REPORT

FOR

2018 JSCE – STUDY TOUR GRANT

Supported by The International Scientific Exchange Fund- ISEF

Mr. Ali Gürkan GENÇ

Graduate Student

Structural Engineering

Istanbul Technical University, Istanbul, TURKEY

1. PREFACE

About JSCE (Japan Society Of Civil Engineers)

Japan Society of Civil Engineers (founded in 1914) is a civil engineering professional organization, its initial 443 members and now it is represented approximately 39,000 members at present. The Society has over 300 committees and 9 International Sections.

With the arrival of the 21st century, JSCE reiterates its objectives for the future:

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.

In addition, JSCE will implement such new indispensable programs as Civil Engineers' Qualification System, Continuing Professional Development, etc.

About Study Tour Grant Program (STG 2018)

Study Tour Grant Program, which is a special program for young civil engineers to witness Japanese civil engineering technology and projects, has been supported by the International Scientific Exchange Fund (ISEF). I attend to STG 2018 program that has been annually organized in Japan for nearly one week. The Program provides the young civil engineers with the opportunity to communicate other civil engineers from different countries.

Participants of STG 2018

No.	Organizaton	Name	Age	Affilication	Email &Tel	Advisor (ISEF Committee)	Presentation Title for the 20th Int'l Summer Symposium	Paper Submission	Passport	Diet Restriction
1	VFCEA	Mr. Ngoc Lan NGUYEN	27	Vietnam-Japan Research and Development Center (University of Transport and Communications), Hanoi, VIETNAM	ngoclan3101@gmail.com	Dr. Ishiwatari	Reseraching and Developing Structural Designs for the low-cost local bridges in the Northern Mountainous region in Vietnam		O	
2	MACE	Ms. Khaliunaa Darkhanbat	23	University of Seoul, Reinforced structure laboratory (fulltime student, assistant)	haliuka0423@gmail.com +82-010-2217-9521 (+976 88025521)	Dr. Takagi	Development of Ground Movement prediction program for CS-H wall, implemented Deep Excavation		O	
3	MES	Ms. Khin Phyu Phyu Thandar	28	UN-Habitat Programme Associate(Structual)	kpp89@gmail.com 09420233773	Mr. Araki	Developing Fragility Curve for Local Structure Types in Myanmar for Earthquake Risk Assessment Case Study: Sagaing City		O	
4	JSCE Turkey Section	Mr. Ali Gürkan GENÇ	25	İstanbul Technical University, Structural Engineering Graduate Program, İstanbul-Turkey	aligurkangenc@gmail.com	Mr. Ishizaka	Nurol Life Project		O	
5	PICE	ENGR. AMIE LOU G. CISNEROS	27	Program Head – Civil Engineering, College of Engineering and Technology, Cor Jesu College, Digos City	amieloucisneros@gmail.com 09212069783	Mr. Sakata	Enviromental Flow Assessment of Manolo Fortich Hydro-electric Power System		O	
6	JSCE Thailand Section	Mr. Jetsada Kumphong	28	2nd year PhD. Student, Department of Civil Engineering,Faculty of Engineering, Khon Kaen University, Thailand	Jetsada.Kumphong@gmail.com	Mr.Machida	Motorcycle Helmet Use Intention with The Theory of Planned Behavior, Transtheoretical Model and Stages of change for Behavior Change		O	
7	IEB	Mr. ANINDYA SAMYA SAHA	24	Lecturer, Department of Civil Engineering, Bangladesh University of Engineering and Techonology	anindyasaha777@gmail.com anindya_11@ce.buet.ac.bd	Mr. Suzuki	Appropriate Source of Aggregates for Future Concrete Structures in Bangladesh		O	

2. JOURNEY

Application & Preparation

In the middle of 2017, I was informed by Assoc. Prof. Dr. Beyza TAŞKIN from Istanbul Technical University and started to do research about the program. After that, I realized that this would be great opportunity for my engineering perspective and discernment. Thus, I immediately contacted with Assoc. Prof. Dr. Beyza TAŞKIN to apply to the program. I submitted my documents on 27 March 2018 and soon after that, I got the information on that from JSCE. After the official procedures, my e-tickets, hotel reservations were prepared and completed and finally I was ready to go to Japan where has very famous places and advanced technology on the civil engineering.

Day 1

(1) Arriving at Japan (26 August, 2018, Sunday)

On 26, August 2018, At the Ataturk Airport at 01:40 am, I was ready for boarding Turkish Airlines' TK 052 Flight from Istanbul to Tokyo. The flight took approximately 11 hours to arrive at the Narita Airport. I was very excited to see the Japanese culture because I've been curious since before. I arrived to the Narita Airport at 07:00pm and got in an airport limousine bus to go to Shinjuku at 07:75pm. Eventually, I met with the tour conductor Ms. Suzuki at 09:50pm and check in the hotel for 2 nights stay.

Fig.1. at the Ataturk Airport

Day 2 (27 August, 2018, Monday)

We met the members of the STG program. After getting to know each other, we left the hotel to go to KAJIMA Technical Research Institute, Nishichofu Complex by chartered bus. When arriving at the Institute, Mr. Yoshizawa and another official welcomed us and they made a speech about Study Tour Program and showed a presentation about Kajima Coop. and Research Institute.

Fig.2. in the charted bus

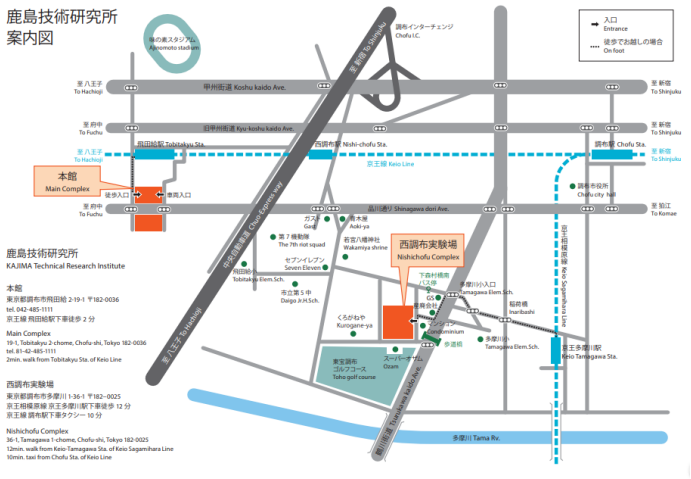


Fig.3. location of the Institute

Fig.4. at KAJIMA Research Institute

1. Kajima Research Institute – Nishichofu Complex

Kajima Research Institute consists of exhibit and laboratory, shaking table lab, concrete and wind-tunnel lab, large-size structural testing lab, soil mechanics and foundations lab, environmental engineering lab, construction and fire safety lab, equipment storage building.

1.1. Shaking Table Laboratory (High performance 3-D 6 D.O.F shaking table "W-DECKER")

This shaking table which has large range to meet various requests can produce highly-accurate earthquake ground motions with a long-period and large amplitude motion. There is a main shaking table (5m x 7m / 1975) which can bear up to 60 tons and reproduce all of recorded large amplitude earthquakes observed in Japan recently and there is also long-period shaking table (2m x 2m / 2012), placing on and interlocked with the main shaking table to reproduce the long-period motions, which can bear up to 5 tons. It can produce 500gal acceleration, 250cm/s velocity and 270cm displacement.

Fig.5. long-period shaking table

1.2. Wind-Tunnel Laboratory

The institute has one of the biggest wind-tunnel in Japan. Wind pressure, wind force and the effects of wind on surrounding environments are simulated with this wind-tunnel. A model is put on the table placed in main segmentation and wind turbine is initiated. Then, data are received from measurement tools on the model.

Fig.6. wind turbine

1.3. Soil Mechanic and Foundation and Large-Size Testing Laboratories

After the Shaking Laboratory (Large-Scale 3-D Shaking Table), we visit to the Large-size Testing Laboratory equipped with loading test systems to examine the strength and safety of structures.

2. Tokyo Outer Ring Road JCT North Ramp Project Site

We reached the Tokyo outer ring road project area around at 13:30. The Tokyo Outer Ring Road (GAIKAN) is approximate 15km radius from the center of Tokyo. The project has some objectives such as reduction of travelling time (e.g. Kanetsu-Tomei duration will be reduced from 60min to 12min), environmental improvement (due to improvement of traveling speed and reduce traffic volume, improvement of air pollution is expected), safety improvement of the community road, security of the transportation network that functions at the same time of the disaster. Open-cut sections and another section with TBM are in there and groundwater preservation system is being also implemented.

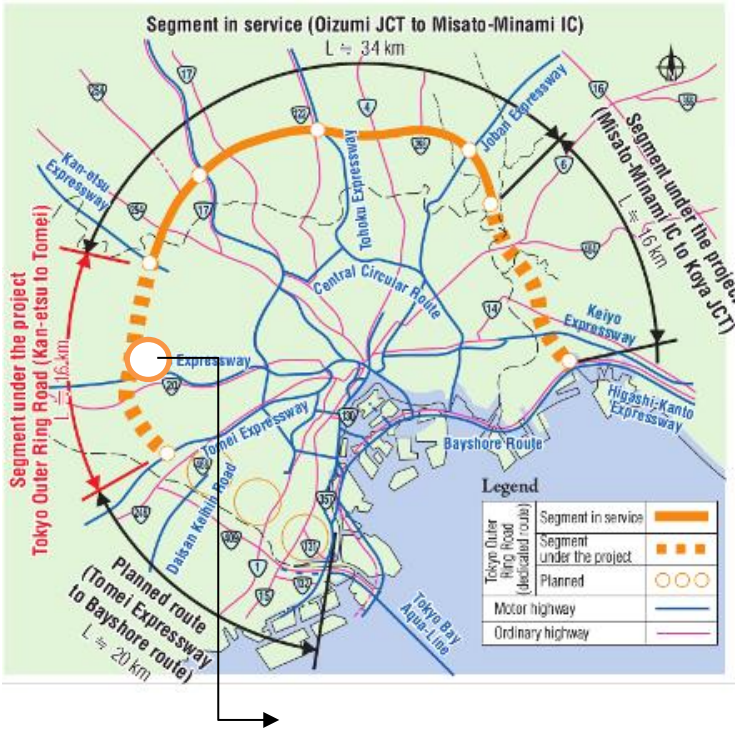


Fig.7. project site

Fig.8. before visiting the construction site

Fig.9. center of work site

Day 3 (28 August, 2018, Tuesday)

1. **Tokyo Outer Ring Road JCT North Ramp Project Site**

On the morning of the August 28, after breakfast, we got on our bus to go and see Railway Technical Research Institute at around 10am. Officials made an informative speech about the RTRI until 10:15. We started facility tour at 10:30 o'clock and visited lobby and maglev exposition, track and roadbed testing equipment, large-scale shaking table, rolling stock test plant, large-scale simulator.

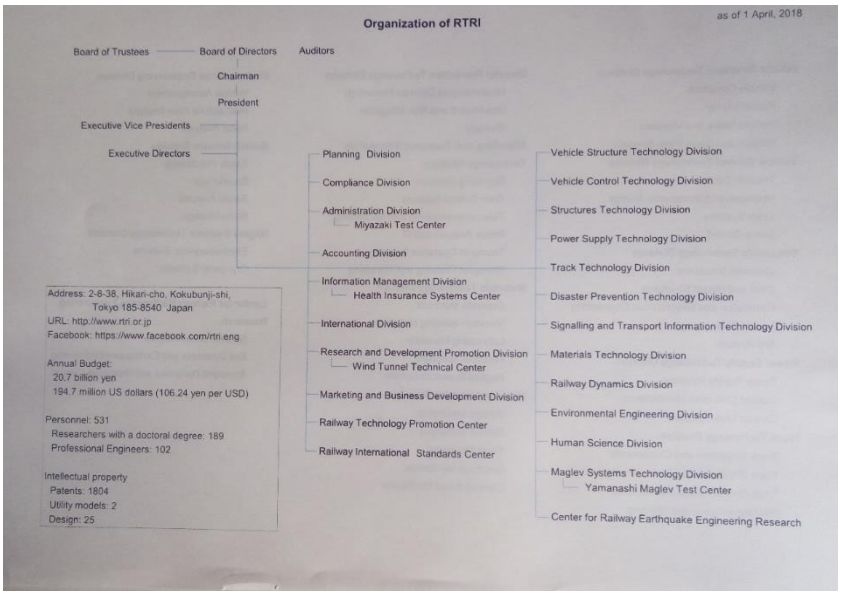


Fig.10. organization chart of RTRI

Fig.11. model of facility

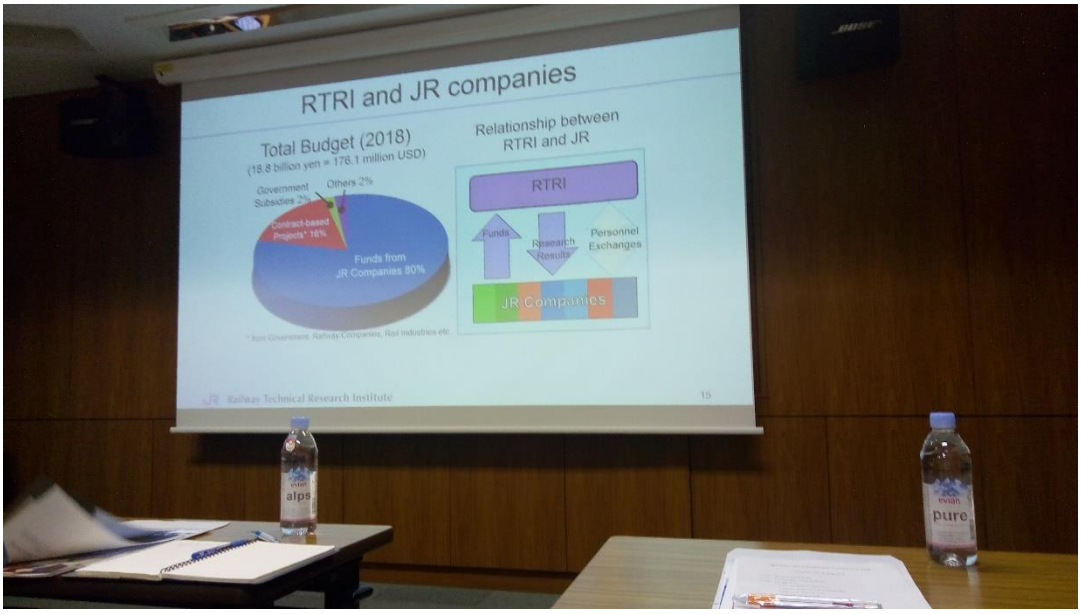


Fig.12. a slide from presentation

1.1. Track and Roadbed Testing Equipment

There is a test apparatus named as the full scale roadbed apparatus. RTRI have been using this apparatus since 1980. It can conduct the cyclic loading tests for the solution of phenomenon and the performance evaluation against the real scale roadbed and track. There are four roadbed and subgrade with different stiffness. These sand box is 7m in length, 3.5m in width and 2.5m in depth. Engineers working in RTRI generally set 5Hz in loading frequency and 10 to 60 kN in loading amplitude for he cyclic loading condition to observe the similar static characteristic.

1.2. Large-scale Shaking Table

The name of the machine is “large two-dimension shaking table test machine”. Its long side is 7m and short side is 5m. Maximum surcharge load is 50tons and direction of excitation is lateral 2 axis, the table is on the levitation device, so not move in a vertical direction. Long side, maximum displacement is 1m and acceleration is 1.0 G.

Fig.13. Tunnel-Lining-Model Testing Machine

1.3. Large-scale Rainfall Simulator

The large-scale rainfall simulator reproduces rain up to an hourly rate of 200mm under conditions similar to actual rainfall. The simulator is used to perform slope failure test and evaluate the performance of sensors in rain.

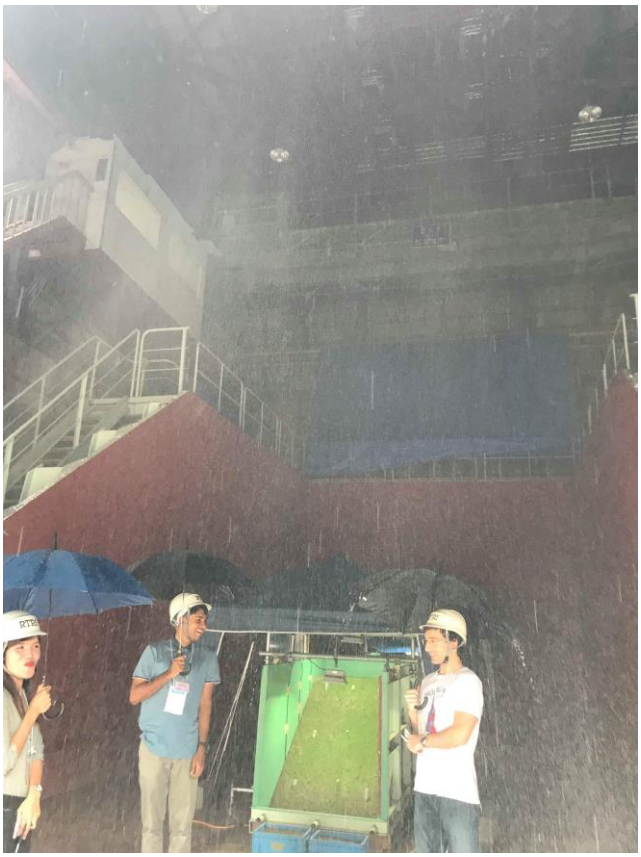


Fig.14. Large-scale Rainfall Simulator

1.4. Rolling Stock Test Plant

This test stand is capable of reproducing running conditions in the speed range up to 500 km/h, using an actual vehicle.

Max Speed: 500km/h
Max axle load: 200Kn
Gauge: 1000-1676mm
Diameter of roller: 1500mm

Fig.15. Rolling Stock Test Plant

2. Shimizu Institute of Technology

After departing from the railway technical research institute, we arrived The Shimizu Institute of Technology that was established in 1944 that was the first such institute of the construction industry. They have four main objectives such as safety against disasters, environment-friendly community, health and comfort, advanced technologies.

Fig.16. Shimizu Institute of Technology

Organization of Shimizu Institute of Tech

I don't have many photos because I wasn't allowed to take pictures of many places. But I will give some informations about places where we visited.

Fig.17. entry of Shimizu Institute of Technology

2.1. Rolling Stock Test Plant

We visited wind tunnel testing laboratory which provides some results from measurements such as:

- Wind load on large-scale structures
- Wind speed around buildings
- Snowdrifts and snow accumulation caused by snow falling around building
- Wind noise from exterior materials
- Visualization of 2-dimensional wind speed around buildings

2.2. Advanced Earthquake Engineering Laboratory

The laboratory is equipped with E-Beetle, most advanced large-scale shaking table in the construction industry, which is capable of simulating the ground motion during a major earthquake. Types of testing are blow:

- Basic research on how structures collapse
- Development of seismic isolation and vibration control system and evaluation of performance
- Evaluation of the aseismic performance of ceilings and other interior and exterior components
- Evaluation of the aseismic performance of equipment and machinery
- Experiencing the shaking caused by an earthquake and evaluating the degree of difficulty in taking action (E-Spider)

- We examined a wall with various types of concrete on it.

Fig.18. Monument wall consisting of various kinds of concrete

Day 4 (29 August, 2018, Tuesday)

At 8:15am, we were ready to go to Hokkaido University. At the end of a short trip, we arrived the Hokkaido University at 9 o'clock. I was a little excited because it was the first time for me being a speaker at an international symposium.

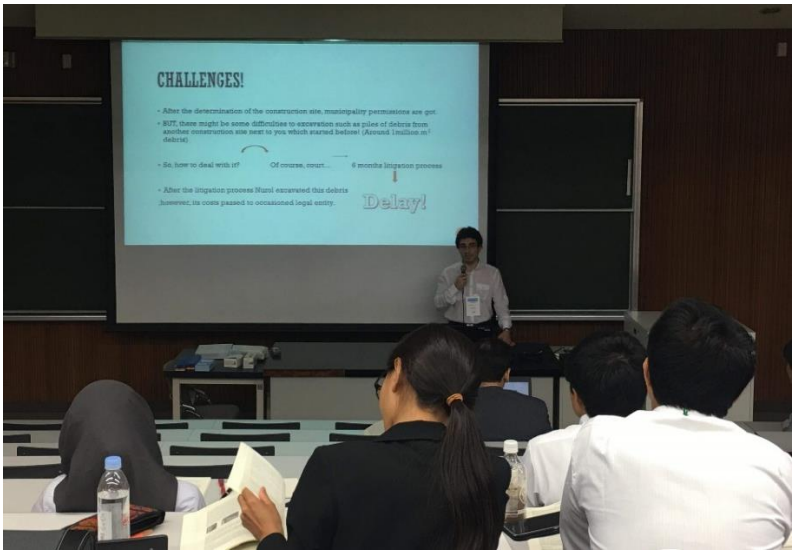


Fig.19. Monument wall consisting of various

After making my presentation about the multi-storey composite structures, we gathered with others in the group and ate lunch at the canteen of Hokkaido University.

Fig.20. Monument wall consisting of various

We left Hokkaido University at 13:15 and set off for the Ishikari River.

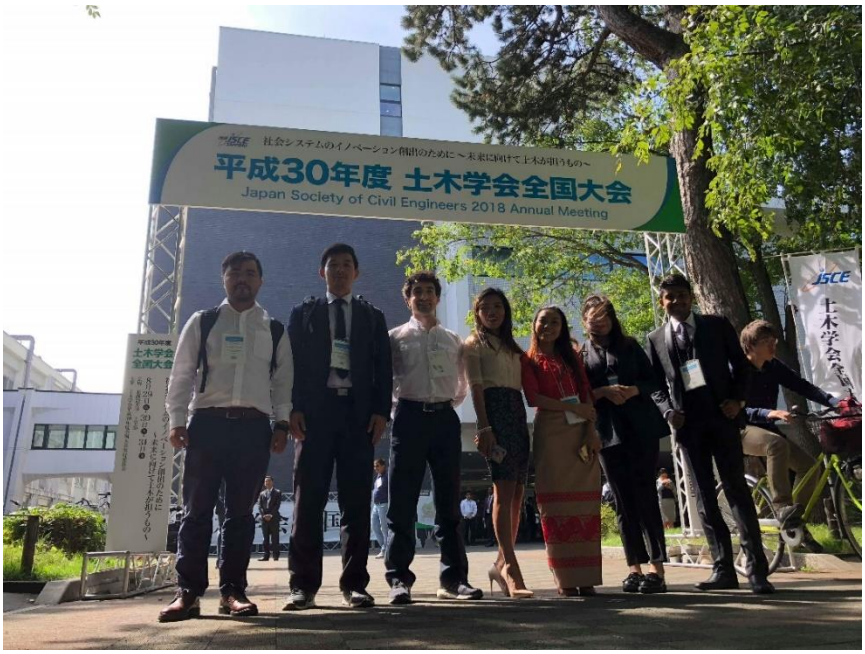
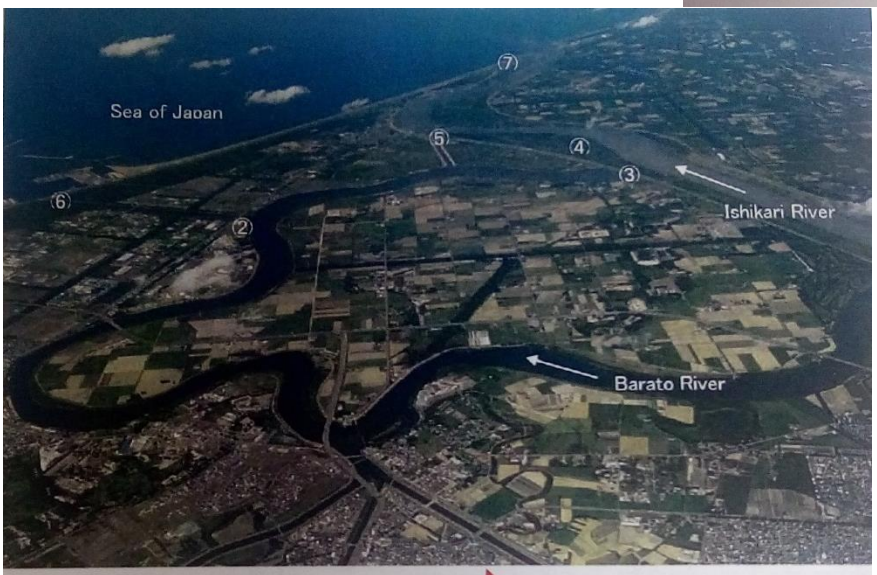


Fig.21. Monument wall consisting of various

Ishikari River Basin and Control Base

Fig.22. Ishikari River Basin

In 1918, the 364 km long river was cut and shortened by about 100 km.(cut-off channells)



② 川の博物館（River Museum）	14:40 ～15:10
③ 生振捷水路（Oyafuru Cut-off Channel）	15:20～
④ マクンベツ湿原 （Makunbetsu Marsh）	（徒歩で移動）
⑤ 運河水門 （Canal Sluice）	～16:20
⑥ 石狩放水路（Ishikari River Drain）	16:35～16:45
⑦ 石狩川河口（Ishikari River Estuary）	17:00～17:20

Fig.23. Ishikari Canal Sluice

- Hokkaido Flood Control Survey Committee was established due to the damage of flood in 1898. Dr. Bunkichi Okazaki ststematically carried out investigations and survaying from 1899. In 1910, Dr. Okazaki put forward an method called as “discharge channel method” wherevy the natural geomorphicstyles of rives are preserved as much as possible and water diverted to discharge channels only at the time of flooding because naturally created rivers are ideal.

Fig.24. Ishikari River utilization

Fig.25. Ishikari River view from Control Room

Fig.26. Ishikari River Gate face to Sea of Japan

Fig.27. Ishikari River Gate and windmills supplying energy to facility

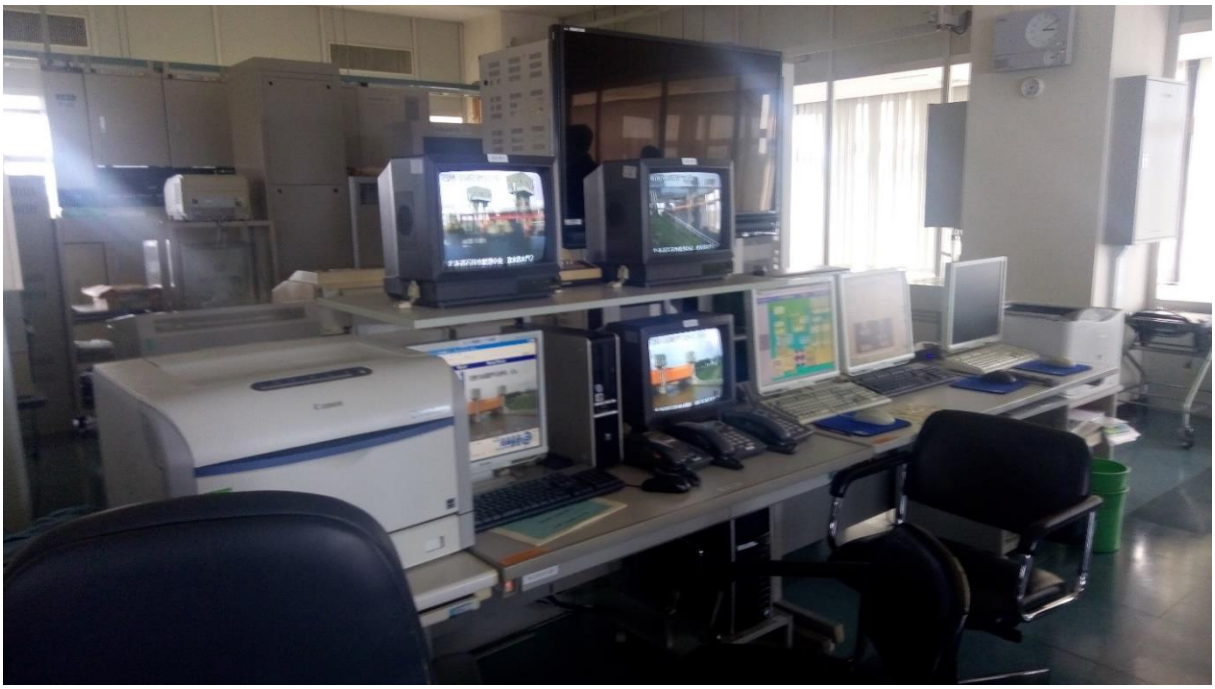


Fig.28. Ishikari River Gate Control Room

Fig.29. Ishikari River Museum from outside

Fig.30. Ishikari River Museum

We returned to Hokkaido University at 6:15 pm. The closing and thanking speech of the symposium was held. The participants had the opportunity to exchange ideas with each other for about 2 hours.

Fig.31. The closing and thanking speech

Day 5 (30 August, 2018, Wednesday)

We left the hotel at 8:15 to go to Ishikari Port and Ishikariwan Shinko Thermal Power Station Unit 1, which started in 2014 and was scheduled to finish in 2019.

Fig.32. Power Station side

Fig.33. Combined Cycle Power Generation System

1-Natural gas is burned in the combustor to cause the generated combustion gas to rotate the “gas turbine”.
2-Heat of the exhaust gas is used to generate steam to rotate the “steam turbine”.

To conclude, high power generating efficiency, outstanding environmental performance (low CO_2 emissions), excellent operability (immediately changing demand for electricity)

Fig.34. Ishikari LNG Tank Base

Fig.35. Ishikari LNG Tank No:4/ 0.23mil radius

We left the harbor at 10.30 to go to Toya-Unesco Global Geopark.

Fig.36. Volcano Science Museum

After watching a long sad video about volcanoes in the region, we visited the museum.

Fig.37. Volcanic region

Fig.38. the vehicle that affected from volcanic eruption

Fig.39. spa center after the volcanic eruption

Fig.40. inside the spa center

Fig.41. a building after the volcanic eruption / its first floor under the ground

Fig.42. a damage caused to the building by the bridge due to volcanic mud / the bridge can be seen ahead

Fig.43. with all STG participants

Fig.44. showing active volcanoes and sphere of influence on the map

Day 6 (31 August, 2018, Wednesday)

Today we were free until 13:00. We left the hotel to go to Asakusa at 13:00.

Fig.45. Asakusa / Main Building

People wash their hands here before praying in the temple.

In addition, there was a place in it with embers. People were rubbing the smoke on their heads.

Fig.46. Main Building inside / People pray in here

After leaving the temple, we went to Tokyo Sky-tree.

- Skytree has a height of 634m with its antenna and it has 2 different floors for visitors as 350m and 450m.

- The above photo shows the highest elevation that visitors can reach. The left one is a photograph of Tokyo from this height.

- About 1 hour after we returned to the hotel, we left the hotel for dinner with JSCE members. Everyone in the group was a dinner with his / her advisors within the STG Program. Everyone had the opportunity to exchange information and ideas.

Conclusion

Although it was a short trip, it was a very important for me in terms of experience and knowledge. In addition to advanced Japanese engineering, I also had the opportunity to get to know the Japanese culture. So, I would like to thank Ms. Yuki, Ms. Suzuki for taking such an opportunity. I would also like to thank Ms. Suzuki and Mr. Yoshizawa for their accompanying us throughout the program and for trying to make us comfortable. Additionally, I would like to thank Prof. Dr. Beyza Taşkın, who is my advisor from İTU, guiding me through the process of applying this STG program. I believe that my connections between anyone who I met in Japan will be continued and we will meet again.