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I am so grateful for JSCE (Japan Society of Civil Engineers) for giving me this great opportunity to visit Japan and study from Japanese and world's latest technologies and projects. I was a recipient of STG 2010 (Study Tour Grant 2010) which is held by JSCE. It was a wonderful experience for me. Thank you so much for this thrilling tour.

I came to Japan on 13th of September, 2010. Mr. Yanagawa Hiroyuki welcomed me on the airport. Mr. Yanagawa Hiroyuki accompanied us during our trip and helped us so much. Also Mr. Sato Yoshiaki, Mr. Yukio Miyagawa and Mr. Takayuki Ayabe guided us during our trip and they helped us for comfortable stay in Japan. I was surprised that although Tokyo is such a big city, it was organized so well-ordered. Also transportation system really caught my attention.

## Briefing at JSCE Head Quarters

Mr. Yanagawa Hiroyuki of International Affairs Section, JSCE and Mr. Sato Yoshiaki of General Affairs Division, PWRI accompanied us to JSCE Headquarters. Then Mr. Yanagawa Hiroyuki explained us about STG 2010 and JSCE briefly. There were totally 4 recipients, participating STG 2010, including Indonesia, North Korea, Mongolia and Turkey. JSCE was established in 1914 and it has approximately 35,000 members. 5000 of them is student members. JSCE has agreement of cooperation with many other foreign civil engineering institutions including MACE (Mongolian Association of Civil Engineers).

Purpose of Study Tour Grant (STG) is inviting other countries' engineers and introducing them about the Japanese latest technologies of Civil Engineering. Afterwards, we met Mr. Furuki Moriyasu, Executive Director of JSCE. He talked to us so nicely and wished us a delightful stay in Japan.

## Public Work Research Institute

Mr. Sato Yoshiaki of General Affairs Division, PWRI guided us to Public Work Research Institute (PWRI) in Tsukuba. PWRI was a very big research institute. First, we were introduced about PWRI by DVD introduction. It was about the organization of PWRI and activities of PWRI. It has four research centers: The Tsukuba Central Research Institute, The Civil Engineering Research Institute for Cold Region, International Centre for Water Hazard and Risk Management (ICHARM) and Center for Advanced Engineering Structural Assessment and Research (CAESAR). Then we visited Geotechnical Dynamic Centrifuge laboratory. It is one of the biggest

Dynamic Centrifuge in Japan and in the world. To calculate and design the difficult activities of the ground, structure and foundations, it is essential to make a research on Geotechnical Centrifuge. We watched the videos of typical Centrifuge tests such as embankment failure caused by liquefaction of subsoil, seismic behavior of underground structure during earthquake and etc. Then we did High speed driving test on Test Track. When driving 120 kilometers per hour on the 27 degrees slanted track, the driver of our car turned the circle without spinning the steering wheel.

Also we saw the pavement test field. Newly developed pavement materials were showed. Porous pavement which is very effectual during rainfall, concrete pavement decreasing the sound of environment and cars and also accelerating pavement materials having very high resistance to hot temperature were very interesting. Then we saw the loaded vehicle which has automatic remote. We observed the loaded vehicle experiments which examine newly developed materials in the field. Later we went to Dam Hydraulics Laboratory. It was a big laboratory contained many dam models and we were explained about the dams in Japan and models in the laboratory. This laboratory is essential to dam constructions and its repair. Next, we saw Wheel Running Machine. Because of extra loaded vehicles, concrete decks of bridges are easily damaged. We observed the failure of concrete decks under pressure. Finally, best student of 2010 in master's course gave us a presentation about his master's thesis. And I got an understanding about IFAS (Integrated Flood Analysis System). I'm really grateful for all PWRI researchers who explained us about these exciting experiments. All the experiment laboratories and fields needed in constructions were contained in PWRI9. I have never visited such a big research institute before and it was a wonderful experience for me.

## Kajima Technical Research Institute

Mr. Sato Yoshiaki of General Affairs Division, PWRI guided us to Kajima Technical Research Institute. Mr. Tsuyoshi Ikeya, General Manager KaTRI, Mr. Yoshihiro Hishiki, Professional Engineer of KaTRI, Mr. Sivaleepunth Chunyakom, Research Engineer of KaTRI welcomed us warmly and explained us about Kajima Technical Research Institute (KaTRI). Kajima Corporation was founded in 1840 and it is one of the five biggest construction corporations in Japan. KaTRI is one of the most important research and development institutes of Kajima Corporation.

We visited Tobitakyu Research Institute and Nishichofu Complex. First, we visited Hydraulic Laboratory. In order to build bridges and underwater constructions, it is useful to test the structures in strong waves. This laboratory is used to make experiments on ocean and coastal constructions and make various sizes (using large size wave flume and middle size wave flume) and multi directional waves. Then we saw wind tunnel tests. Actually it was under testing, so the researcher of wind engineering explained us its activity. Beside earthquakes and ocean problems, it is

really important to calculate the wind influence on high and large scale buildings. Also it studies wind effects around constructions and its results. Then we visited Structural testing laboratory. Since earthquake happens a lot in Japan, structures must be tested in strong seismic forces. In structural testing laboratory large structures, high buildings and their foundations, extraordinary constructions and etc are tested in seismic forces, static and dynamic loadings. Also newly developed construction materials are tested in here.

Also we visited new laboratory (office) of KaTRI. It was not fully completed but most parts were finished. This new laboratory building is being built to be very friendly to nature. First of all, there won't need any lights during days because it has so big windows and they are aimed at to lighten inside of the buildings. Also this building will use solar energy system to provide all the electricity. The most interesting thing was heating and cooling system of the building. It will use underground water to keep the temperature of the room constantly. In basement floor there will be underground water kept in constant temperature and in summer it will flow through the pipe and cool the room air. In winter, the constant water flow will warm up the room. Also there were gardens on the roof to reduce heat island effect. This new technology attracted me so much.

## Tokyo Port Seaside Bridge

Mr. Sato Yoshiyaki guided us to Tokyo Port Bridge. The workers of Tokyo Port Seaside Bridge greeted us so nicely. We sailed from Ariake passenger terminal through ocean to Exhibition room of Tokyo Port Seaside Bridge. Tokyo Port Bridge is steel truss bridge which is 2933 meters long and 87.7 meters high above water level. Choosing shape of this bridge was interesting. Haneda airport is near and it must have a passage under the bridge for ships so they chose this shape. We saw small models of Tokyo Port Seaside Bridge and the foundation structure of the bridge was amazing. There were also shape models and tables showing properties of materials used to build the bridge.

Then we went to construction site of Tokyo Port Bridge. It was so big and beautiful. A part of the bridge was going to be assembled the following day so that part was prepared on the construction site. Cranes, machineries and equipments used to construct the bridge was really developed and advanced. It was great. Wind power system is used to provide electricity. It is planned to finish in 2011. Sailing by ship from one place to other was very exciting. Especially when getting near to the bridge, I could see how large the Tokyo Port Bridge was. Underwater foundation system was amazing. The middle part was not assembled yet. This bridge has four lanes for vehicles and also sidewalks and elevators are provided. Using latest technologies and high quality steel, the bridge is building to be strong and relatively less cost. Worker

of Tokyo Port Bridge explained us about earthquake resistance of the bridge. It was an amazing experience for me since my country doesn't have huge bridges like this.

## Arakawa Museum of Aqua

Mr. Yukio Miyagawa guided us to Arakawa Museum of Aqua. This museum is dedicated to the river Arakawa. Arakawa is one of the biggest rivers in Tokyo and there was all information about Arakawa river in this museum like animals and birds which live near Arakawa river and fish living in the Arakawa river. Even information about the insects and butterflies were available. Whole history of this river was explained by pictures and models in this museum. You can see the map of the positions of the Arakawa river. There are many dams and embankments in the river Arakawa. In its history Arakawa river has many floods and disasters.

You can see the life history of Mr. Akira Aoyama, the only Japanese architect who took part in the construction of the Panama Canal. Mr. Akira Aoyama was the President of JSCE in the past. He constructed the Red Sluice Gate. Also the Arakawa river is one of the sources of the drinking water of Tokyo. Then we went to see the Arakawa river and its facilities. It was so big river. Also we saw the Red Sluice Gate in reality.

## Hibiya Common Utility Duct Construction

We have visited Hibiya Public Utility Conduit on 16$^{th}$ of September, 2010 with Mr. Yanagawa Hiroyuki and Mr. Yukio Miyagawa. Employees of Hibiya Public Utility Duct welcomed us so warmly and explained us about the common utility ducts. Before going to Hibiya Common Utility Duct construction, I have no idea about the common utility ducts. It was a great experience for me. Before using the common utility ducts all the utility lines such as telecommunication, electronics, gas, water and wastewater lines were installed separately under the roadways and streets. Using common utility ducts we can consolidate all the utility lines together in one secure common utility duct.

We saw over the biggest common utility duct by diameter in Hibiya Public Utility Conduit. It was so big. Diameter is 6.7m. It takes 10 years to construct this and according to schedule it is planned to finish in 2012. After seeing the models and pictures we went down almost 60 m below ground by vertical shafts. And there was the common utility duct which is constructing. Wastewater and water lines have been already consolidated. It was a huge duct that I could walk freely inside it.

There are many good results for using the common utility ducts. First of all, we can protect the utility lines from damage during the earthquakes or other disasters. Also it is easy for maintenance of the lines. Because there is enough space in the duct

for workers, they can walk and repair the utility lines inside it. There are additional spaces for the future utility lines. In order to repair the utility lines we dig the roads and sidewalks repeatedly and due to roadway excavation some roadways closed. It results increasing of traffic jam. Thanks to common utility ducts it doesn't have to dig the ground for maintenance. And it is possible to decrease the traffic congestion.

## Waseda university

We visited Waseda University with Mr. Takayuki Ayabe. Since I am a student too, I was really interested in Japanese universities. On Waseda University, Professor Tomoya Shibayama greeted us so nicely. Mr. Tomoya Shibayama is the professor of Civil engineering and environmental engineering faculty of Science and Engineering. Professor Tomoya Shibayama explained us about Waseda University and especially about Department of Civil Engineering and Environmental Engineering. Waseda University was founded in 1882. Waseda University is the $4^{th}$ biggest university of Japan. So I feel so honored to visit Waseda University. Department of Civil Engineering and Environmental Engineering belongs to School of Creative Science and Technology. International students are open to study at Waseda University in English language. And also Waseda university is really good at sport events.

Department of Civil Engineering and Environmental engineering does many researches on the places where natural disasters have occurred. Professor Tomoya Shibayama worked on many field surveys of natural disasters like Chilean Tsunami, Samao Tsunami, Java Tsunami and Hurricane Katrina. Researching Storm surge, High Wave attack and Tsunami are really necessary to safety of people and also it is possible that we can prevent from it in the future. Under professor Tomoya Shibayama's direction students study at master's and doctor's degree at Coastal and ocean engineering, sociology of construction.

Then students who are studying at master's degree at Coastal and ocean engineering, sociology of construction faculty guided us around the campus of Waseda University. I am so grateful for them for guiding us around Waseda University. First we visited to the research and technology laboratory. In here students do researches according to their specialization. After that we went to main campus of Waseda university by bus. It was so big and beautiful. I really liked the building designs and organizations of the campus. It was planned so systematic. The Tsuboichi memorial theatre museum is Japan's only museum dedicated to theatre and it was established on October, 1928. Central Library of Waseda is one of the largest in Japan and it has over 2.4 million items. We did tour in the central library and it is really huge library.

# The 12th International Summer Symposium

It was a great honor for me to attend the 12th International Summer Symposium which was held at Nihon University. Young engineers and researchers give presentations and exchange their recent activities during International Summer Symposium. Presentations were divided into 8 divisions. Prof. Shigeru Morichi gave the keynote lecture “Development of Infrastructures and National Growth in Asia – Current Situation and Future perspective in Vietnam”. I was happy to give a short presentation about my trip in STG 2010 at this symposium.

It was my first time in Japan and when I first come to Japan, I was thrilled by the huge bridge and road constructions and underground constructions.

Thank you so much for JSCE for giving me this chance to visit Japan and experience these amazing visits. It was a huge effect on my perspective of my Civil Engineering profession and I think it will help me so much for developing my country in the future.