

Japan Society of Civil Engineers

REPORT ON STUDY TOUR GRANT 2015

Prepared by:

Jess Anthony P. Alcid

B.S. Civil Engineering Specializing in

Hydraulics and Water Resources Engineering

De La Salle University-Manila

Recommended by the Philippine Institute of Civil Engineers

I. Introduction

a. About the STG

The Japan Society of Civil Engineers – Study Tour Grant (JSCE-STG) is a grant travel program supported by the International Science Exchange Fund (ISEF). This program which was held on the 3rd week of September (13-19), 2015 invites civil engineering students to Japan for one week with all expenses are covered by ISEF. The students are selected by their participating country's civil engineering society and consequently screened by the JSCE. Each country had one representative each and the countries that were chosen to participate were China, Indonesia, Vietnam, Myanmar and Philippines. The participants were to learn latest technologies through lectures provided, visit large-scale construction sites and have discussions with Japanese civil engineering experts.

The recipients of the study tour grant are listed below:

1. China: Mr. Jun Li – Student (Master Degree) at Tongji University
2. Philippines: Mr. Jess Anthony Alcid – Student (Undergraduate) 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

b. Itinerary

Day	Date	Time	Events
1	9-13 Sun	AM	Arriving at Narita Airport
		PM	Move to Hotel (Tokyo)
2	9-14 Mon	6:45	Departure
		9:20 - 11:50	Public Works Research Institute/National Institute for Land and Infrastructure Management, Tsukuba
		14:30 - 16:30	Tajiri Area Project
3	9-15 Tue	7:30	Move to Construction Site by Bus
		9:00 - 11:30	KAJIMA Technical Research Institute, Chofu, Tokyo
		13:30 - 16:00	JR Shinjuku Station Project
		16:00 - 17:00	Move to Tokyo Station by JR
		17:20	Move to Okayama by Shinkansen
4	9-16 Wed	8:00	Departure, move to Okayama Univ.
		8:30 Onwards	Attend JSCE 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 Thurs	8:00	Departure, by bus
		9:00 - 11:30	Seto Ohashi Bridge (Seto Ohashi Tower, Commemorative Hall), Yoshima P.A.
		13:30 - 16:00	Mizushima Tamashima Area Road Const.
		17:00	Move to Tokyo by Shinkansen
6	9-18 Fri	7:30	Departure to Hato Bus
		8:30 - 13:30	Sight Seeing (Hato Bus Tour)
		13:30 Onwards	Free Time
7	9-19 Sat	AM	Hotel Checkout, Move to Narita, Departure from Japan

II. Public Works Research Institute/ National Institute for Land and Infrastructure Management, Tsukuba



Group Photo at NILIM

Test Course

For our first activity, we went to Tsukuba by bus, in Ibaraki prefecture for a visit at the Public Works Research Institute (PWRI) and National Institute for Land and Infrastructure Management (NILIM). We were welcomed by Dr. Wada who was with the NILIM and International Science Exchange Fund (ISEF). He talked about the STG and what we should expect throughout the week and also about the tour that we were about to have that day in PWRI.



Traffic Sign Test Bridge

First, we went through the test course of the PWRI in which they featured different experimental areas/devices for road management. This included the traffic sign test bridge, which enables them to determine whether a certain signage can be seen from a certain distance at a certain height. They also featured experimental facilities for lighting to determine the proper placements of

lighting fixtures along a road, in real life application. They also had full size test tunnels, and sound proof barriers for experiments. The test track also had a part where porous elastic pavement was used to check its effectiveness when used in actual conditions. We also went through two types of loops with different inclinations/slopes, radii and design speeds. This test course emphasized how important actual conditions were in designing road systems, especially the signs and fixtures. These may be determined through simulations however, actual observations still prove to be very important in this field.

Dam Hydraulic Laboratory



Model of Nagayasuguchi Dam

After the test course, we were taken to the Dam Hydraulic Laboratory of PWRI. In this laboratory, they created models of different dams in Japan in order to investigate the hydraulic phenomena concerning a certain dam's spillway, reservoir, outlet works and intake systems. Some dams that were subject to model tests in this laboratory

were still under construction in real life, and some were being assessed for further improvements. These models did not only account for the flow of water but some models also considered sedimentation in reservoirs and other parts of the dam. They tested different designs on current or under-construction dams to determine which will be most effective to implement. Again, this dam laboratory of PWRI emphasized how important real-life models are important in determining the most appropriate hydraulic designs for large-scale water resource projects. The results from this laboratory were said to be compared to the results from numerical simulations obtained from modeling programs done also in PWRI, which was also deemed to be very important considering technical advancements in this field.

Vibration Laboratory

The next facility we went to was the Vibration Laboratory which ultimately featured the Large-scale 3D Shaking table which was used to examine seismicity of the ground and infrastructures by simulating the motion of large earthquakes. The parameters used for the movement of the shaking table were obtained from actual earthquake events for more realistic simulations.

Structural Engineering Laboratory

Another facility in the PWRI that we went to was the Structural Engineering Laboratory, which takes pride in having the 30 Meganewton (MN) Universal Testing Machine (UTM). The said machine can be used for compressive, tensile and bending tests for full-scale or reduced scale bridge members. The maximum

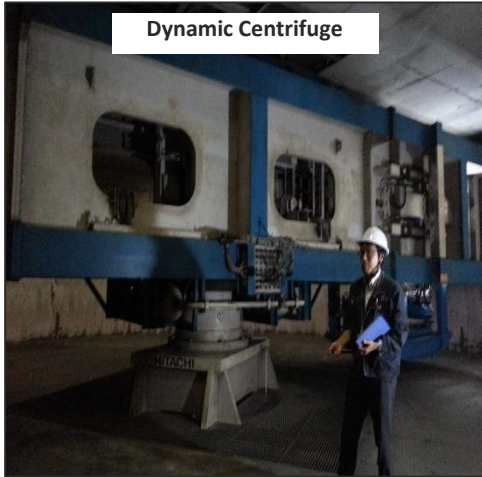


Bridge Component Failure

load that the machine can give varies depending on the type of the test. (i.e. 30 MN for Compressive Test, 10 MN for Tensile and 12 MN (+), 3 MN (-) for bending tests. A photo of a bridge member that was tested using the machine is shown. It is a rare opportunity to see a large scale UTM such as this. It was unfortunate that our group could not witness an actual experiment conducted in this laboratory, however, the samples that we saw were already enough to show the undeniable capacity of the said machine.

Dynamic Geotechnical Centrifuge Laboratory

The last facility that we went to was the Dynamic Geotechnical Centrifuge



Laboratory where they have one of the largest dynamic centrifuges in the world. (Radius 6.6m, Max Acceleration: 150G, Max Payload: 5t) It was said that this machine is used for tests to understand the complicated behavior of ground, earth structures, foundations etc. Other studies may include Soil liquefaction and ground flow, seismic behavior of underground

structures etc. It was stated that these studies are very important in Japan because of the coastal cities that are in high risk of experiencing liquefaction. This was an entirely new experience for me as I did not know such equipment existed. We had a long discussion about how it works, or how it simulates the motion of an earthquake.

III. Tokyo-Gaikan Expressway Construction Site “TAJIRI-Area Project”



Group Photo inside Excavation

After having our lunch in Tsukuba, we went directly to the Tokyo-Gaikan Expressway Tajiri-Area Project which was being constructed under the joint venture of TAISEI-TODA-DAIHO. The main idea of the project was to connect the Tokyo-Gaikan Expressway and the Keiyo road way by constructing the Keiyo-Junction. This was said to be a very challenging project as the existing Keiyo road is a very busy highway and

they (the contractors) did not want to impede the traffic flow even during construction. In order to do this, they had to create a detour which was used during the underground highway construction period, which was very convenient for both motorists and the contractors. They utilized different methods for the construction, one was the cut and

cover method which involved the use of retaining walls and ground anchors. The other was the tunneling method which was definitely a sight to see. We were told to be very lucky to be able to walk inside the tunnels that were created as it was the first time that they allowed visitors to see through the process. They said that they utilized this method in order to reduce the traffic burden on the existing roadway.

A large-scale project such as this could cause heavy disturbance to the surrounding community and environment, however they also managed to have this problem under control. They provided transparent safety walls for better visibility for drivers and pedestrians. The fences also had LED security street lightings for the safety of pedestrians at night. They had also addressed the problem with noise and vibration during construction by putting up sound proof walls around the site, and vibration proof sheet piles along the boundaries of the open excavations.

IV. KAJIMA Technical Research Institute, Chofu, Tokyo



At Kajima Technical Research Institute

On Tuesday morning, our group went to Chofu, Tokyo to have a tour at the KAJIMA Technical Research Institute (KaTRI). What was imprinted on my mind during this tour was the company's tagline: "Exploring today, building tomorrow." This explained the determination of the Japanese Engineers/researchers to keep on pushing through the future by creating innovations to address the problems faced by our current world. This was very evident in their facilities as they toured us around. It was unfortunate that we

were not allowed to take pictures but this was completely understandable. I felt very privileged to see in real life, the support systems that they put beneath structures to lessen the movement of the superstructure during an earthquake event because I only get to see this on television. We were also privileged enough to see the different kinds of these systems. They also had universal testing machines for structural testing. One unique facility that we visited was the place where they tested walls and other materials for fire resistance.

Another facility that caught my attention was the wind tunnel wherein they simulated the effects of wind loads on certain structures and the surrounding area, depending on the location of the structures. They showed us different models of areas and how they were able to observe the behavior of the wind and the structures using computer programs. I believe that models for wind testing are very important especially in areas that are always hit by typhoons or hurricanes.

One important facility that we visited which we were not supposed to go to initially was the hydraulic laboratory. Being an undergraduate student specializing in water engineering, I was very grateful for this opportunity to witness their large-size wave basin. Even though they did not have an experiment running through that time, it was more than enough. This facility was created for the sake of disaster prevention. Knowing that Japan is a country very susceptible to Tsunamis. Aside from the creation of waves, their facility can also simulate a Tsunami and observe its behavior and effects, which allows better preparation for the said phenomena. I believe this is an essential facility for my country because there are also a lot of coastal cities in the Philippine archipelago which face risk of storm surges and tsunamis. This could mean saving a lot of lives in the event of an unfortunate coastal mishap.

We were also taken to the rooftop of one of the buildings at KaTRI, where they featured their artificial soil that can hold more water than ordinary soil, which allowed faster growth of plants. The same soil was also said to be lighter than ordinary soil which makes it more economical to be put on roof tops of buildings since it will add less load on the structure. It is very inspiring to see that ideas and technical innovations keep on moving forward in this country.

V. JR Shinjuku Station Project



At Top Level of Area above the station

After visiting Kajima Research Institute, we then went to another large-scale construction site which was called the JR Shinjuku Station Project. Apparently it was the busiest train station/area in Japan with 3.2 million passengers. It was said to be a transportation hub with a lot of businesses and other commercial establishments in the

surrounding area. Due to this, there was a

huge demand for improvements in the station and the bridge that is built on top of it which was said to be 70 years old. Another problem that they wanted to address in this area was the lack of space to move or relax specifically for pedestrians. This lack of space causes accidents on the bridge as said in the report. The said lack of space is also caused by the lack of transfer function, meaning the taxis are parked on one lane of the over bridge which greatly reduces space. Buses do not have a proper place to load passengers from the station. With this, they wanted to make the Infrastructure development in the area more comprehensive by hitting all the above mentioned issues with one project that would take 17 years since year 2000. I felt very inspired when the project engineer said he took pride in not allowing any delay, not even one minute in train operations in that station throughout the duration of the project. This only proved their dedication and discipline in their work, at the same time, their concern for the 3.2 million passengers that need to pass through this station to work, school etc. And I admired their



Me with Protective Gear for the Shinjuku Site Visit

confidence when they said there was no chance that they will not finish the project in time (2017). The construction industry should have more of these values rather than just trying to make money and leaving legacies. The project aimed to make the over bridge friendly for the aged and handicapped pedestrians for better comfort. They also

retrofitted the overbridge to be more secure during an earthquake event. Aside from addressing the main issues they also took the chance to utilize the area on top of the station to create a 4 storey structure for taxi, bus and private vehicle parking for a better transfer function from the busiest station in Japan. It is wonderful to see developments that do not just address the problems of the present, but also making use of the opportunities to maximize the potential of a certain area for future generations.

VI. 17th International Summer Symposium at Okayama University



One highlight of the Study Tour Grant was the 17th International Summer Symposium at Okayama University. We attended the said symposium together with the members of Japan Society of Civil Engineers (JSCE) and many other students taking up their masters and doctorate courses in Japan. It was quite a unique experience for me as I was the only

undergraduate during the symposium, but that did not stop me from having a very memorable experience with intellectual civil engineers and students alike. We were asked to present our research paper among the International students in the morning. The sessions were very informative and it gave us different ideas as to how students from different countries tackle problems in their research. I felt very privileged to have been given this once in a lifetime opportunity. After the morning presentations, we had our lunch at the cafeteria of Okayama University wherein they served good Japanese food



At Okayama University



Young Engineers Workshop

too. It was a very complete university experience. In the afternoon, we were asked to join the workshop for young civil engineers with the theme of “Why did you come to Japan”, which tackled the issues faced by International students studying civil engineering in Japan. This was a more hands on experience as we were able to interact with the students themselves in an activity wherein we

discussed about what Japan could improve on to increase the number of international civil engineering students studying in their universities. To end the day, we were invited to join the JSCE’s reception at Okayama Castle. It was very interactive as both the students and the professionals were enthusiastic to discuss different topics amongst their peers over food and drinks. We were also allowed to go to the museum part of the castle where we experienced wearing a Samurai armor and hold a sword for picture taking.



Wearing the Samurai Armor

VII. Seto Ohashi Commemorative Park



The day after the 17th international summer symposium, we went to the Seto-Ohashi Bridges connecting Honshu and Shikoku. The 6 long span bridges crossed the 9.4 kilometer strait in between. The bridges do not only have highways but also railway lines beneath the highway. We were even told that the bridge was originally designed to have one more line for high-speed trains, however it was not in place yet during the time we went there. Our group



Ramp beside railway

was privileged enough to go up and walk along the ramp beside the railway to see the bridges' structure up-close. I could not believe when they said that the bridges were already almost 30 years old, because the members or parts of the structure still looked new. This was not all, we were even allowed to go even to the top of the tower of the suspension bridge. This, I may say was an experience better than the Tokyo Skytree itself. We could see Honshu on one side and Shikoku on the other. I realized that it is never impossible to

connect islands that are separated by long distances, which made me think that these type of bridges could be very useful in my archipelagic country. This could create better connection between different sub cultures of the Filipino people from different islands. At the top of the tower, it is hard not to think about how small you are compared to the wonders that you can create as an engineer. It was truly life changing.



Group Photo at the top of the Tower

VIII. Mizushima Tamashima Area Road Construction

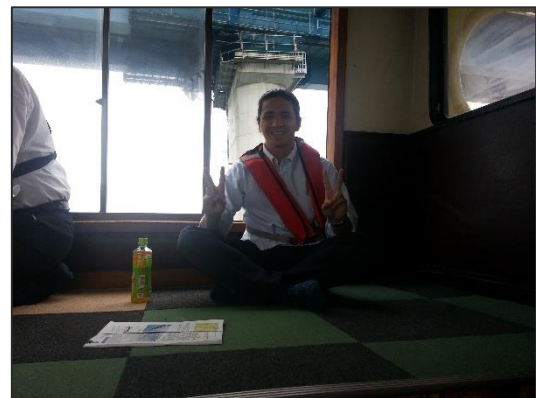
Before going back to Tokyo by Shinkansen, we went to one more construction site: The Mizushima Tamashima Area Road Construction. This time, we had to ride a boat to go to the bridge construction site. We had short lectures inside the boat as well. Again, this bridge was made out of the need to lessen the burden of heavy traffic on the other bridge near it. The area around the bridge was mostly industrial and there was a very busy port on the other side that was a very strategic location for the



The Bridge Superstructure work

industrial plants. However, the trucks that carry the products to the port share the same bridge as those who travel regularly, which makes it very dangerous for pedestrians who regularly use the bridge and for those who use bicycles as their mode of transportation. The methods that were looked very effective however it was

surely difficult as they emphasized that they also had to consider the tide in order to properly install the girders to the columns. They assembled the girders on land then transported them to the bridge using a barge then used cranes and jacks to install them to their corresponding piers.



On the Boat

IX. Sight Seeing

Aside from the construction site/company visits, we were also given a tour through the Tokyo Metropolis riding the Hato Bus. We went to Tokyo Tower, Asakusa and passed by the Emperor's House.





We then had lunch at a hotel to part ways with Mr. Wada and the others. Aside from the sightseeing that was included in the program, I made sure that the extra free time was not put to waste, so I went out as much as I could. I used the free time to go to places like Shibuya, Tokyo Skytree, Akihabara and Odaiba. The transportation system in Japan looks very complicated at first but once you start getting used to it, it is very convenient.

X. Reflection and Letter of Gratitude

The JSCE Study Tour Grant was truly a once in a lifetime opportunity. I was able to visit construction sites and marvelous structures that I am sure I can't go to if not for this program. Being selected gave me the chance to experience things that I have never imagined in my field and be inspired by their greatness. One notable learning I had during this trip was the importance of real-life models to Japanese civil engineering, or civil engineering itself for that matter. I was actually surprised when they still had large scale models where in fact they can obtain what they want to know using numerical simulations in computer programs. They emphasized the need to actually "see" what would happen using the models in order to fully understand a certain phenomenon, construction method, renovation that they are going to do. Another thing that I noticed in Japanese civil engineering, or most Japanese people, is their discipline and dedication in their work. These values were evident in all the construction sites that we visited. They were so strict about their schedule and at the same time they were very sure they would finish in time. Time was not the only thing that was important to them, but also the quality of work. They strive for perfection down to the last detail. Now, I can really see why they are the best at what they do. Thinking about this, I realized how much room I still have for improvement. I knew there was something more that I could learn after seeing all what I have seen during my stay in Japan. The same goes for other civil engineers in my country as well. We have to crave for more. There are unlimited things that we can possibly do to improve civil engineering and make the world a better place, this I have proven during the study tour grant.

To sum it all up, I would like to extend my deepest gratitude to JSCE and its members who gave me this life-changing opportunity. I guarantee that my life will never be the same after this trip. The opportunities to study/work in Japan presented during the trip were more than I could ever ask for and rest assured, I will not put them to waste. I would also like to thank the Philippine Institute of Civil Engineers for giving me the chance to make you proud. I will forever be grateful. Lastly, I would like to thank my family, friends and everyone who supported to make this trip an incredible and fruitful experience. I shall share whatever knowledge I have obtained, and the experience I had to other people or civil engineering students in order to show them the limitless possibilities in this field, also to make them aspire for bigger things and not just settle for what is in front of them and ultimately, to make them understand the undeniable truth: that we, civil engineers hold in our hands, the power to build tomorrow, and to make it a better place especially for the generations to come.

どうも有り難うございました。