Report For

2017 Japan Society of Civil Engineers

Study Tour Grant

Supported by International Scientific Exchange Fund-ISEF

By

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The Project for Updating Strategic Urban Development Plan for Greater Yangon 2040 (SUDP)

Recommended by Myanmar Engineering Society (MES)

Contents

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) is supported by International Scientific Exchange Fund (ISEF). STG is a unique program for young civil engineering who are nominated by the AOC societies in order to learn Japanese civil engineering technologies 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 late January 2017, Myanmar Engineering Society (MES) was announced to apply for JSCE-STG 2017 program. From that time on I start preparing my application for JSCE-STG 2017. There are two steps of selection for the applicant from Myanmar. The first selection was done by Myanmar Engineering Society (MES). Among many of applicants, MES selected some participants to make presentation “why the applicant interested JSCE-STG and their expectation through this program”. Based on the result from the presentations, MES nominated only 5 participants and then MES submitted these 5 participants lists and their presentation to JSCE for the final selection at the end of March 2017. JSCE announced the selected participant for JSCE-STG tour grant 2017 at the end of May 2017.

1.4 Participants of JSCE- Study Tour Grant 2017

There are six participants for STG 2017who came from different countries as follow.

Table 1. Participants in study tour grant 2017

No.	Name	Affiliation	Country
1	Mr. Pau Sian Muan	JICA Study Team	Myanmar
2	Mr. Mai Hoang Bao	HCMC University of Technology	Vietnam
3	Mr. Ganzonrig Tsevelsuren	Mongolian Engineering Construction LLC	Mongolia
4	Ms. Tugce Ceran	Istanbul Technical University	Turkey
5	Mr. Al-Adzhar P.Usman	DPWH-ARMM	Philippines
6	Mr. Pornnarong Lueanpech	King Mongkut's University of Technology/ office of Engineering Research & Development, Expressway Authority of Thailand	Thailand

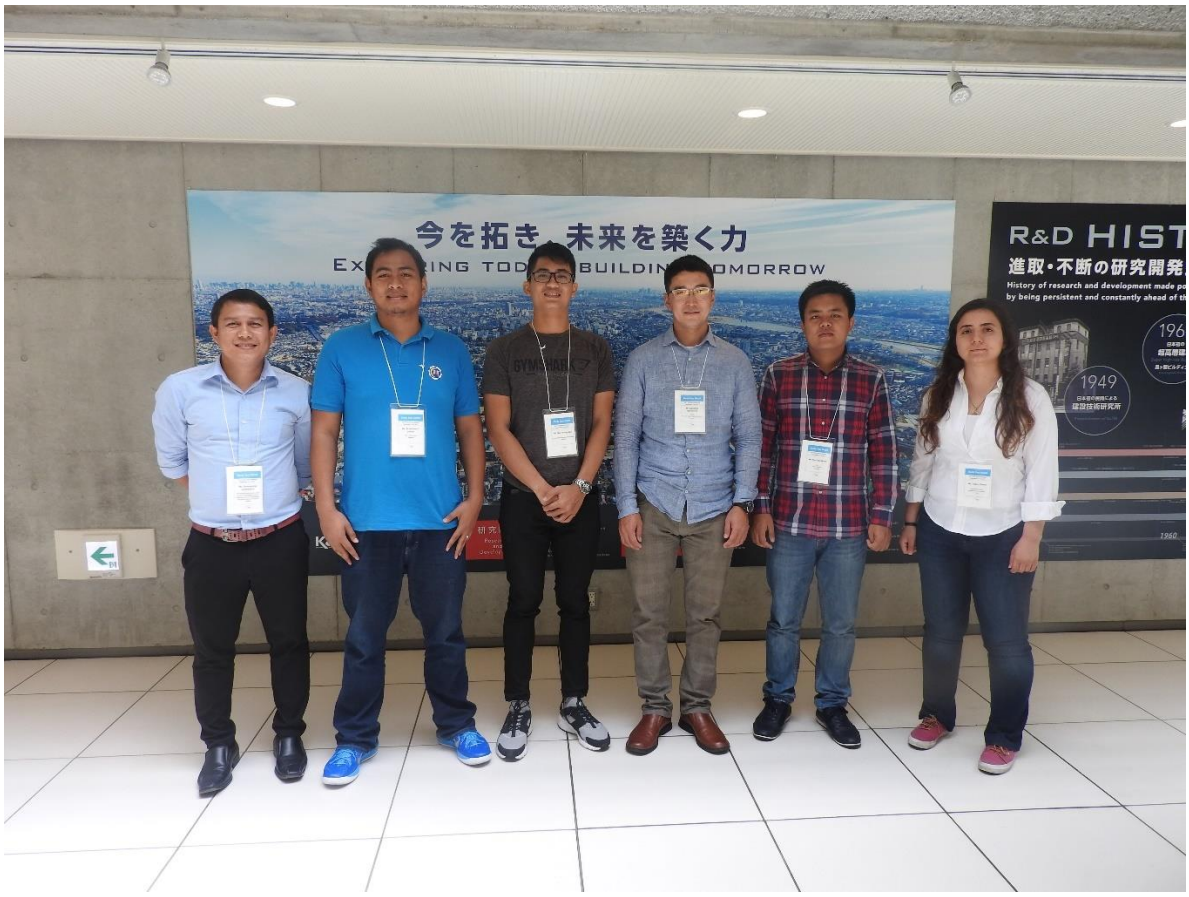

Fig 1. JSCE-STG 2017 Participants

2. Study Tour Activities

2.1 Itinerary

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 9-16, 2017 as shown in table 2.

Table 2. Schedule of STG2016

Date	Time	Events	Attend
10 Sep 2017 (Sunday)	A.M	• Arriving at Narita Airport • Check in at Nishitetsu Inn Shinjuku (Tokyo)	Ms. Suzuki
11 Sep 2017 (Monday)	A.M	• Visit KAJIMA Technical Research Institute (Tokyo)	Ms. Suzuki, Mr. Yoshizawa
	P.M	• Move to Fukuoka by flight and attend JSCE • Networking reception at Kyushu University • Check in at Nishitetsu Grand Hotel	Ms. Suzuki, Mr. Yoshizawa
12 Sep 2017 (Tuesday)	A.M	• Participate and deliver a presentation at the 19th • International Summer Symposium (Kyushu • University)	Ms. Suzuki, Mr. Yoshizawa, Mr. Katayama
	P.M	• Visit to project site; Yabegawa Bridge, Yabe river levee breakdown site, Miike Coal Mine Site • Check in at Hotel Routeinn, Kumamoto Ekimae	Ms. Suzuki, Mr. Yoshizawa, Mr. Katayama Ms. Ito
13 Sep 2017 (Wednesday)	A.M	• Visit to the area affected by 2016 Kumamoto • earthquake and reconstruction project sites	Ms. Suzuki, Mr. Yoshizawa, Mr. Katayama
	P.M	• Return to Tokyo from Kumamoto Airport	
14 Sep 2017 (Thursday)	A.M	• Visit to Tokyo Gaikan Expressway "TAJIRI-Area Project"	Ms. Suzuki, Mr. Sakata
	P.M	• Visit to SHIMIZU Institute of Technology • Visit JR, Tokyo Station Site • Dinner with ISEF Committee Members	Ms. Suzuki, Mr. Katayama Ms. Shibuya Mr. Arai Mr. Asano
15 Sep 2017 (Friday)	A.M	• Free time	
	P.M	• Sight-seeing in Tokyo	Ms. Suzuki Mr. Arai
16 Sep 2017 (Saturday)	A.M	• Check out hotel and go to Narita International Airport	Ms. Suzuki
	P.M	• Flying back to Home	

2.2 Day – 1: Arriving Japan

I departed Yangon on 9th September by All Nippon Airways at 9:45 pm. My flight is a direct flight to Japan and it takes for six hours and I arrived Narita airport, terminal 1 on 10th September at 6:30 am (+2:30 hours from Myanmar time). This is my first time to visit in Japan. After passing the immigration counter, Mr. Hashimoto was waiting me at the arrival gate, he was very friendly and advise me how to take the shuttle bus to Tokyo. When I arrived the bus terminal in Tokyo, Ms. Suzuki fetch me up and bring me to the hotel: Nishitetsu Inn where I will stay for a night.


Fig 2. Bus terminal at Narita airport & Nishitetsu Inn in Tokyo

2.3 Day – 2: Technical Tour & Travel to Fukuoka

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

When 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 (a) Shaking Table Laboratory (b) Concrete and Wind-tunnel Laboratory (c) Large Size Structural Testing Laboratory and (d) Construction and Fire Safety Laboratory.


Fig 3. Group photos at KAJIMA Technical Research Institute

(a) Shaking Table Laboratory

This 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 configuration; 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.

Table 3. Specifications of Shaking Table

		Large Table	Small Table
Table Size		5 m x 7 m	2 m x 2 m
Rated Loading Capacity		600kN	50 kN
Max Acceleration	Horizontal	2.0 g	0.5 g
	Vertical	2.0 g	-
Max Velocity	Horizontal	200 cm/sec	250 cm/sec
	Vertical	100 cm/sec	-
Max Displacement	Horizontal	X:±50 cm Y:±70 cm	±200 cm (X: ±250 cm Y: ±270 cm) *
	Vertical	±30 cm	(±30 cm) *

* In combine with the main table

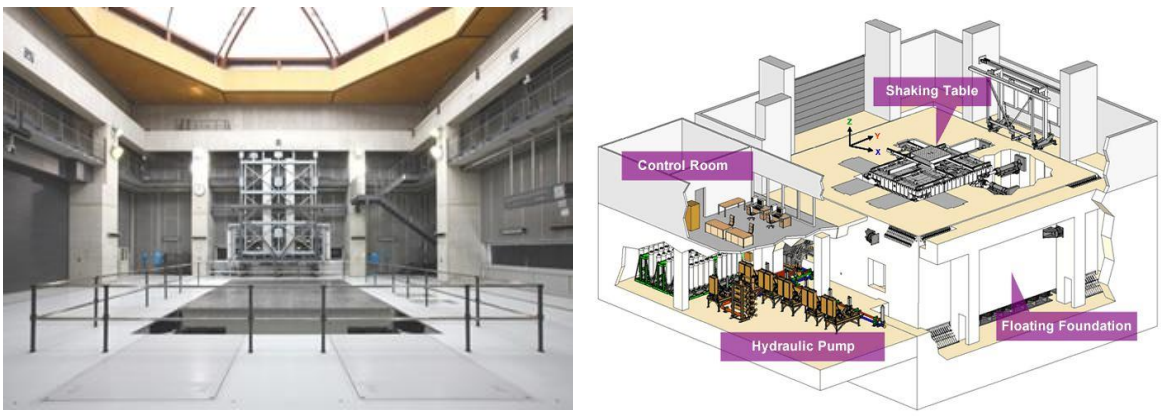

Fig 4. High Performance 3-Dimensional Shaking Table System

(b) Wind-tunnel Laboratory

This laboratory is used to research 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. This laboratory is to resolve the various

environmental problems induced by wind such as the wind environment around tall buildings, the habitability to building vibration and wind noises of building supplementary materials.

Fig 5. Wind Tunnel Laboratory & Large-size Structural Test Laboratory

(c) Large Size Structural Testing Laboratory

This testing laboratory 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 (e.g. large crane, specimen preparation yard), are provided. This facility provides the basic information, to be applied in civil engineering and other construction works, such as nuclear power plants, large-span bridges, marine structures, high-rise buildings etc. and to clarify quake-resisting behavior, obtainable only through experimentation.

We moved to HANEDA airport to go to Fukuoka after having lunch at KAJIMA. We directly went from Fukuoka airport to Kyushu University, Ito Campus and joined JSCE Networking Reception. At the network reception, I got a chance to meet JSCE members including Mr. Tamio Shimogami, the Chair Person of International Scientific Exchange Fund Committee, JSCE. Then we stayed at NISHITETSU Grand Hotel at Fukuoka City.

Fig 6. JSCE Annual Meeting and Networking Reception

2.4 Day – 3: Presentation at International Summer Symposium & Technical Tour

We left the hotel in the early morning for the 19th International Summer Symposium at Kyushu University. All the presentations were separated by the subjects at open learning plaza lecture room No.5, 6 and 7. The presentation from Mr. Daniel Haussner, Hazama Ando Corporation which is about "the internationalization: recommendations for Japanese construction firms" is very interesting. Presentation from other STG participants presentation are also very impressive. I am allocated to make my presentation "Current Significant Development of Yangon" at lecture room No.6 in open learning plaza. I got total 10 minutes for my presentation. I presented about the current problems/ issues of Yangon and what are currently developing and what are necessary to develop. Other participants are very interesting about my presentation.

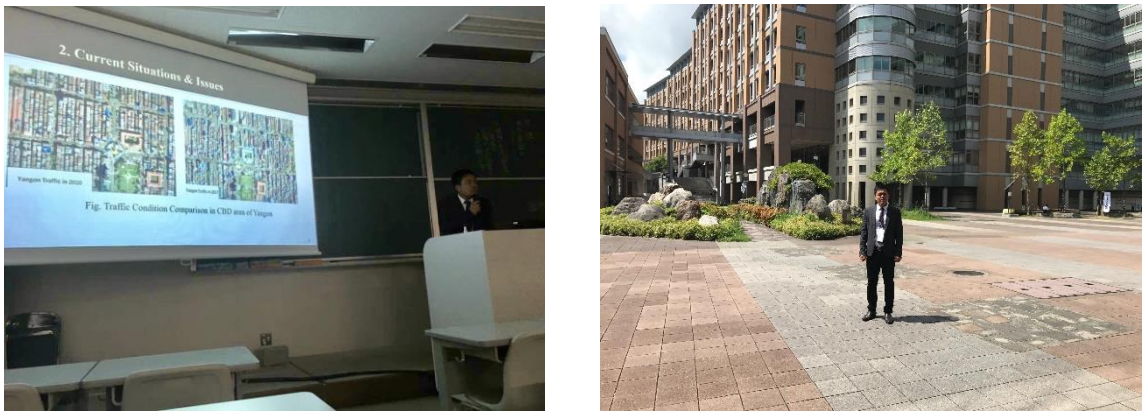

Fig 7. Presentation at 19th International Summer Symposium, Kyushu University

After having lunch at Kyushu University canteen, our technical tour to Kumamoto was started. The first place we visit was Yabegawa Bridge which is located on Ariake Seashore Highways. It is the largest span prestressed concrete cable stayed bridge in Japan with 261m main span. The inclined pylon is employed to ease the influence of the curvature in plan (R = 1150m). This bridge has the innovative design using seismic isolation bearing, damper and stopper. Moreover, the bridge is composed of deep pneumatic caisson foundation, sophisticated design of cross section, steel anchorage box in pylon, non-grout type multiple strand stay cable and hybrid ground foundation of abutment on the soft ground. Then we visited to Yabe-river embankment collapsed site.

Fig 8. Site visit to Yabegawa Bridge


Fig 9. Site visit to Yabe river embankment collapse site

The next place we visited was Miyanohara pit, one of the main pits at the Miike coal mine, which is the one of the world heritages in Japan. The mine pit produced 400,000 to 500,000 tons per year from 1989 to 1931. The mining began during the Kyoho era. The mine was nationalized in 1872 by the Mejii government. The Mitsui Zaibatsu took control in 1899. The mine site close in 1997, with devastating effects on the local economy.


Fig 10. Miike Coal Mine, Miyannohara Pit

After the sites visit, we checked in at Hotel Route Inn in Kumamoto. We had our dinner at Japanese Restaurant and enjoyed Basashi; the raw horse meat; the famous local food of Kumamoto.

Fig 11. Basashi; Raw Horse Meat & Night Scene of Kumamoto

2.5 Day – 4: Technical Tour to Kumamoto Earthquake effected area

We left the hotel in the early morning as usual and the very first place we visited on that day was Kumamoto Castle damaged by Kumamoto earthquake in April 2016, located at Mashiki town in Kumamoto prefecture. The castle was also damaged by the Kumamoto earthquake in 1889. Two of the castle's turrets were partially collapsed, more of the exterior walls at the foot of the keep also collapsed. It is estimated that the castle restoration work will take decades. The repair works for the castle was started in June 8, 2016. The restoration of the main tower is supposed to complete by 2019. The completion date of full repair and restoration of the entire castle is scheduled to set in the year 2036.

Fig 12. Kumamoto Castle damages by earthquake on 2016.

The next destination is Tsujun aqueduct located in Yamato. This is the largest stone arch bridge in Japan with 84m long which was constructed in 1854. The purpose was to supply water to Shiroito Plateau (the higher area) for farming.


Fig 13. Tsujun Aqueduct

After the site visit to Tsuun aqueduct, we also visited to the Shirakawa Fountainhead located at southern foot of central volcanic cones in Aso Caldera. It is gushing to tons of water per minutes and has been selected as one of the '100 famous water sources' in Japan by the Ministry of Environment.


Fig 14. Shirakawa Fountainhead

The last place we visited in Kumamoto area is earthquake affected area in Aso Ohashi Bridge. Route 57, Aso Ohashi Bridge on Route 325 and JR Hohi main line were damaged due to the massive slope failure due to Kumamoto earthquake of 2016.The scale of slope failure is approximately 700 m in length and approximately 200 m in width. The sediment volume was estimated as 500,000 m^3. The main counter measure work; soil retaining works and slope protection works were started on May 5, 2016 and done in October 2016. The most interesting part on this recovery work for me is the network-type unmanned construction system so that work could be conducted safely from the remote-control room 1 km away from the work site.

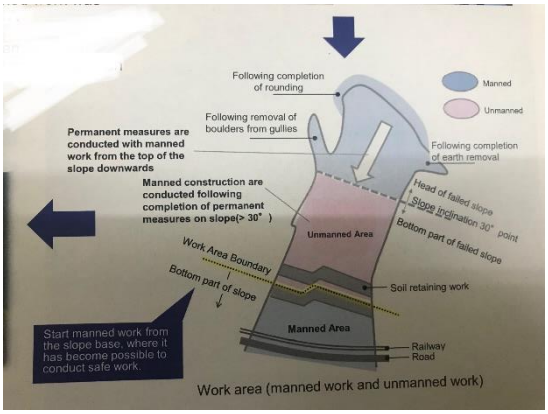

Fig 15. Recovery work area around Aso Ohashi Bridge.

Fig 16. Damages of Aso Ohashi Bridge and Route 57.

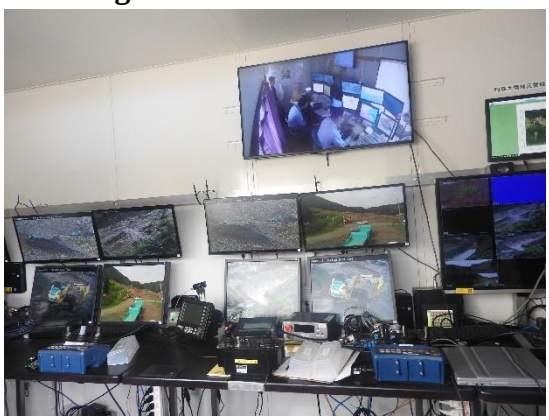

Fig 17. Unmanned excavators and control room

Fig 18. Group photos at the work site.

In the evening, we returned back to Tokyo from Kumamoto airport and checked in at Hotel KEIO PRESSO INN Otemachi in Tokyo. We enjoyed dinner at sushi restaurant.

2.6 Day – 5 : Technical tours in Tokyo

As this is the last day for technical tour, we visited Tokyo-Gaikan Expressway "TAJIRI Area Project". Mr. Sakata from TAISEI Corporation explained about the project and conducted the site visit. Tajiri area construction site is the work to construct Keiyo-junction connecting Tokyo-Gaikan Expressway and Keiyo- Roadway.


Fig 19. Group photos and site visit to Tokyo- Gaikan Expressway.

After the site visit, we had lunch at TAJIRI Area project office. Then we visited to SHIMIZU Institute of Technology. Mr. Nakamura from SHIMIZU Corporation explain about their organization and their works. There is a gallery showing the small-scale models of SHIMIZU projects around the world from the first project. Then we visited to Wind Tunnel Testing Laboratory; to examine the wind load effect to the proposed buildings and the its effect to the surrounding area. Seismic isolation floor.

Then Mr. Nakamura explained about the Main Building which is the innovative technology called column-top isolation system. Another technology called "Cor-suspended Isolation System" was applied in the Safety and Security Center.


Fig 20. SHIMIZU Institute of Technology

The last place we visited was JR Tokyo Station Site. Mr. Asano from Obayashi Corporation introduced and explain about the Tokyo Station north pedestrian passage enhancement project. This pedestrian passage enhancement project composed of 2 phases. Phase 1 was started in September 2015 and completed in January 2017. Phase II was started in March 2015 and going to finish on August 2019. The most interesting in this project is they have only 3 hours per day to work on the site when all the trains services are not functioning in the night time. Our technical tour was accomplished at 17:00 and we had a dinner with ISEF committee members at "Budo no mori-Godanya".


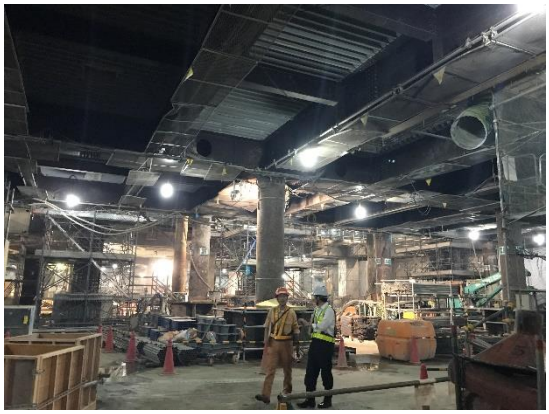

Fig 21. Site visit to Tokyo Station north pedestrian passage enhancement project

2.7 Day – 6: Sightseeing around Tokyo

We had some free time in the morning until noon. So, I visited to Akibara Station to buy some souvenirs. Ms. Suzuki pick us up at the hotel after lunch for sightseeing in Tokyo. We took the train about 5 stations. Then we enjoyed the beauty of Tokyo cityscape through the river-cruiser. Then we visit to Asakusa Kanon 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 train.


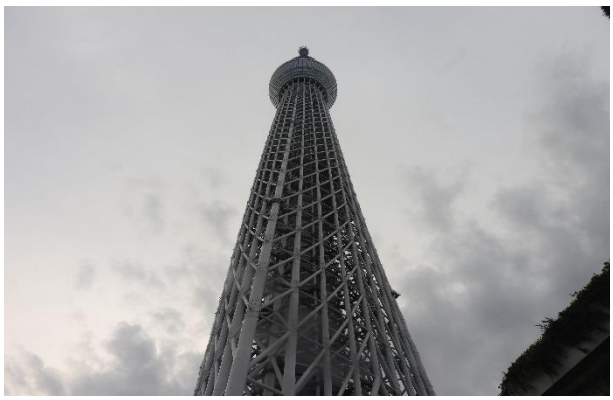

Fig 22. Group photo with ISFE Members and Tokyo Sky Tree

2.8 Day – 7: Returning Home

As my flight back to Yangon is 13:30 pm. I need to leave the hotel at 10:00am. I safely arrived home at 7:00 pm.

3. Speech of Gratitude

Firstly, I would like to express my gratitude to Japan Society of Civil Engineering (JSCE) for this study tour grant. I would like to thank all JSCE staffs for their effort in making all the necessary arrangements during my trip. As this is my first trip to Japan, I got many changes to explore the developments and technologies of Japan. I also got networks with young professions from other countries and many experiences in civil engineering profession.

I would like say my special thanks to Mr. Yoshizawa, Mr. Katayama, Ms. Ito, Mr. Sakata, Ms. Shibuya, Mr. Arai, Mr. Asao and Mr. Shinya Sugimoto. I would like to express my gratitude to Kajima Technical Research Institute, Tokyo-Gaikan Expressway Construction Site TAJRI-Area Project, SHIMIZU Institute of Technology, JR Tokyo Station Construction Site; Obayashi Corporation and others remaining organizations and officers who explained about their projects during our site visits.

I would like to express my gratitude to U Win Khaing (President, Myanmar Engineering Society), U Myint Soe (CEO, Myanmar Engineering Society), all interviewers from Myanmar Engineering Society and Mr. Kuniomi HIRANO (Team Leader, JICA Study Team for SUDP) who supported and helped for my STG trip to Japan. I would like to say my thanksgiving to everyone who supported my STG trip.

I do believe that this trip is valuable and memorable trip for me. I am blessed with many experiences, ideas and future plans for my further study to improve my career through this trip.