Japan Society of Civil Engineers

Report For

2016 Japan Society of Civil Engineerings

Study Tour Grant Report

Supported by International Scientific Exchange Fund-ISEF

By

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Recommended by Japan Society of Civil Engineerings
Thailand Section

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1. Introduction

1.1 About JSCE

Japan Society of Civil Engineers (JSCE) was established as an incorporated association in 1914 (around 102 years ago). 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. Presently, the JSCE membership has approximately 39,000 members 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) is supported by International Scientific Exchange Fund (ISEF). The STG is a unique program which invites the civil engineering students who are nominated by the AOC societies in order to learn Japanese civil engineering technlogy and projects for about one week in Japan. This program provides a chance to visit project sites and research institutes, meet leading civil engineering professionals and academics, and share their projects with other students as well as those experiences for applying in their countries.

1.3 Application procedures and results

In March, I knew the STG programme announcement from my teacher who is Thai member of JSCE. Since STG is the interesting program that includes technical visiting to public and private organizations and latest civil engineering project site. These will give the valuable knowledge for young civil engineering who have planned to study or work with a Japanese company in Japan. It is not easy to specially visit in their projects so STG program is the best opportunity to get new aspects for preparing about Ph.D. Course or working in the future. Thus, I am so interested and quickly prepare the documents to apply in this scholarship. Regarding the application requirements, the important documents are questionnaire and paper for presentation at International Summer Symposium. In that period, I hardly searched the background of STG programme and wrote the reasons such as why I attended this and how I can apply the acquired knowledges as well as prepared the paper

presentation. After that in the beginning of June, I received a good news from the announcement of STG participants and invitation letter from JSCE later.

In part of preparation before visit in Japan, I got a kind informations and itinery documents from Ms.Yukiko Shibuya and Mr. Hashimoto who are person in charge of STG. I would like to thank them very much.

1.4 Participants in STG 2016

There were seven participants who came from different countries in STG2016 as shown in table 1 and figure 1.

Table 1. Participants in study tour grant 2016

No.	Name	Affilation	Country
1	Mr. Aung Myat Thu	Structural Engineering, Hasty Power Company Limited	Myanmar
2	Mr. Habibie Razak	Project Manager, ASEAN Chartered Professional Engineer	Indonesia
3	Mr. Tran Dinh Tung	Director-General, VICICO Construction&Investment Joint Stoc Company	Vietnam
4	Mr. Purevdorj Sosorburam	Teacher, Mongolian University of science and Technology	Mongolia
5	Mr. Dogancan Telli	Student, Department of Civil Engineering, Istanbul Technical University	Turkey
6	Mr. Alben Rome B. Bagabaldo	Mapua Insitute of Technology (MIT)	Philippines
7	Ms. Rattanaporn Kaewkluengklom	Student, Department of Civil Engineering Khon Kaen University	Thailand

Fig 1. Participants in study tour grant 2016

2. Study Tour Activities

2.1 Itinery

The study tour program in Japan including visiting an advanced technologies and research in the institute, exiting huge projects and presentation in the symposium, started from September 5-10, 2016 as shown in table 2.

Table 2. Schedule of STG2016

Date	Time	Evens
9-4-Sun		Arriving at Narita Airport
		Go to Narita Excel Hotel Tokyu and check in the hotel
9-5-Monday	9.00-11.50	Public Works Research Institute, Tsukuba
	12.00-13.00	Lunch at "Restrant SATO"
	14.30-16.30	Tokyo-Gaikan Expressway: "TAJIRI-Area Project"
	18.00	Check in "Super Hotel Lohas Tokyo Station Yaesu Chuo-Guchi"
9-6-Tuesday	9.00-11.30	KAJIMA Technical Research Institute
	11.30-12.15	Lunch at the institute
	13.15-15.00	Disaster Prevention Center, Tokyo Metropolitan Assembly Hall, and Tokyo Olmpic Facilities in Shinjuku-ku, Tokyo
	15.15-17.00	"JR Tokyo Station Extension Project"
	17.20-18.52	Go to Sendai by Shinkansen "Hayabusa"
	19.00	Check in "Hotel Unisite" and Dinner at "La Pausa"
9-7-Wednessday	9.00-12.00	Participate and deliver a presentation at The 18th International Summer Symposium
	12.15-13.15	Have a meeting with the members of Internation Scienctific Exchange Fund (ISEF) Committee over lunch.
	13.30-17.30	Sighseeing in Sendai
	18.00-20.00	Attend IAC's Networking Reception
	20.00	Go back to "Hotel Unisite" and Dinner at "La Pausa"
9-8-Thu	8.00-11.30	Go to Rikuzen-Takata City by bus
	11.30-13.00	Visit Shimizu Corp. in the Imaizumi and Takata area
	13.00-14.00	Visit Kajima Corp. JV to see disaster restoration works in the coastal area
	14.00-18.00	Visit the disaster-affected site located between Rikuzen-Takata and Minami-Sanriku towns. See these area from bus windows.
	18.21-19.56	Return to Tokyo by Shinkansen "Hayabusa"
	20.00	Dinner at "Bodoa no Yashiro, Godanya"
9-9-Fri	-12.00	Free time
	12.00	Leave the hotel and go to the restaurant "Hanagoyomi Tokyo" in Hotel Ryumeikan Tokyo
	14.10-19.10	Go to Tokyo Skytree and the Asakusa area
	20.00	Return to hotel
9-10-Sat	A.M.	Leave for home

2.2 Arriving in Japan (Sept. 4th A.M.)

The travelling was begining, I departured from Thailand on Sept. 3rd at night by Thai airway airline. My flight directly flew to Japan (non-stop) for six hours and I arrived Narita airport, terminal 1 on Sept. 4th at 8.30 o'clock (+2 hours from Thai time). This is a second time to visit in Japan so I familiar with the immigration procedure and fastly pass it. After that I saw Mr. Hashimoto in the front of exist door, he was very friendly and advice me how to move and check-in at the hotel.

This is my first time that I saw the Narita airport's bus terminal where is the good systematic management. There are many bus stops and fixed schedule for any local bus so it is quite on time, that is a good attibute of transport. I moved from Narita airport to Excell hotel by local bus around 20 minutes and then I went to meet my friends at downtown.

Fig 2. Bus terminal at narita airport

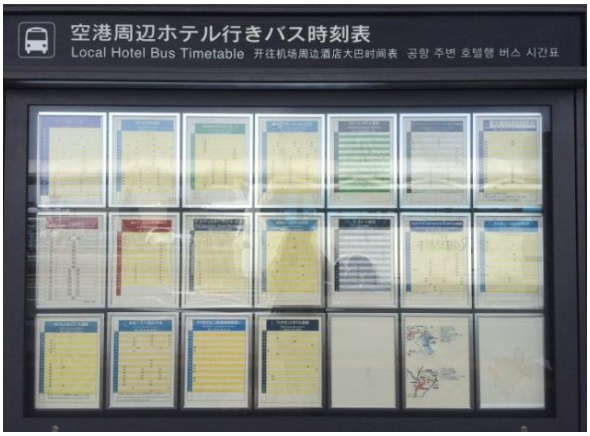


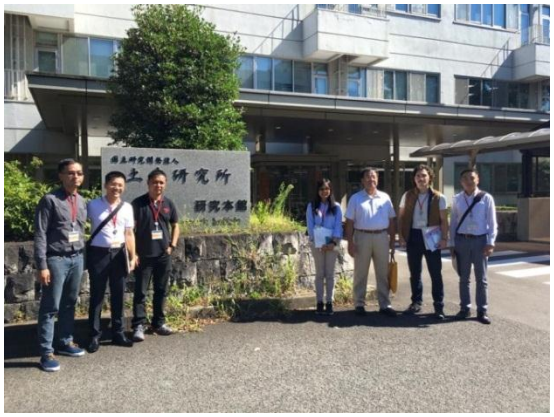
Fig 3. Schedule of local bus

2.3 Public Works Research Institute (PWRI) and National Institute of Land and Infrastructure Management (NILIM) (Sept. 5th A.M.)

The first day of study tour started in the early morning, I had a breakfast with the first known guy from Turkey. We introduced ourselfs and talked a little among having breakfast. Then we quickly checked out the room and saw our group in the reception counter. On the way to go to PWRI&NILIM by bus, we had introducing each other about career and past experience. When arrived the PWRI&NILIM in tsukuba city, we saw Dr. Wada who is organizer of STG program and he lead us to go inside the main building.

First activity, we got the friendly reception from staffs and listened the brift of this program before visit their laboratory. PWRI conducts high-quality studies of civil engineering in Japan, it provides technical guidance, disseminating research results, etc. PWRI aims to deliver outstanding achievements and focus on priority projects that are classify into four types; "Realization of a safe and secure society", "Realization of a sustainable society through green innovation", "Stratefic maintenance and life extention of infrastructure" and "International contributions through civil engineering technology". As the same NILIM where conducts research of the ministry of land infrastructure, transport and tourism (MLIT), plans and propose policies, etc.

a.



b.

Fig 4. Group photo in PWRI&NILIM

After that, we went to the test course of truck. The test truck has long about six kilometers which includes traffic sign test bridge, experiment facilities for lighting and impact tests, weather environment test truck, north-south loop, ITS test facility, etc. From all of test, I was very excited with speed test in south loop which has radius 223 meters and design speed 120 km/hr for truck as well as 140 km/hr for car.

Fig 5. Test course

Fig 6. South loop of test truck

Fig 7. Speed of truck

Then, we went to dam hydaulic laboratory, it used for investigation of the hydraulic phenomena concerning dam's reservois and hydraulic facilities such as sprillways, outlet works and intake systems. The staff bring us to see many model tests here for almost hydraulic design. He explained in two model, first the reduction of sand at downsteam beaches by technology of an "burrowing-type sediment removal suction pipe". Moreover, the other model was Stepped chute of rock-fill dams' sprillway reflecting site to pography which is used to examine the effective energy dissipation and excavation reduction.

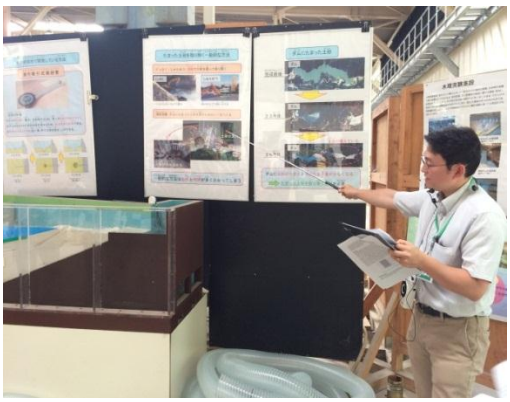


Fig 8. Hydaulic laboratory

Fig 9. burrowing-type sediment removal suction pipe

Fig 10. Stepped chute of rock-fill dams' sprillway reflecting site to pography

For the vibration laboratory, the staff did not allow us to take a photograph. Large-scale three-dimensional shaking table is to examine aseismicity of the ground and civil infrastructures by simulating strong motion of huge earthquake. Besides, we saw the video about the computation and vibration experiments of Hybrid Vibration System. In this system, computation takes a role of evaluation response of structure as a bridge piers which is easy to analysis while the soil-structure effect is difficult to analysis.

The next visiting was the structural engineering laboratory (30 MN universal testing machine). We listened a brift informations about why they have to test the structure, the staff told us since there are various conditions of strength so they have to test the actual samples' behaviour before work. There were many structures was tested here for example, PC member, bridge, truss member, bofted joints, etc.

Finally, we moved to visit dynamic geotecnical centrifuge laboratory. This test is an ideal to perform prototype model tests, that has purpose to understand the behaviour of ground, earth structures and foundations as well as develop techniques to rationalize design. The staff described the example of centrifuge test on embankment failure and seismic behaviour during earthquake also lead us to see the real geotecnical centrifuge.

a.

b.

c.  **d.** 

Fig 11. Structural engineering laboratory

a.  **b.** 

Fig 12. Dynamic geotecnical centrifuge laboratory

2.4 Tokyo-Gaiken Expressway: "TAJIRI-Area Project" (Sept. 5th P.M.)

In the afternoon, we visited the TAJIRI-Area project which is expressway site in Chiba city. This project is conducted by the joint venture between TAISEI-TODA-DAIHO. We had listened the introduction of project by PPT and discussed some questions before saw tunnel and underground section sites. TAJIRI area construction site is to construct Keiyo-junction connecting with Tokyo-Gaikan expressway and Keiyo-Road way. The methods contained two types; cut and cover metod that the earth retaining wall is used to support ground pressure to aviod corruption of soil. Other is tunneling method that construct underground tunnel beneath thae surface structure without disturbing existing structure.

First we went to see the tunnel section site, it has diameter 13 meters for two lanes. The constuction were expanding distance by shield tunning and pipe jacking method. Next, we visited the underground construction site and we walked down to see how to construct with many machines. Regarding existing road, at the same time it is detoured and used during underground construction so that it seems very hard work to carefully design for protecting existing construction.

a.  b. 

c.  d. 

Fig. 13 Tunnel-construction site

a.  b. 

Fig. 14 Underground-construction site

2.5 KAJIMA Technical Research Institute (Sept. 6th A.M.)

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

In this program, we had opportunities to visit five dominant laboratories and got the informations about each work from Ms. Umehara Haruko. Firstly, we visited the large-size structure testing lab which was testing the strengh of column, beam and reaction wall. The maximum load for testing depend on their conditions. Secondly, rubber lab we saw the example of rubber which contained a lot of steel sheets. The rubbers is utilized to diverst works such traffic vibration, reducing energy and testing spring rubber which have lifetime approximately 60 years. Thirdly, we walked to the near building is concrete and wind-tunnel lab. Regerding concrete research, there were many example of applied concreate that use for spectial task for instance, preventing fire, frindly animals, recycle aggregrat, high performance water repellent etc.

Fig. 15 Photo at KAJIMA

Then we moved to the roof top of building, the porous concrete with drainage system were used to be floor in order to provent flood and make a small garden on the roof. Finally, we visited the wind-tunnel lab which impressed me the most because it is very important to consider wind directions before construct high buiding. The researchers have to design and simulate the building behaviour by using advanced technology untill they get the suitable condition. After that Ms. Haruko presented the new "OPSODIS" 3D sound and technology which can make surronding sound to audience in that position.

Fig. 16 Group photo at KAJIMA

Fig. 17 Group photo at win-tunnel lab

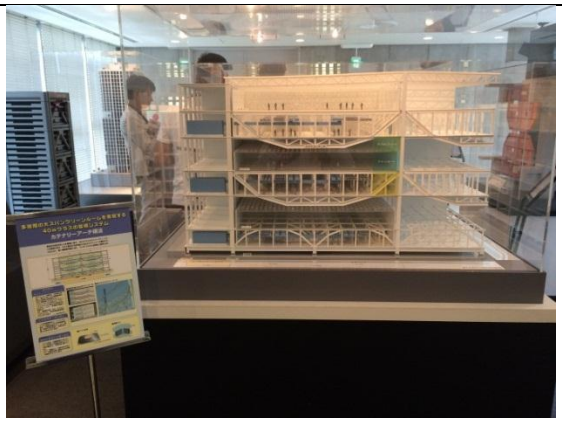


Fig. 18 Model of constuction

Fig. 19 Model of constuction without column

2.6 Disaster Prevention Center, Tokyo Metropolitan Assembly Hall, and Tokyo Lympic Facilities (Sept. 6th P.M.)

The program in the afternoon, we had a great chance to visit the Disaster Prevention Center, Tokyo Metropolitan Assembly Hall, and Tokyo Lympic Facilities, located in Shinjuku. Tokyo Metropolitan Assembly is the place where assembly members assemble to discuss and decide on the affairs of metropolitan Tokyo. The governor of Tokyo, who is chuef of the executive body, acts based on the decosions of here.

The Tokyo Metropolitan Government Buildings are outstanding as a symbol of the Metropolitan city of Tokyo. Its was completed in 1991 with height 243 meters. We had been allowed to visit the Assembly building with quite security. The president/vice president's room was first visiting where seems a formidable and orderly room. Next, we walked to see the assemble hall, there are 127 chairs in that rooms that means the number of assembly members. We was enjoying to take a photographs and listening information from guide. After that, we moved to the committee room for listening knowledge about the disaster prevention by PPT. Staffs explained us the process of citizen do when disaster occoured and responsibility of Tokyo Metropolitan Government, that is benefit informations for living.

Fig. 20 Tokyo Metropolitan Government Buildings

Fig. 21 The president/vice president's room

Fig. 22 Assemble hall

Fig. 23 Group photo in assemble hall

2.7 JR Tokyo Station Extension Project (Sept. 6th P.M.)

At noon, we visited at JR Tokyo Station Extension Project constructed by OBAYASHI. Tokyo station is the gate way station to Tokyo where is hub of high speed railway networks and personal commuting in Tokyo region. The reasons that why Tokyo station is the most important since there are 1.8 million passengers per day, 15 lines connected, income 3.4 million US per line and 40 trains per line during peak hour. The improment of north passage at Tokyo station contains three periods, however; now this project is working in phase 1-2 and going to finish in 2018.

After the project engineers introduced us for background of this project in tempolary office, they took us to visit the project site. It was very great experience for me to visit the hard work where have many barriers from existing construction. An engineers had to carefully design the work's process and use the techniques to decrease effect toward existing constuction. Besides, the challenges of this project has more pressure from period time to finish before Tokyo Olympic game in 2020.

Fig. 24 Introduction about constuction site

Fig. 25 Constuction site at JR Tokyo Station

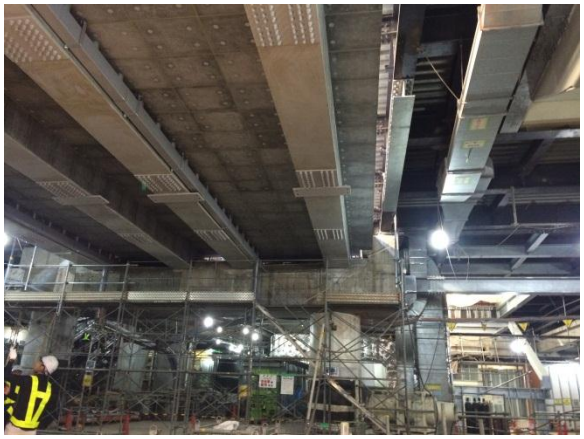


Fig. 26 Constuction site under platform

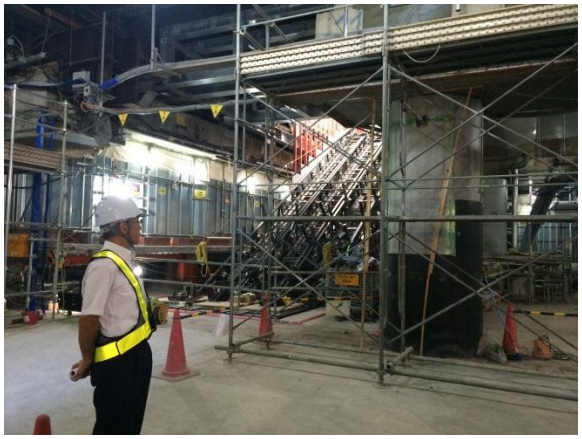


Fig. 27 Constuction site at JR Tokyo Station

Fig. 28 Shinkansen "Hayabusa"

After finished visiting site, we hurry moved to Tokyo station to go to Sendai by shinkansen "Hayabusa" which is very comfort and convenioun train. The train use max speed 300 km/hr and time for 1 hour and half from Tokyo to Sendai.

2.8 The 18th International Summer Symposium at Tohoku University (Sept. 7th A.M.)

The International Summer Symposium provides a good change for international students and engineers to present, discuss and exchange their research and interested projects in English language. The 18th International Summer Symposium hold on 7 and 8 September 2016 as part of common sessions of 2016 JSCE Annual Meeting at Tohoku University.

In the morning, we leaved from the hotel at 8.00 a.m. to Tohoku university by subway. By the way, I saw many Japanese officers and students commute by subway which is convenioun transport mode in peak time. When we arrived at Tohoku University, we quickly walked to the presentation room and we were separated into two sessions. In my session, there were diverst fields of civil engineering research included transportation, geotechnical engineering, hydraulic, structure and material. Most of all researches are very interesting that apply new theory and technology in order to provide benefit contributions in real work. Regarding my research is about "Effect of Psychological Factors on Intention of Using Bus Rapid Transit: A comparative study between Thailand and Japan" in field of transportation engineering. It seems difficult to understand for audience as human behaviour is quite complicated thinking and depend on many contexual factors. After finished my presentation I got a good questions and some suggestions about the gab of research

hypothesis. The 18th International Summer Symposium, therefore, is excellent activity lead me to got the new aspects to extent my future research.

Fig. 29 Presentation in 18th summer symposium

Fig. 30 Group photo in 18th summer symposium

Meeting with the member of International Scientific Exchange Fund (ISEF) committee

After we finished our activity in the morning, we had meeting with committee of ISEF. We jointed to have lunch and introduce ourself to each other with friendly situation. Then, program in the afternoon was free time for us so that I walked to sighseeing inside the Tohoku University with my teacher who is member of JSCE from Thailand. This university has a huge area where located at the mountain so there are many big trees, good ozone and nice views.

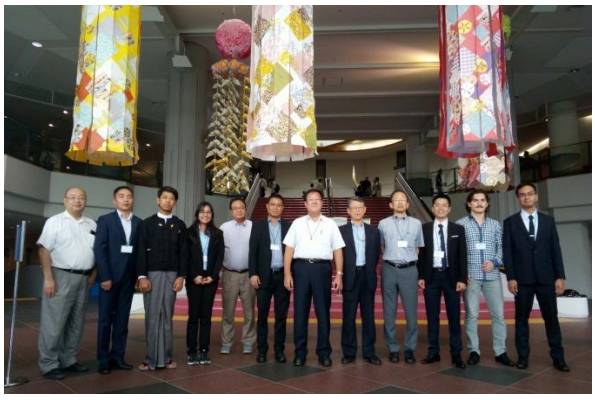


Fig. 31 Group photo with committee of ISEF

Fig. 32 Having lunch with committee of ISEF

IAC's Networking Reception

In the everning, we had activity about IAC's Networking Reception that is welcome party for JSCE member from different countries. We enjoyed to listen experience stories in work from older member and got a new friends who study and work in Japan. After party, we came back to the hotel in central city.

a. 

b. 

Fig. 33 Group photo with JSCE members

2.9 Shimizu Corp. JV in the Imaizumi and Takata areas (Sept. 8th A.M.)

In this day, we moved to visit the disaster area from earthquake damage and tsunami in 2011 at Rikuzentakata city. This program is very exiting to me since it is difficult opportunity to see how to recovery constructions that not only buildings, houses but also rehabilitate their citizens feeling. First, we visited the Shimizu Corp. JV in the Imaizumi and Takata areas, an engineers took us to see the top-view of area that can see 180 degree-panorama. They described in the important details and limitation of each recovery work espeacially taking care an aquatic animals. The tsunami destroyed most of building and environments, however; there is one miracle pine which is not affected from tsunami. This project had purpose to elavate the huge area by cutting and filling soil from mountain so this had many joint venture companies and used the most machines in Japan. The quility of control for filling work divided into two period, first is during construction; each embankment layer should be spread horiontally within 30 cm. thickness, compacted by machines and monitored by 15 points per day. Second, after filling work, the Swedish Weight Sounding Method is used to test strenght of embankment soil.

After visited site, we moved to the office to see the presentation by PPT and had lunch among this activity. From this project, I learned many amazing things starting from the coorperation between authorities, proceder plan and how to manage conveyor resources into the area. Besides, the city's history will be kept in my good memory and set as prototype of recovery disaster area.

Fig. 34 Panorama view of construction site

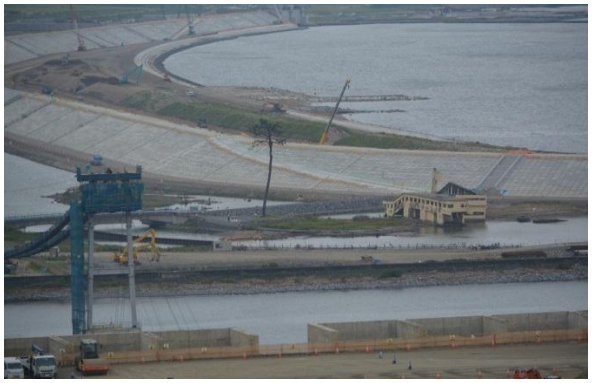


Fig. 35 Miracle Pine

Fig. 36 Group photo in Takata area

Fig. 37 Having lunch in Shimizu Corp. JV office

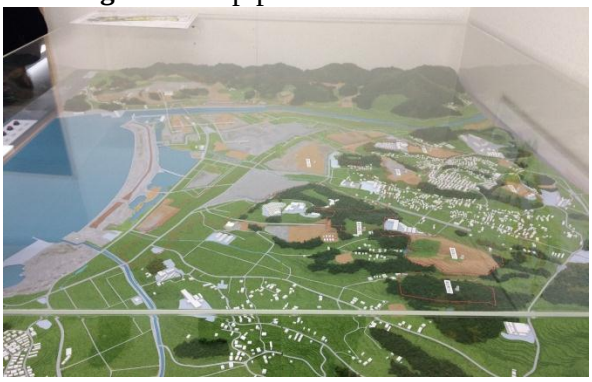


Fig. 38 Model of Imaizumi and Takata areas

2.10 Kajima Corp. JV (Sept. 8th P.M.)

In the afternoon, we moved to the close project in this area was coastal disaster restoration project which is conducted by Kajima Corporation and other joint ventures. This project was constructing an execution of high-density compacting work and seawall for protecting human life, possession, various industries, economy and national land from tsunami. That is, in the back side of Takata coast is Rikuzentakata city, there are many places including Rikuzentakata Municipal office, Iwate Prefectural Takata Hospital and among the seawall is known as beautiful scenic spot of white sand and green pines along 2 kilometers. In term of construction proceder, the three major works was doing at the same time; front sea wall, back seawall and artificial reef. They utilized the Innovation of Construction System by using the automated construction machines to improve and equalize compaction, that is interesting technology for me.

Fig. 39 Group photo seawall construction

Fig. 40 Seawall construction

Fig. 41 Seawall construction

Fig. 42 Introduction about construction site

2.11 The disaster affected site located between Rikuzen-Takata and Minami-Sanriku towns (Sept. 8th P.M.)

By the way between Rikuzen-Takata and Minami-Sanriku towns, we saw the disaster affected site from the bus. There were many destroyed buildings from tsunami and some of them had re-construction as new building. We had a good chance to see the main reconstructions outside including shinkasennuma bridge which has distance around one kilometer, Michi-no-Eki Takada Matsubara where is remain broken, new BRT station, new roof of house, Koizumi Bridge (underconstruction) and railway bridge broken. For the five years after tsunami, this city seems quickly recovery such road network, house and other infrastructures since Japanese government and authorities have supported the budget to recovery the important public utility especially citizen life. Moreover, Japanese people know their role and responsibility so that is reason why every disaster town in Japan are quick resurgence.

Fig. 43 Michi-no-Eki Takada Matsubara

Fig. 44 Information of Michi-no-Eki Takada Matsubara

Fig. 42 Shinkasennuma bridge

Fig. 43 Group photo at Shinkasennuma bridge

Fig. 45 BRT station

Fig. 46 Shinkasennuma bridge

Fig. 47 Reconstruction house

Fig. 48 Koizumi Bridge (underconstruction)

2.12 Sigh seeing in Tokyo, Asakusa temple and Tokyo skytree (Sept. 9th A.M.)

The last program in STG2016 was sightseeing in Tokyo that is relax activity. We leaved from the hotel at 12.00 a.m. to have lunch, then took the bus to see and listen the history of central of Tokyo city. At 2 p.m. we visited the Asakusa temple where is the famous temple for Japanese and tourists to go there. There were many people and gift shops along side street road and I think that is one of beautiful life style in Japan.

Then, we moved to Tokyo skytree where is a new television broadcasting tower and landmark of Tokyo. It is the centerpiece of the Tokyo Skytree Town in the Sumida City Ward, not far away from Asakusa with a height of 634 meters. We was upward to the observation decks which offer spectacular views out over Tokyo at 350 meters. I could see most of outstanding that are amazing views of Tokyo. Inside of tokyo skytree we could do

many activities; zoom the special place from the machine, eating at restaurant, buying souvenir etc. Thus, Tokyo skytree is one of convenient and beautiful landmarks for tourist having to visit there. It was a pity that we have a little time to seeing the amazing view.

Fig. 49 Hato bus tour

Fig. 50 Asakusa temple

Fig. 51 Walking street near Asakusa temple

Fig. 52 Photo with Japanese girls

Fig. 53 Group photo at Tokyo skytree

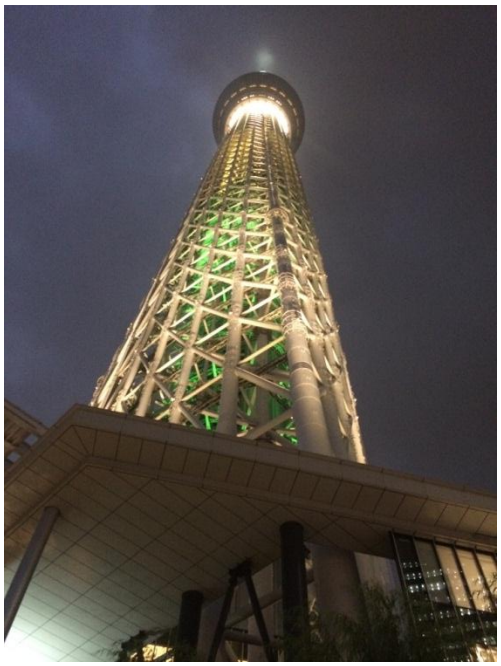


Fig. 54 Tokyo skytree

3. Speech of Gratitude

First of all, I would like to express my gratitude to Japan Society of Civil Engineering (JSCE) for supporting total expence including air-ticket, itinerary, accomodations and all of exclusive activities. Moreover, I would like to thank Dr. Wada, Mr. Hashimoto and other staffs from company where visited for friendly reception and taking care me all this week. Also, thank my lovely friends who are different nationality that treat like friend and truly together. Firstly, since I am only one female from participants so I had scared for how to do activity with stangers. However, in the real situation everyone are very nice guys so I feel very happy and look at them as family.

For the special study tour program, although this is the second time to travell in Japan, I am still exited to get a chance for learning the different culture, language and society in Japan. Regarding knowledge in civil engineering, I had saw the good network infrastructures in everywhere and had got a lot of knowledge about applied advance technology in civil work from research institute, public company and construction site. Besides, in term of research I also got new ideas and inspirations from the 18^{th} International symposium at Tohoku univrsity that would stimulate me to find scholarship to continue Phd course in Japan soon.

Finally, although a short period staying in Japan, I am so impress with all programs that provide me the valuable experience in many ways. Furthermore, I have opportunity to create a good relationship with Japanese organizations. The everything I got will be used to contribute back to my future work and society as well as I will suggest these to younger students who want to study or work with Japan company.