

## STUDY TOUR GRANT – TOUR REPORT

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On September 1<sup>st</sup>, my first arrival was to the Incheon Airport. Then, I arrived at Narita Airport at the evening hours and under Ms. Nonoka's guidance I reached the hotel.

On Monday morning, September 2<sup>nd</sup>, after we had met with the other participants and dear Ms. Suzuki at the reception, we left the hotel for KAJIMA Technical Research Institute. We also met with dear Mr. Yamamura. After the kind greeting in the institute, we took the plan that helps to perceive the layout of the laboratories. This place was truly upgraded in case of experimental topics. We watched a video explanations about the works performed by the institute. The robotic construction tools and the studies about eco-concrete engaged my attention for instance. There were also other topics that I interested in such as superconducting magnet, ground freezing method and firefly biotube. Corporate's responsible people guide us to the appropriate laboratories to visit. We visited the Shaking Table Laboratory in first place, which I have genuinely interest about shaking tables. In this laboratory, the bigger shaking table has a size of 5 m x 7 m and able to reproduce large amplitude earthquakes observed in Japan and the smaller one has size of 2 m x 2 m. We were able to learn information about the capacity of the shaking tables and informed about the structures where the shaking tables were used.

After seeing the Shaking Table Laboratory, we went to see the building with base isolator. Around Japan, there are more than five thousand structures that have base isolator. In this building, the isolator provides 56 percent isolation. According to the given information, a laminated rubber which is one of the main parts of the isolator could be in two different shape. The thicker laminated rubbers are used for both earthquake and traffic vibration and the thinner laminated rubbers are used for only earthquake effects.

We were also able to visit the Wind Tunnel Laboratory. Because of the significance of being careful of dust, the shoes should be taken off before entering the laboratory. The path length of the large boundary layer wind tunnel was 121.9 m and the wind direction was clockwise. The size of the testing area was 4.5 m wide, 2.5 m height and 27.7 m length. This means only models with a radius of 4 m can be tested and as we learnt, this is the biggest size among the Japanese companies in this case. In the laboratory, we were able to see a big model that is completed before. That model has been very costly and in the meantime very beneficial. While preparing the model, they model the structure that will be tested and its surroundings. After experiencing a couple of laboratories, we have visited a section where we can read the explanations about some newly manufactured technological construction products and observe a samples of them, which are SUQCEM, NV Concrete, ECC, EIEN etc.

After having lunch at the institute, we left there for visiting the tunnel construction site of Tokyo International Airport (Haneda Airport). We met with our Chinese participants who are interns at JSCE. In case of the upcoming international multi-sport event 2020 Olympics that is scheduled to take place in Tokyo, they are planning to develop this international airport, because they will welcome so many guests. The tunnel under constructions connects the domestic terminal to the international terminal. They will be able to reduce the transportation duration between these two regions thanks to this tunnel. TBM is used as tunneling method. In the construction site, we watched a 3D movie about the plan and parts of the tunnel, which makes the method more understandable. The perimeter of the tunnel consists of nine concrete parts. These parts are produced outside and are moved one by one to allow the tunnel to proceed in segments. When a segment is completed, TBM is moved one step further. We walked into the tunnel for 2.4 km in total and were able to see the TBM, which is my first time seeing this machine. There are 64 jacks used for the TBM as I remembered. We also observed the other equipment and had an opportunity to see how Japanese employees are working regularly and safely at the construction site.

Besides, they use artificial intelligence. In the site, responsible engineers helped us a lot about the explanation of the project and making easier to understand the applications. The design of the construction started five years ago and it began three years ago and is scheduled to complete in May, 2020. After this visit, we went for a flight from Haneda Airport to Kagawa Prefecture. In Picture 1.1, an image is seen from the construction site.



**Picture 1.1.** Image from the construction site of tunnel construction of the Haneda Airport

On September 3<sup>rd</sup>, we left the hotel for the Kagawa University in order to participate in the 21<sup>st</sup> International Summer Symposium. According to the planned schedule, every participant attended to the proper classes to the presentation. With this symposium, we had the chance to listen to the studies of people from various countries. This international meeting also gave me a chance for expressing myself in such a different society. Meeting people from various places is so significant especially when we are in the same working area. We could find a lot to share about. After the lunch, we left the Kagawa University to go to the Teshima Island, which we had to go by a boat from the Takamatsu Port to the Ieura Port. After 35 minutes travel with boat, we went by bus to see the Illegal Dumping Site of the Industrial Waste. According to the explanation of the guide, the situation of the uncontrolled dumping had reached a very serious level since the illegal collection of the dumping has started on this small island in the past and there has been no work done to prevent it for many years. Islanders had wanted to solve this problem. They brought this to trial and the court ended in favours of them in 1996. Because, the illegal dumping has caused contaminated air and earth. A waste-disposal facility built in the area and with long-term working, they cleaned the area from wastes. One way of the recycling the dumping was melting them down and transformed into a slag that could be usable in concrete. In this area, we also saw the factory established to cleanse groundwater contaminated by the illegal dumping. Then, we went a museum built in memory of the islanders struggling with enforcements in the process of getting rid of the waste in the region. We listened to the difficulties of the people at those times, the lives of the people who passed away without being able to see the island being cleansed. There was also a huge model expressing how the soil was in the presence of that much dumping. After returning back to the Takamatsu Port, we went to the Kagawa University to participate the IAC Networking Reception, which allowed us to communicate the professors from the universities in Japan, JSCE members and also to form a network. A wonderful view can be seen in Picture 1.2 near the Ieura Port in the Teshima Island.



**Picture 1.2.** A scenery from the Teshima Island

On September 4<sup>th</sup>, we left the hotel for Michioeki-Shionoe to get on the Technical Tour Bus. First of all, we visited the Kabagawa Dam Construction Site. There were very steep mountains around the construction site; therefore, excessive rainfall could cause overflow in the river in that region. We found out that one of the objectives of Kabagawa Dam is to prevent the floods. We also examined the map of the Takamatsu and learnt that there were many small dams built to bring water to arid areas. Kabagawa Dam will be very beneficial for the water supply around its region. Picture 1.3. shows a view of the Kabagawa Dam construction site.



**Picture 1.3.** Kabagawa Dam construction site

We left the construction site for The Sanuki Mannou Park. After our arrival, we learnt the history of that captivating park by the guide and walked around enjoying the view of the colorful flowers. We also visited an old Japanese house while walking around the park. We went to the traditional Udon Restaurant for lunch before heading to the Hiroshima rotation. When we reached The Kurushima Kaikyo Bridge on the way to the Hiroshima which took four hours, we stopped for sightseeing and shopping. We had the chance for the enchanting landscape of the bridge that connects small islands. The view of the bridge

was literally magnificent for me. Picture 1.4. displays a photograph taken at the flower path of The Sanuki Mannou Park.



**Picture 1.4.** An image from The Sanuki Mannou Park

In Picture 1.5., there is one of my best photographs of The Kurushima Kaikyo Bridge.



**Picture 1.5.** A view of The Kurushima Kaikyo Bridge

On September 5<sup>th</sup>, we visited a damaged areas in Kure is caused by the heavy rain (430 mm in total) started on the night of the July 6, 2018. One of the effects of the Typhoon No. 7 was that heavy rain. There were a lot of deaths and damaged houses due to the sediment-related disasters in Hiroshima-ken. Debris flow and a large amount of earth flowed in the city gave rise to a lot more damage. We visited

the Junior High School, which a large amount of earth and sand flowed into the school through the steep mountain nearby. There is also risk of the falling rocks. After the disaster, they made three emergency treatment, which are waterway construction, rockfall buffer measures and rockfall prevention measures. Besides, there are planned dam in that region (Sabo Dam). Then, we visited the damaged areas on National Highway 31, which completing the repair of the railway and highway lasted approximately two months while the detour road is secured in the parking lot on July 11<sup>th</sup>, 2018. From these roads, large amount of earth and sand was removed. We went to meet the construction head of the Saka town for learning more about the emergency temporal housing. After the disaster, there were too many damaged houses. Temporary houses were built in one month and habitable for two years. They built those houses with simple interior design by completing a lot insulation work considering a hot days.

After lunch, we visited The Hiroshima Peace Memorial Park and also saw the Hiroshima Dome on our way. I have seen many documentaries about the atomic bomb disaster in this region before. But the experience of visiting the museum gave rise to find out more about the struggles of those people during and after the bombing. The personal belongings of the victims are displayed, which shows the horrible strength of the damage. Exhibition shows what the nuclear weapons and its effects are. The recovery of the regions both Hiroshima and Nagasaki was observable due to the models placed in the museum. While the number of the dead people was too high, the impacts on human beings continued to live were also magnificent. Their effort to rise again was incredible. I wish we had more time to read all the writings on the walls. Picture 1.6. shows an image from The Hiroshima Peace Memorial Park.



**Picture 1.6.** Hiroshima Peace Memorial Park

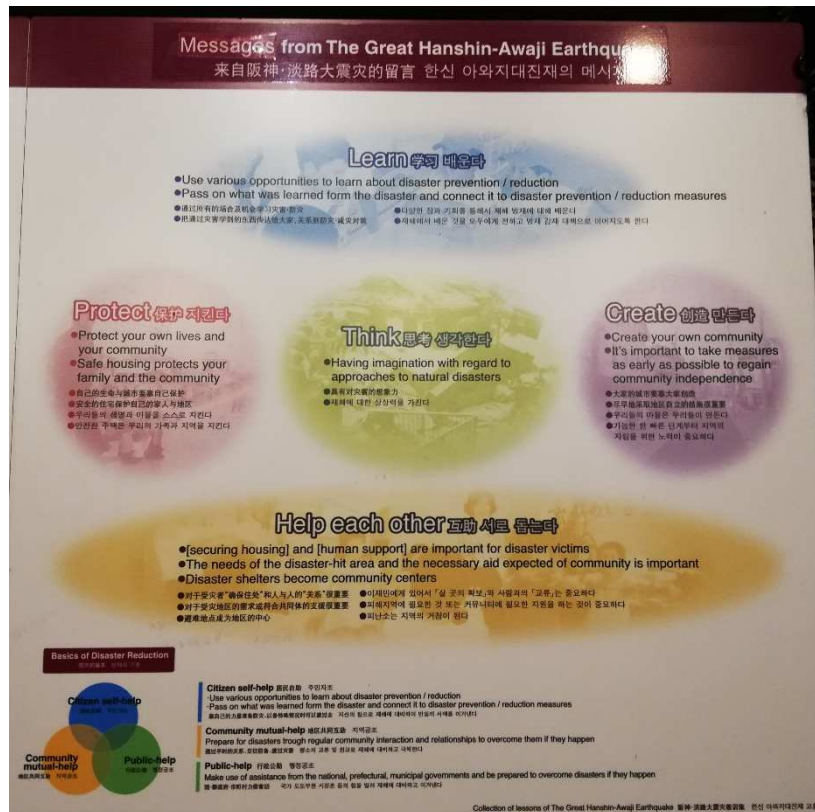
Our next direction was to the disaster affected area on Misasa River. After the heavy rain, they made a temporary levee urgently by embankment and block mat setting work to the part where earth flowed due to the flood. The permanent construction began on January 26 (when the flood season ended), which is concrete block as a revetment. As a final destination, we went to the Torigoe Bridge where fell owing to the increase in river water during the heavy rain. Furthermore, the water pipes connected to the bridge is dragged at that time by the river water. Then, a lot of water cut happened around the bridge. They constructed a new and temporary water pipeline within three days, a smaller diameter than the previous damaged one, but a longer one. Besides, they are planning to rebuild the damaged bridge and also the pipes as the way they were before the disaster, which this might takes around two years. Within this period, they will use the tentative pipes. We were able to see a part of this temporary pipeline and the damaged bridge at the construction site. Since the water cut could be a serious problem for the citizens of that region, it was very successful to resolve the situation in such a short time. After that, we left the site for getting on to the Shinkansen to Kobe. It took an hour and half to arrive. Having a dinner together

with all participants, Ms. Suzuki and Mr. Arai as a souvenir of our tour, was genuinely excellent for me. In Picture 1.7., there is a photograph of the Shinkansen that we used.



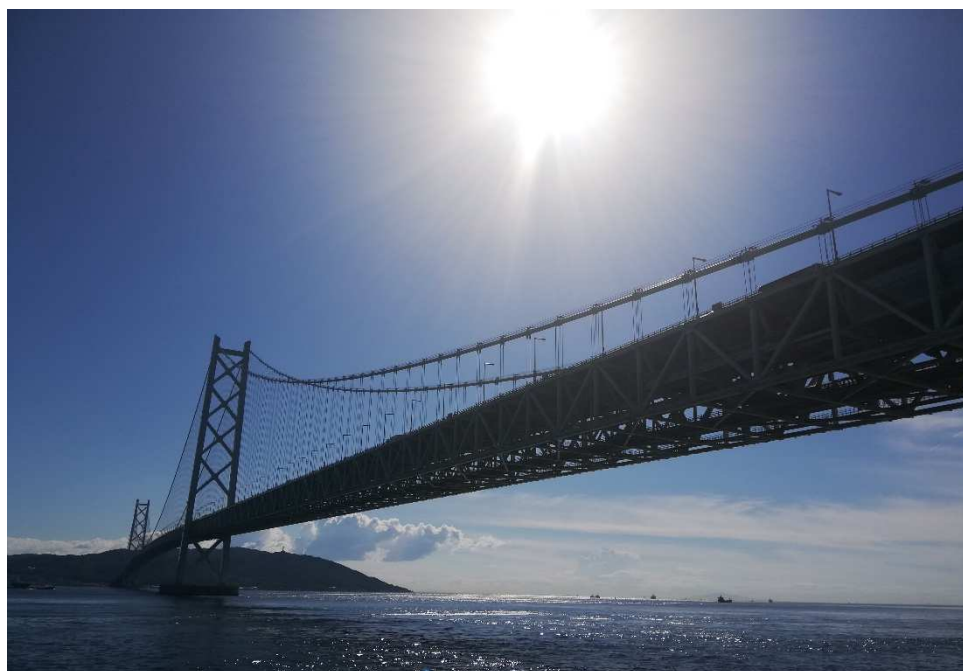
**Picture 1.7.** Shinkansen from Hisroshima to Kobe

On September 6<sup>th</sup>, first place that we visited was Disaster Reduction and Human Renovation Institution (DRI) in Kobe. The institute where activities that can be done to raise awareness of the people about disasters are organized in such a systematical, impressive and easily understandable for every person. This is truly significant, because the consciousness of the society in disaster times may be one of the most crucial things in case of quick recovery. Maybe we are able to prevent some part of the happening (as a disaster) but not all of them of course. In this case, educating people about the acts that they are capable of is a necessity, which I saw this initiative at this institution. Our 84-year-old guide in the institution was very helpful in explaining the work with his good command of English and high energy. We found out that the DRI was opened on 2002 in Hyogo Prefecture by the central government in Japan and operated by The Hyogo Earthquake Memorial 21<sup>st</sup> Century Research Institute. The aim is preparing a resilient society, teach them the importance of disaster management, prevention, resilience and risk reduction by inheriting the experiences of The Great Hanshin-Awaji Earthquake in 1995 and other disasters in Japan and abroad. Looking at the total number of injured and dead people, they could not predict this great earthquake in 1995, since there has never been such a devastating earthquake after 1923. The other earthquake that suffered the most losses occurred in 2011. The number of people who dies, injured and lost with the collapsed structures was very high. Although rebuilding can be done, it was a more difficult process for people to recover. They also noticed the importance of the furniture regulation in houses and of the local community in disaster times. The 80% of people are helped by the local community at those times. A communication between local community and downtown could weaken due to the modernization. In order to prevent this, they strengthened their work on this issue for maintaining the unity. We listened the story of the 1995 earthquake and we learnt the functions of the DRI. The idea of the Disaster Reduction Alliance (DRA) and internationally promotion of disaster reduction awareness by their annual forums are outstanding. “Re-experience the Earthquake” parts of the museum also make the story of the happenings more understandable and effective. Then, we watched 3D documentary movie about the Great Tsunami on March, 2011, which reveals personal stories of the survivors. After such a devastating disaster like 2011 Tsunami, they continued and strengthened their mission, which is educating the future generations. Picture 1.8. shows a signboard indicating “the messages from The Great Hanshin-Awaji Earthquake”, which places in the DRI.



Picture 1.8. A signboard in the DRI

As a final destination, we went to The Akashi Kaikyo Bridge, which was one of the structures I wanted to see the most. I have read and watched a lot about the construction of that bridge. The successful completion of the project is related with the professionalism of the engineering in this country although the earthquake in 1995 coincided with the construction. In Picture 1.9., there is a photograph of The Akashi Kaikyo Bridge.



Picture 1.9. The Akashi Kaikyo Bridge

I always want to learn more about Japanese culture. After being an engineer and noticed the Japan's remarkable level in civil engineering area, I was eager to be a part of this system, and I am still. This program, thanks to the JSCE, was an amazing experience for me as an initiative activity. Especially, after seeing the works done in case of disaster management, I am thinking to study in this topic. Because my country, Turkey, is also facing serious disasters. I respect the systematic and safe engineering applications of the Japan. STG gave me a chance to find out the system and to form a new network. It was a pleasure to be a participant of STG.

Sincerely yours,