

# 2015 Japan Society of Civil Engineers Study Tour Grant Report

## Jun Li

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## **1. PREFACE**

## (1) About JSCE

Japan Society of Civil Engineers (founded in 1914) is a civil engineering professional organization, representing more than 38,000 members worldwide. The Society has over 300 committees and 9 International Sections.

The Society's mission is to contribute to building a sustainable society for present and future generations through promoting and progressing civil engineering. In order to actualize the mission, the Society focuses on the following goals:

1) Enhance professional knowledge, skills and practices;

2) Strengthen the contribution of civil engineering to society

3) Promoting communication, cooperation and collaboration among the members.

## (2) About Study Tour Grant Program

Study Tour Grant (STG) is the grant travel program supported by International Scientific Exchange Fund (ISEF). The STG program invites civil engineering students to Japan for one week. The young engineers, who are nominated by the AOC societies, learn latest technologies through lectures provided, visiting construction project sites and infrastructure operations, and discussions with Japanese civil engineering experts.

#### (3) Participants of STG 2015

1) China: Mr. Jun Li, Student (Master Degree) at Tongji University

2) Philippines: Mr. Jess Anthony Alcid, Student (Bachelor of Science degree) at De La Salle University, Manila

3) Indonesia: Mr. Andi Subhan Mustari, Lecturer at University of Hasanuddin, Indonesia

4) Vietnam: Mr. Dang Quoc Su, Student (Master Degree) University of Transport and Communication, Hanoi,

5) Myanmar: Ms. Hmwe Kyu, Structural Design Engineer, Aung Myin Thu Construction and Real Estate Development Co., Ltd, Myanmar

#### (4) Schedule of STG 2015

Tab.1 Schedule of STG 2015			
	Date	Time	Events
1	9-13-Sun	AM	Arriving at Narita Airport
		PM	Move to Hotel (Tokyo)and check in
2	9-14-Mon	6:45	Time of Departure
		9:20-11:50	Public Works Research Institute, Tsukuba
		14:30-16:30	Tokyo-Gaikan Expressway Construction site "TAJIRI-Area Project"
3	9-15-Tue	7:30	Time of Departure, Move to construction site by bus
		9:00-11:30	KAJIMA Technical Research Institute, Chofu, Tokyo
		13:30-16:00	Construction site "JR Shinjuku Station Project"
		16:00-17:00	Move to Tokyo Station by JR
		17:20	Move to Okayama by Shinkansen, Nozomi
4	9-16-Wed	8:00	Time of Departure, Move to Okayama Univ.
		8:45~	Attending 2015 JSCE Annual Meeting /The 17th International Summer Symposium at Okayama University
		9:00-12:00	International Summer Symposium Presentation
		13:30-17:00	International Workshop for Young Engineers
		18:00-21:00	Reception at Okayama Castle
5	9-17-Thu	8:00	Time of Departure, Move by bus
		9:00-11:30	Seto Ohashi Commemorative Park (Seto Ohashi Tower, Com- memorative Hall), Yoshima P.A.
		13:30-16:00	Construction site "Mizushima tamashima Area Road Const."
		17:00	Move to Tokyo by Shinkansen, Nozomi
6	9-18-Fri	7:30	Time of Departure, Move to Bus stop (Hato Bus).
		8:30-13:30	Sight Seeing (Bus Tour /Hato Bus)
		PM	Move to Narita Airport and departure from Japan

## **2. JOURNEY**

#### (1) Application & preparation

In the middle of April, I knew the STG program of JSCE through my graduate teacher. It was such a precious opportunity that I decided to apply for it immediately because I was very interested in advanced engineering technologies and culture of Japan. Therefore, I began to prepare the materials needed for the STG program, and submitted all the required documents before the mid May. Soon after that, I received a reply from JSCE, and in July 28th I received the invitation from JSCE.

However, it was only one and a half month left before the time of STG program, so I began to apply for my passport and visa to Japan immediately. The process of applying for passport was quite smooth, and I got my passport from Exit-Entry Administration very soon. But it took a long time to deal with visa matters in school for most of school administration departments were on vacation. In late autumn, I submitted all the documents needed to Consulate General of Japan in Shanghai. 5 days later (Sept. 3rd), my visa to Japan passed finally.

#### (2) Arriving at Japan (Sept. 13<sup>th</sup> A.M.)

As for me, Shanghai Pudong International Airport was my first stop of the STG program. Because Tongji University was quite far from the airport, I went there very early in the morning of Sept. 13th. At about 10 o'clock A.M., I boarded fight CA929 to Tokyo.

Soon after taking off, the plane began to fly eastward into the Donghai Sea. I landed at Narita International Airport 3 hours later. Because there was +1 hour's time difference, the time I arriving at Japan was 2 o'clock P.M.



Fig.1 Narita International Airport

The procedure to pass customs inspection is relatively simple, however, because too many people got off planes at the same time, I had to wait over 20 minutes before going out. When I came out of Arrival Hall, I saw Mr. Kawakami and Daisuke. Then Mr. Kawakami introduced the STG program and some important consideration in Japan to me.

Because Mr. Kawakami had to wait for other members of the STG program, Daisuke and I went to downtown Tokyo by Airport Bus first. After 1 hour on the highway, we arrived at Tokyo Keio Presso Inn near Tokyo Station. However, it was a pity that I didn't see the other members of the STG program for the time was too late.

This was the end of  $1^{st}$  day.

## (3) Visiting PWRI & NILIM (Sept. 14th A.M.)

Mr. Kawakami came to the hotel very early in the morning to gather us, and during the time of breakfast, I met the other members of the STG program for the first time. After brief self-introduction, we began to know each other. We headed to Tsukuba together by bus then, and our destination today was the Public Works Research Institute (PWRI) and National Institute for Land and Infrastructure Management (NI-LIM) in Tsukuba Science City.

It took us more than an hour on the way, and



Fig.2 Public Works Research Institute

when got there, we were welcomed by Dr. Wada and staff of the institute. Dr. Wada was the organizer and sponsor of the STG program, he told us the schedule in the next week.

Then we went to experience test course first. It was a 6,152 m long test track, which was used to perform experiments concerning road drivability, safety, and environmental conservation. There were many other facilities on the roadside.







Fig.4 South Loop of Test Track

After that, we went to the Dam Hydraulic Laboratory. This laboratory was used for investigation of the hydraulic phenomena concerning dam's reservoirs and hydraulic facilities such as spillways, outlet works and intake systems. In this laboratory, we saw a few dam models were testing. From the guider, we knew that almost all spillways and outlet works of MLIT (Ministry of Land, Infrastructure and Transportation) dams were executed through model tests here.







Fig.6 Large-scale Three-dimensional Shaking Table

The Large-scale Three-dimensional Shaking Table in the Vibration Laboratory was our next stop. This machine was to examine aseismicity of the ground and civil infrastructures by simulating strong motion of large earthquake. After the introduction, we were invited to take a closer look of internal structure of the machine. What we saw was that many supports, actuators and other devices were installed under the shaking table. It was really a huge project to make experimental equipment like this.

The 30MN Large Structural Members Universal Testing Machine was another destination of our visiting. This equipment was used for compressive, tensile, and bending teats for full-scale or reduced-scale bridge members/components to evaluate the ulti-



Fig.8 Geotechnical Dynamic Centrifuge,



mate strength and the behavior to

Fig.7 30MN Large Structural Members Universal Testing Machine

the failure. It was constructed in 1978 and the control unit was updated in 1991 and 2002 to improve the safety and usability for operation.

Besides, we also visited the Geotechnical Dynamic Centrifuge, which was made to understand the complicated behavior of ground, earth structures and foundations, and also to develop the techniques to rationalize design.

## (4) Visiting Tajiri-Area Project of Tokyo-Gaikan Expressway (Sept. 14th P.M.)

In the afternoon, we paid a visit to the project department of Tajiri-Area Project. Before we went to construction site, the engineer gave us a presentation about summary of Tajiri-Area Project. From the presentation, we knew that this project was constructed by the East Nippon Expressway Company, which was one of the main operators of expressways and toll roads in Japan. Tajiri area construction site is the work to construct Keiyo-junction connecting Tokyo-Gaikan Expressway and Keiyo-Road way. The project was planned to undercrosss existing roadways, which were detoured and used simultaneously during underground high way construction period. The construction was started in the year of 2010 and has finished almost 60% of its schedule.





Fig.9 Model of Construction

Fig.10 Construction Site

Then he showed us some models of the project to make us better understand the construction steps and new technologies. After that, we went to the highway construction site together to get a more intuitive understanding. At the construction site, we saw the existing highway, which was still operat-

ing during the period of construction. Besides, there were lots of civilian houses not far from the project as well. So it was really a hard work to construct such a complicated expressway deep underground. All of these restrictive conditions required the construction company to use newer design & construction technologies, to take more quality control measures. Besides, environmental consideration could be seen everywhere in the project to reduce burdens for surrounding environment.



Fig.11 Construction Site



Fig.12 Group Photo at Construction Site

## (5) Visiting Kajima Technical Research Institute (Sept. 15<sup>th</sup> A.M.)

We left hotel very early in the morning to pay a visit to the Kajima Technical Research Institute (KaTRI) today, which is located in the Chofu city. As one of the most advanced research institutes in Japan, the KaTRI covered an extremely wide field of technology. Its research field mainly included civil engineering, building science, disaster prevention and environmental consideration.

There were a lot of interesting laboratories in the KaTRI, and we were very lucky to visit most of them in the day. The laboratories we visited included large-size structural testing laboratory, large-size wave basin, wind-tunnel laboratory, fire resistance test furnace, multifunctional greenhouse and so on. And what impressed me most was some devices installed between the foundation and superstructure of buildings to resist earthquake damage. These devices, which looked like huge springs, could resist both transverse and longitudinal vibration of earthquake.

The visit today showed us what a top research institution was like and how it worked. It was with these advanced equipment that research specialists and engineers could make more and more research findings.



Fig.13 Group Photo at KaTRI

## (6) Infrastructure Development Project in South Area at Shinjuku Station (Sept. 15<sup>th</sup> A.M.)

After KaTRI, we went to a construction site at Shinjuku Station. It had been the core of Tokyo both in name and in reality since the Tokyo Metropolitan government moved its headquarters to Shinjuku. However, shortcomings in the transportation infrastructure impeded further urban development in the area. Traffic congestion and thronging commuters, phenomena common to all large commuter cities, were slowing progress. To solve these problems, a reform of old Shinjuku Station was necessary.

The measures included building two layers of parking lot, one for buses and another for taxis. However, the construction must be done above the operating Shinjuku Station, which made this project very hard. In this project, the construction company came out with a new piling way to solve the problem. This project has been construct for 15 years by Tokyo National Highway Office since 2000, and it would be finished in the year of 2017.



Fig.14 Construction Site



Fig.15 Construction Site

This was a typical example of urban problems, we could foresee that, there would be more and more projects like this needed in future. Therefore, this project could be a perfect templet for the later constructions.

After visiting site, we came back to site office, and studied about the project by watching PPT. After that, we went to Okayama by Shinkansen. The Shinkansen was similar to high-speed rail train, but its transfer was more convenient. It was really a good trip in short.



Fig.16 Group Photo at Site Office



Fig.17 Shinkansen

## (7) Attending the 17<sup>th</sup> International Summer Symposium (Sept. 16<sup>th</sup>)

International Summer Symposium brings together young civil engineers from 20 countries every year. It is an excellent opportunity for young civil engineers to discuss their research projects, to ac-

quire new perspectives and to network with their peers. Over 100 papers are presented annually. The 17th International Summer Symposium was held in Okayama University, and we were asked to attend the symposium and gave a presentation. So all of us STG members had arrived at Okayama last night by the Shinkansen.

In the morning of Sept. 16th, we went to Okayama University quite early by taxi. There we met a lot of companions from other universities from Japan.

At 9 o'clock, we were asked to make a presenta-



Figure 18 Okayama University

tion about our research. My presentation title was Study on Automatic Monitoring System of Ground Deformation Caused by Shield Construction and Its Application. It was about a system I designed before and how I applied it in some engineering projects. After my presentation, some audience asked some questions about my research and we had some discussion after that.



In the afternoon, we attended a discussion activity called International Workshop for Young Engineers. Most of the participants were foreign students studying in Japan. We were divided into several groups to discuss the topic "Why did you come to Japan?"

All of the members thought it was hard to get involved into university and the language was the mainly problem they thought. After that, we analyzed

Fig.19 International Workshop for Young Engineers the reasons and solutions of this problem. At the end of the discussion, each of our teams were asked to present our conclusions by drawing a poster. It was really an interesting and substantial afternoon.

Besides, we had a reception at Okayama Castle at night.

## (8) Visiting Seto Ohashi Commemorative Park (Sept. 17th A.M.)

This day was the fourth day of our tour, after one day stayed in Okayama University, we continued to visit engineering projects and construction sites. Set out from Okayama in the morning by bus, our destination today was Seto Ohashi Bridges.



Fig.20 Seto Ohashi Bridges

The Seto Ohashi Bridges are a series of double deck bridges connecting Okayama and Kagawa prefectures in Japan across a series of five small islands in the Seto Inland Sea. Built over the period

1978–1988, it is one of the three routes of the Honshu– Shikoku Bridge Project connecting Honshu and Shikoku islands, and the only one with railroad connections included. At 13.1 kilometers, it ranks as the world's longest two-tiered bridge system.

We were very lucky to be allowed to observe the bridges at a close distance. We entered into Seto Ohashi Commemorative Hall to take an elevator to the lower deck of the bridge, which was designed to carry one railway track in each direction. Then we ascended to the top of bridge tower to have a better view. This



Fig.21 Seto Ohashi Bridges



Fig.22 Seto Ohashi Commemorative Hall

was an unprecedented experience. Standing at the top of the bridge, we could see the panorama of the bridges and the small islands in the Inland Sea.

After going down from the bridge, we came back to Seto Ohashi Commemorative Hall to learn more about the Seto Ohashi Bridges. At here, we learned the process of bridge construction and saw some valuable models of the bridge components.

We had a lunch in a restaurant near parking lot then and took a short break for the wonderful journey in the afternoon.

## (9) Visiting Mizushima Tamashima Area Road Construction Site (Sept. 17<sup>th</sup> P.M.)

After visiting Seto Ohashi Bridges, we then went to the construction site of Mizushima Port

Bridge. This time, we took a boat to go to the bridge construction site. On the way to the bridge, we could see the port on one side of the ship, lots of cranes and containers were in our sight. And from the introduction of the staff, we knew that lots of industrial plants were located here, which made it one of main harbor of Seto Inland Sea. However, with the development of this area, the old bridges connecting Mizushima and Tamashima area became more and more congested.

Therefore, the construction of Mizushima Port Bridge in Mizushima-Tamashima Road was an infrastructure project which aimed to strengthen its logistics functions connecting between the production base in Mizushima area and the physical distribution base in tamashima area, to improve safety and convenience for cyclists and pedestrians, and to provide anti-earthquake reinforcement against big earthquake. It was 2564 m long road connecting between Tamashima side and Mizushima side.



Fig.23 Mizushima Port

After that, we went to the Uno Port Office of Chugoku Regional Bureau, where the staff showed us more about the whole process of bridge construction. Then, we went back to Tokyo by Shinkansen again.



Fig.24 Construction Site



Fig.25 Construction Site

(10) Sight Seeing in Tokyo (Sept. 18th A.M.)

This was the last day of the STG program, instead of visiting construction sites, we had a sightseeing in Tokyo city. As one of the largest city in the world and the capital of Japan, Tokyo attracted millions foreign tourists from all of the world. It was a perfect combination of ancient and modern times. In this morning, we visited Tokyo Tower, Asakusa temple and passed by the Tokyo Imperial Palace, which were all landmarks of Tokyo.

We went to Tokyo Tower at first and stayed there for half an hour. It was a communications and observation tower located in Tokyo downtown. As it was the second-tallest structure in Japan with a height of 332.9 meters. It always appeared in TV plays and cartoons that sometimes it was the symbol of Tokyo.



Fig.26 Tokyo Tower

Then we moved to Asakusa temple, which was an ancient Buddhist temple located in Asakusa, Tokyo. It was Tokyo's oldest temple, and one of its most significant. As a must-see destination for visitors, people liked praying and shopping here.

Besides, we passed by the Tokyo Imperial Palace, which was the primary residence of the Emperor of Japan. And it was a large park-like area located in the Chiyoda ward of Tokyo.



Fig.27 Asakusa Temple



Fig.28 Tokyo Imperial Palace

## (11) Departure from Japan (Sept. 18<sup>th</sup> P.M.)

At about 15 o'clock on Sept. 18th, I went to Narita Airport by airport bus with Su, then left Japan and returned to Shanghai by flight CA920 in the evening. With the plane landed at the Pudong International Airport, the wonderful journey finally came to an end.

## **3. SUMMARY & GRATITUDE**

Attending the one-week STG program to Japan, each step was not easy as I thought. The shortterm trip brought me far more harvest than I imagined. The STG program brought me not only the expansion of knowledge and the improvement of abilities, but also an opportunity to approach a different culture.

During the STG program, we visited lots of construction sites and research institutions, where we learned advanced project management and new engineering technologies. At the 17th International Summer Symposium at Okayama University, we got lots of new ideas. Through this program, I had the chance to come to one of the biggest city in the world, Tokyo. And most important of all, I knew so many new friends and experts from different countries, from whom I could learn so much.

Finally, I would like to express my gratitude to Japan Society of Civil Engineer for their arrangement from air tickets to accommodations, and contacting so many good companies. I really thank Mr. Kawakami, Dr. Wada and other staff of the companies we visited for their caring and teaching when I was in Japan. From them, I learnt not only professional knowledge, but also the attitude of rigorous and conscientious. Moreover, thanks all my friends in the STG program, it was a memorable experience of whole lifetime.