. Figure 14 illustrated the photo while we listened to the presentation in the meeting room of Shimizu Institute of Technology**.**

Figure 14 Shimizu Institute of Technology

JR Tokyo Station

The last session of JSCE STG 2017 technical program was the Tokyo station north pedestrian passage enhancement project which is the underground construction site beneath the railway track of busiest train station in Tokyo. This construction site operated by Obayashi Corporation and the main objective of this construction site were based on the level of service of pedestrian. Before launching this project, the pedestrian passage way within the JR Tokyo station was crowded and as an operator the JR Tokyo would like to resolve this congestion problem by expansion the pedestrian passage way to gain the better level of service.

At first, our group gathered in the meeting room of construction site listened to the Obayashi Corporation businesses and the brief detail of this project. After that we moved to the evacuation site beneath the railway track where the construction was limited by the operating time of railway system. Then we moved to the detoured of pedestrian passage way, we had seen the systematic change and protection between old pedestrian passage way and the detoured. The last one, we went down to the underground construction site for main structure preparation. Figure 15 illustrated the activities in JR Tokyo Station pedestrian passage enhancement project.



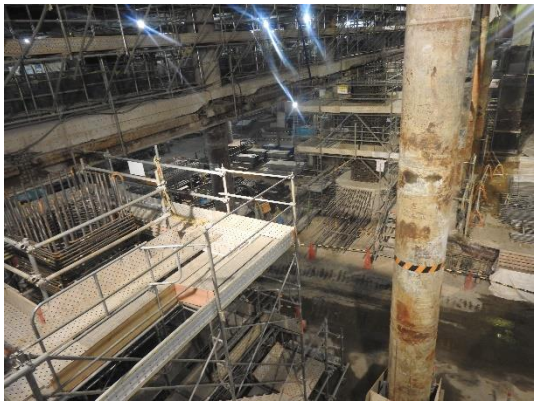


Figure 15 JR Tokyo Station Underground Structure Site

Dinner with ISEF Committee Members

After we finished all of activity today which is the last day of technical program, we had a great opportunity to meet and dinner with committee of ISEF at Budo no mori - Godanya nearby the Tokyo station and our hotel. The dinner was held in friendly atmosphere, we talked and discussed to each other about the program this year and of course we might necessary to be the delegation and give some suggestion for next year student.

Figure 16 After Dinner with ISEF Committee Members

Sightseeing Tour

This activity was the complimentary from JSCE to get to know the famous sightseeing spot in Tokyo, after free time in the morning we gathered in the hotel lobby and after all set we took a train to the Hinode pier where the first trip begins. The Tokyo river cruise was the trip along the Sumida river started from Hinide pier to Asakusa pier and during the cruise we passed through several bridges which difference design.

After getting off at Asakusa pier, we walk to Sensoji Temple where the popular Buddhist temple located in Asakusa area. The legend said that in the year 628, two brothers fished a statue of Kannon, the goddess of mercy, out of the Sumida River, and even though they put the statue back into the river, it always returned to them. Consequently, Sensoji was built nearby for the goddess of Kannon. The temple was completed in 645, making it Tokyo's oldest temple.

Then, we moved to the Tokyo sky tree by Tubu Skytree Line. Tokyo Skytree was a broadcasting, restaurant and observation tower in Sumida area and became the tallest structure in Japan in 2010 and reached its full height of 634.0 meters in March 2011, making it the tallest tower in the world and the second tallest structure in the world after the Burj Khalifa. The tower was the primary television and radio broadcast site for the Kantō region; the older Tokyo Tower no longer gives complete digital terrestrial television broadcasting coverage because it was surrounded by high-rise buildings. Tokyo Skytree was completed on 29 February 2012 and the tower opening to the public on 22 May 2012. Figure 17 illustrated the photo while our Tokyo sightseeing tour.

Figure 17 Tokyo sightseeing tour

Conclusion

First of all, I would like to express my gratitude to Japan Society of Civil Engineering (JSCE) for supporting total expenses including air-ticket, itinerary, accommodations and all of exclusive activities. Moreover, I would like to thank all of staffs from company where we visited for friendly reception and taking care of our group all this week.

Also, I would like to thanks to all of my lovely friends who from different country which I believe that 1 week was not enough for our friendship and from now on please remember we are JSCE STG family already.

For the special study tour program, even though this is not my first time to travel in Japan but I am still exited to get a chance for learning the different culture, language and technology in Japan. Regarding to the knowledge in civil engineering, I have seen the application of advance technique in civil work and I have got a lot of knowledge about disaster prevention especially the earthquake prevention.

Finally, even though 1 week stay in Japan is not enough to get to know all fields of civil engineer but I am still impress to all of schedule that you provide us. Furthermore, I have an opportunity to create a relationship with Japanese organizations. I hope that the knowledge I got here will be useful and contribute back to my future work and I will suggest these to the next year student or younger students who want to study or work in Japan.