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REPORT FOR 2016
JSCE - STUDY TOUR GRANT

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1. 2016 - JSCE Study Tour Grant

The Study Tour Grant (STG) program invites young engineers from the Agreement of Cooperation (AOC) societies to Japan. STG is organized under International Scientific Exchange Fund (ISEF) of Japan Society of Civil Engineers (JSCE) to promote international exchange and cooperation. In this year, the program was taken from 4th September 2016 to 10th September 2016. We visited to public and private sector organizations and major civil engineering project sites in Japan.

2. Preparations

According to bilateral relations between Myanmar and Japan, all Myanmar young civil engineers were invited from Myanmar Engineering Society to compete and participate in STG program. I know about it from my senior, Mrs. Hmwe Kyu, from Mandalay city. Because I had a passion to study engineering in Japan, I prepared to apply 2016 STG program. I presented about our project, "The Highest Building Project in Shan State, Myanmar" and "The Foundation of Every Great Structure is People'' at Myanmar Engineering Society.

Luckily, I received an invitation email from Mr. Yoshihisa, Chair of International Scientific Exchange Fund JSCE, to make a presentation at the 18th International Summer Symposium on September 7. I was very glad to visit to Japan and to study Japanese technologies. During our stay, we visited project sites and research institutes, met leading civil engineering professionals and academics. At the end of the program, we were requested to submit a report on our experiences gained in Japan to JSCE.

3. Public Work Research Institute (Day 1)

According to the schedule, the first day of STG visit is Public Work Research Institute (PWRI) located in Tsukuba. Unfortunately, I missed the flight on 4th September and so I arrived to Japan later than other STG participants. With kindness, Mr. Tsuyoshi Hashimoto picked me up at Narita Airport on 5th October. He is the one who is always smiling and taking care of us along the program. From Narita, we went to Public Work Research Institute and National Institute for Land Development by bus. Along the bus route, I found the peaceful urban, green agriculture, clean rivers, good buildings, roads, bicycle roads and bicycling, some digital system in toll-gates, clean air and nice weather exposure.

When we arrived in Tsukuba, we met with Dr. Kazunori Wada who is research coordinator for Land Management and Disaster Prevention at building of National Institute for Land and Infrastructure Management. After greeting with all STG recipients, our group started to study in the PWRI by bus.

I was late so that I could not have a chance to see the high speed driving test truck. But, I studied about this test from other STG participants. They said that this pavement design speed is 100km/hr and the radius of curvature is 147.5m and the maximum angle of inclination is 28 degree in both north side and south side loop. The pavement types are continuously reinforced concrete pavement, water drainage pavement and porous elastic pavement. Then we studied about full-size test tunnel and traffic sign test bridge.

Next study in PWRI is the dam hydraulic laboratory and annex. There are many small scale dam designs and annex. In Japan, there are great improvements in dam construction and it has long history in dam construction, maintenance and improvement. In Japan as far as I know, there are approximately 2800 dams and over 15m high till now. The size of this Laboratory is 120m in length and 44m in breadth and its annex size is (L70mx B29m) used for this investigation. This studying was the great experiences for me although I had studied about dam construction, some experiments for dam stability, spillway and flood control as an engineering student in Paung Long RC dam near Nay Pyi Taw, the capital of Myanmar.

After studying in the dam hydraulic laboratory, we went to the vibration laboratory. Unfortunately, there was some modification or repairing in vibration laboratory, and so we could not have a chance to study large scale three-dimensional shaking table which is to examine a seismicity of the ground and civil infrastructure by simulating strong motion of large earthquake. I still want to see its tests because seismic design of Japanese engineering is very impressive. As far as I know, a building for shaking table and wind tunnel test will be completed with the cooperation of Japan at Yangon Technological University next two years. So, I hope I could study about shaking table in that laboratory. Just for now, I can only learn from You-tube.

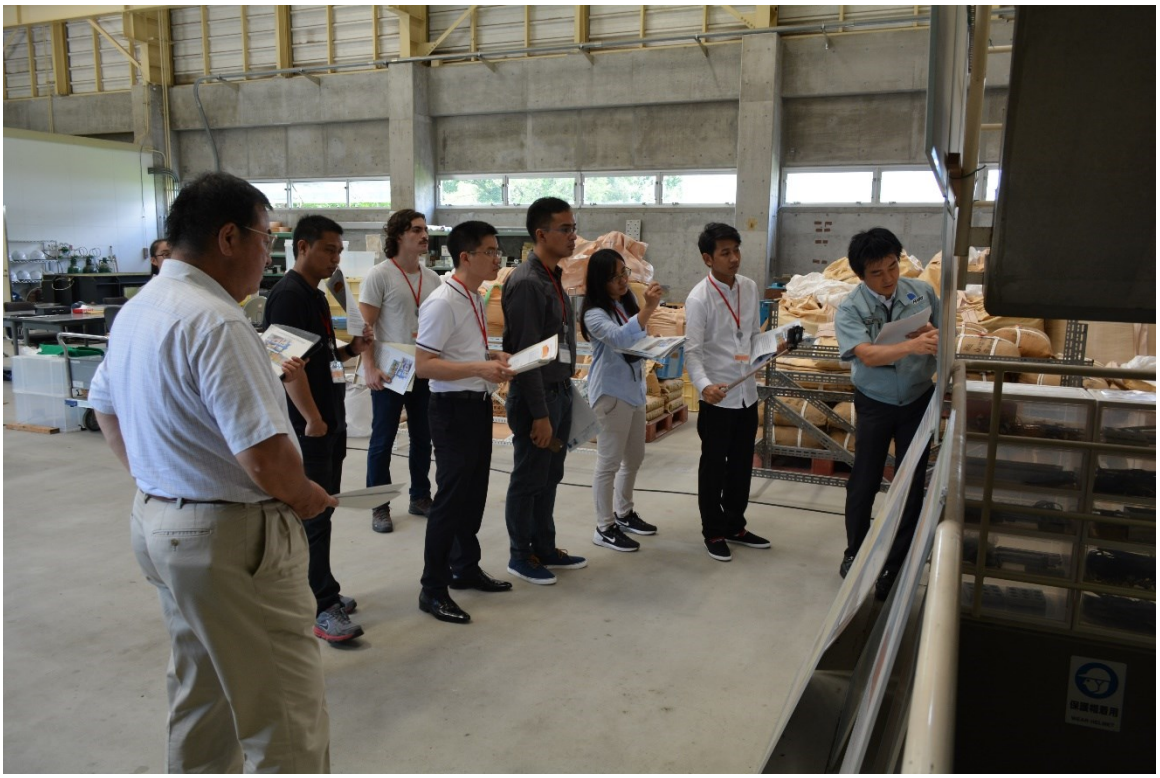

Photo 1, Studying Geotechnical Dynamic Centrifuge

At the structural engineering laboratory, I found the 30MN universal testing machine which is the second largest in the world. The largest one is in U.S according to the explanation of an engineer from the lab. It is used for compressive, tensile, and bending tests with full scale or reduced-scale for bridge member/components to evaluate the ultimate strength and the behavior to the failure. It was constructed in 1978 and the control unit was updated in 1991 and 2002 to improve the safety and the usability for operation. That machine is used for multi-purpose in structural engineering. I was so amazed to see this machine and took some photo with it.

After that, we studied about geotechnical dynamic centrifuge. This is really impressive and essential one for geotechnical engineering. That centrifuge was constructed in 1997 to perform prototype model tests in order to understand the complicated behavior of ground, earth structure and foundation and also to develop the technique to rationalize design. There are three dynamic centrifuges in Japan including PWRI.

Typical centrifuge tests in PWRI are (1) centrifuge tests on embankment failure induced by liquefaction of subsoil, (2) centrifuge test on seismic behavior of underground structure during earthquake, (3) centrifuge test on residual displacement of road embankment on mountain side, (4) centrifuge test on resistance of reinforced soil walls against earthquake. We studied short video presentation. We found the liquefaction map of Japan in that laboratory. Without doubt, I saw that Japan is developing not only in structural Engineering but also in geotechnical engineering.

Photo 2, Group photo at PWRI

4. Tokyo-Gaikan Expressway Construction Site, TAJRI-Area Project

In the afternoon, Dr. Wada and Mr. Hashimoto took our group for the lunch at "Restaurant SARO''. Although the taste of Japanese food was a little difference with Myanmar food, I could enjoy and it is Oishi. After lunch, we went to the Tokyo-Gaikan Expressway construction site, TAJRI-Area project. That project is the large scale construction project. That project is constructed by East Nippon Expressway Company, TAISEI-TODA-DAIHO Joint Venture.

Before going to the site, we wore the safety accessories and we were explained about project with small model demonstration by construction manager at the site office. I saw the awareness of Japanese for construction safety and preparations for the visitors. At the entrance of the site, I found the temporary stair used in site with the noticed board 280 kg.

Informing with safety signboards and cartoons is a good habit to increase awareness and decrease accidents. TAJIRI area construction site is the area where Keiyo-junction Expressway and Keiyo-Road way are constructed. Gaikan-Expressway and Keiyo-JCT ramp are semi-basement structure. The junction is made from many ramps that have different height and structure that are well calculated. We were explained about that expressway project by construction manager and we saw heavy steel structure strut including concrete casting work for mat foundation and retaining wall under construction.

Photo 3, Mr. Hashimoto and me

Then, we saw large machine for tunneling and big crane. I was really interested in that construction because I have only watched this kind of tunneling on You-tube. And there is still little chance for me to do this kine of construction and also to study in my country. There are three construction methods used in that project;

(1) Open cut method

(2) Shield tunneling method and

(3) The Harmonica + Underpinning method

Moreover, I found safety awareness, value of working drawings, good management for complex project, good quality control and housekeeping in the construction site. No doubt, I impressed Japanese Engineers and this project.

5. Kajima Technical Research Institute (Day - 2)

In the morning of second day, we studied at Kajima. The motto of Kajima Technical Research Institute is “Exploring today, building tomorrow”. KaTRI is the nick name of Kajima Technical Research Institute. There are 4 sectors in that institute. Those are civil engineering, disaster prevention, building science and environmental consideration.

We reached at Kajima Technical Research Institute and we met Mr. Tesuya Yoshizawa who is General Manager of Business Development Group Construction Group. After greeting in meeting hall, we watched a short video which is explanation about Kajima. In this video, I watched a shaking table test for interior furniture behavior during earthquake. The testing of non-structural members is awesome idea for me because I never thought about that. Then, we started looking and studying around KaTRI area. In KAJIMA, taking photo is prohibited although I wanted to do.

Photo 4, With STG recipients in front of Kajima Technical Research Institute

But, we studied many researches. We saw two types of damper. One damper which is made with 6 rubber layers and steel plate used not only earthquake but also vibration. Next damper is made of many steel plates layer and it can resist only for earthquake. Because I am interested in earthquake engineering, I was keen to look the usage of these dampers in actual building. In Kajima, I found *base-isolated buildings*.

The main feature of the base isolation technology is that it introduces flexibility in the structure. As a result, a reinforced concrete building becomes extremely flexible. The isolators are often designed to absorb energy and thus add damping to the system. This helps in further reducing the seismic response of the building. Also, base isolation is not suitable for all buildings. Most suitable candidates for base-isolation are low to medium-rise buildings rested on hard soil underneath; high-rise buildings or buildings rested on soft soil are not suitable for base isolation.

That institute works for the largest construction companies in Japan. Then, we reached to the building to study concrete technologies and then we saw concrete samples with various strength; light weight concrete (30N/mm2), regular concrete (27N/mm2) and high strength concrete. There was a sample of old concrete under water for 100 years without much damage. I gained some knowledge about placing concrete under water. In my opinion, concrete is more important than reinforcement in reinforced concrete and so it is better that we should know about concrete as much as we can.

And then, our group went to the wind tunnel testing building. This is one of the reason why I would like to participate in STG program. Before that day, I had only seen the wind tunnel testing machine in videos. I wished to see it and finally my wish had come true. We saw small scale model of wind tunnel test and we studied specifications of large boundary layer wind tunnel. The specifications of wind tunnel are maximum power (750KN, 496 rpm), diameter (4.3m), air speed (0.4-40 m/sec), path length (121.9m) and contraction ratio (5). After studying wind tunnel test, we studied about fire testing and artificial garden on the roof.

In the noon, we were in the main building of KAJAMA area and we studied sound testing, small scale modeling room. After all, we had lunch and took photos in front of KAJIMA. I really appreciated for this great opportunities that I could study in Kajima Technical Research Institute. I appreciated everyone from Kajima Technical Research Institute. Kajima Technical Research Institute (KaTRI) is one of thrilling places in STG visit.

6. Tokyo Metropolitan Government Building

We travelled to Tokyo Metropolitan Government Building which is the tallest building in Japan. It is 243 meter (797 feet) in height and floor area is 195764 m^2 [2,107,190 sq ft]. Located in Shinjuku, the building consists of a complex of three structures, each taking up a city block. The tallest and most prominent of the three is Tokyo Metropolitan Main building No.1, a 48 storeyed tower that splits into two sections at the 33rd floor. The building also has three levels below ground.

I really love skyscrapers so that visiting and taking photo with this structure is still like a dream for me. Even after the program, I searched about it on google and I found out its architect, Kenzo Tange, and structural designer, Kiyoshi Muto, who are Japanese. I also would like to design tall building in my country like them.

We studied in Tokyo Metropolitan Government (TMG) where banners about the 2019 Rugby World Cup and 2020 Tokyo Olympics are already in display. We were welcomed at the office of Tokyo's vice governor. We were given the chance to be seated at the governor's seat in the Tokyo Metropolitan Assembly Hall.

We listened to some lecture about the disaster preventions for Japan at the disaster management center. And we were given Tokyo Metropolitan Government Disaster Prevention Guide Book to be able to study more.

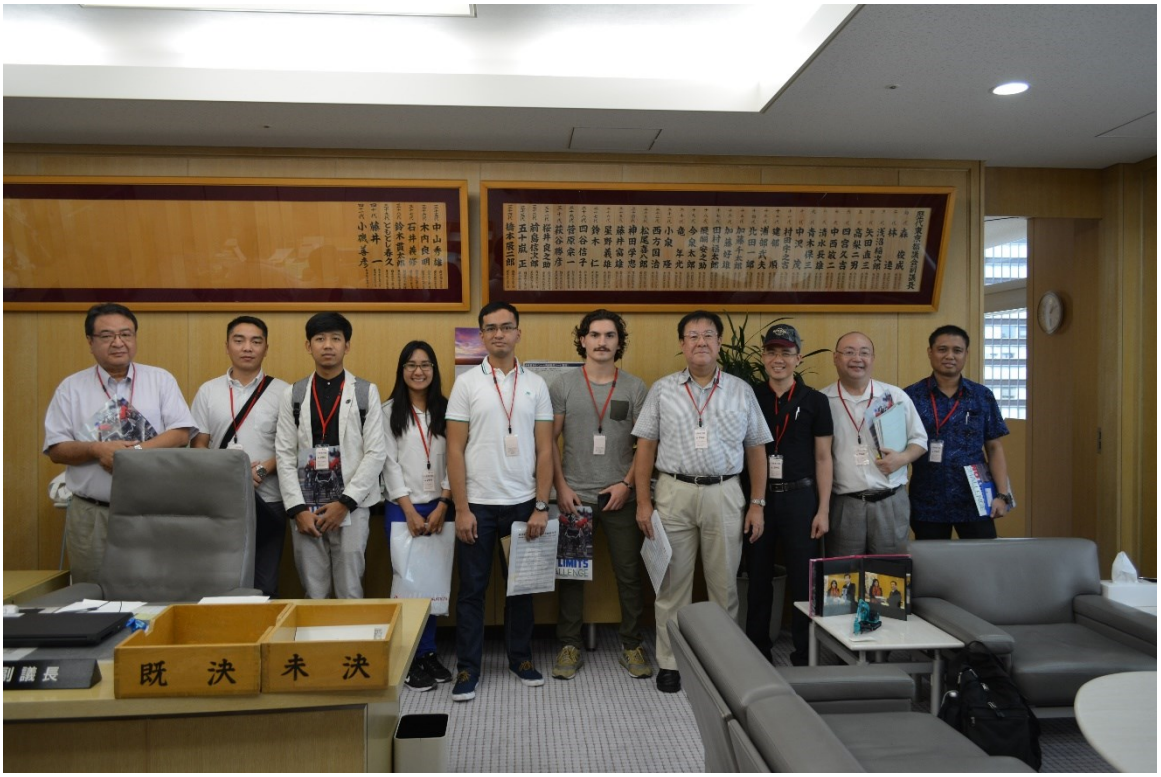

Photo 5, Tokyo Metropolitan Building

Next, we went to the construction of the northern pedestrian passage enhancement project. Tokyo station is the gate-way-station to Tokyo, capital city of Japan, and is the hub-station of high speed railway networks connecting with regional cities in Japan. That is also the pivot of the railway networks in Japan with 0 km post located at the center of Tokyo Station.

In this underground construction, it must be done without disturbing train operations above. We found many techniques and good housekeeping in this big project. As for me, I had worked in bored pile foundation and I asked to see their bored pile construction. The engineers from this construction showed us one and I found their accuracy in vertical alignment, at least inclination error, cleanliness, safety cover, and boring method. It is a challenge since construction is needed to be finished in 2019, just in time for the 2020 Olympics. Tokyo station was constructed by OBAYASHI more than 100 years ago and it is also main contractor for the project now.

We travelled to Sendai by the bullet train of JR Tohoku Shinkansen Hayabusa. It took only one and a half hours for nearly 200 miles. I really like bullet train because I used to travel from my city to Yangon by express and it took about 10 hours for nearly 400 miles. I accepted that good transportation is the major need for every country and its people, especially for economy, education, trading, civilization, urban planning and every field.

7. 18th International Summer Symposium at Tohoku University (Day 3, Sept. 7.)

International Summer Symposium brings together young civil engineer from over 20 countries every year. It is an excellent opportunity for young civil engineer. I made a presentation at 18th International Summer Symposium.

That Symposium was held at Tohoku University, Sendai. The title of my presentation is "The Highest Building Project in Shan State, Myanmar & The Foundation of Every Great Structure is People". I presented about Taunggyi Myoma Tower project from design to construction. After my presentation, three students asked me one question respectively. I remember that my presentation is the one which got three questions in our seminar room. I was really excited and happy for my first experience for the international presentation.

In this morning section, I could study other students' presentations with various fields of civil engineering from different countries. I noticed a young engineer from Japan who made a presentation about "A study of bridge wash-out simulation during Tsunami'', a young engineer from India and a young girl, masters student studying in geotechnical & geo-environmental engineering at the university of Tokyo, who were interested in my presentation. In the same room, I found our STG participants' presentations are great also. Some presenters are master and doctoral students studying in Japan. This is my first experience for international seminar and I felt the word, international students, by my heart.

Photo 6, My Presentation at 18th International Summer Symposium

8. Sendai City

We visited some area in Sendai city and enjoyed walking, shopping, taxi riding, praying at temple, and sight-seeing. It is a beautiful city. At night, we participated in JSCE annual dinner and met with the president and senior engineers of JSCE. Actually, we enjoyed Japanese sake and fried cow tongue. We got a lot of visiting cards and friendships for the future network. I came into realize Asia is not very different, we are the same under the umbrella of Civil engineering family.

Photo 7, At the annual dinner of JSCE

9. Visit at the 2011 Tsunami-affected Areas (Day 4, Sept. 8.)

Along the trip, I saw retaining walls and shotcrete areas that reinforced the side of mountains along the road. It is a good method to imitate for the maintenance of mountains and their environments. My native town has many mountains and it can be said as one of the hilly regions in our country. There are many possibilities of sliding and falling, and thus there could be disasters especially during earthquakes and tsunami. That is the reason why I like that way of maintenance for transportation. Love environment which helps us.

By the time we visited to the Tsunami-affected areas, I still remembered the news about the 2011 Great East Japan Earthquake. It has been five (5) years since the earthquake with 9 Richter scale that caused a 14.5m tsunami. We saw many developments in the affected city of Rikuzentakata at the Iwate Prefecture. We had a chance to look at the Shinkasennuma bridge and took photos with the 438- meter bridge being constructed. In that bridge photos, I noticed that the reinforcing steels are coated to prevent corrosion. Concreting, formwork and scaffolding works are not easy in this kind of construction. It's a really huge project.

Photo 8, at the Shinkasennuma bridge

Following that, we went to the site office of Shimizu Corp. Joint Venture (JV) and we were brought to a higher point to overlook the entire construction project. We are able to see the so-called "miracle" pine, the only one which is left standing alone among 70,000 trees along the town's coastline after the disaster which is now considered as a symbol of hope.

Photo 8, At the top of seawall

At the Kajima Corp. JV, we studied disaster restoration works in the coastal area by a short presentation briefly. We stood at the top of the seawall(back) which was made with a lot of pre-cast concrete blocks and a large number of piles.

Remain from the earthquake disaster – the former roadside station, Takata Matsubara Tapic 45 reflects how badly the area was hit by the tsunami where it was submerged. After visiting the Tsunami-affected areas, I want to pay my respect for Japanese and pray for them to get the solution which achieved the miracle of Kamaishi and to be safe from any disaster.

10. Sight Seeing

The last day of our STG visit was the sight-seeing in Tokyo. In the morning, we were picked up by Dr. Wada and Mr. Hashimoto. We walked to the HATO bus station. Firstly, we visited to Asakusa Temple by HATO bus. Asakusa Temple is the Buddhist Temple and that was my second time to it. So, I prayed for a chance to come to Asakusa Temple again. We went to many souvenir shops. I bought Japanese traditional cloths for my teacher and a watch for my father and a bag for my mother. We took some photos with Japanese girls who were wearing Kimono.

Photo 9, A remembrance photo of Japanese girls and me

Then, we went to Tokyo Sky Tree by HATO bus. 634 meters high Tokyo Sky Tree is the world's tallest free-standing tower for digital terrestrial broadcasting. Japanese traditional sense of beauty and state-of-the-art engineering have been integrated to its design. The tower is a new landmark in Tokyo and create memorable views from the Sumida river and nearby spots. The view of Tokyo was amazing and trilling. There had many high rise buildings and I really like those bird's-eye views.

As far as I studied, the structural character of this tower is different from the other domestic structures. Unique systems for a vibration control, the core column system, and the ridged sub-structure system, were invented for this tower to satisfy the requirements for earthquake and wind resistant design. Tokyo sky tree is one of my favourite tall structures in the world.

Photo 10, Me at the 350 meter height of Tokyo Sky Tree

Photo 11, An unforgettable group photo of STG program

Tokyo is very clean and has many awesome places. Moreover, Japanese people are very friendly and obey the disciplines. Tokyo is the wonderful mega-city for me. I miss the days in Japan and STG friends also.

Photo 12, Japanese children and me

Photo 13, With bundle of Thanks to all members of JSCE

11. Speech of Gratitude

My five-day study tour in Japan which last Sept. 5-9 gave me a great opportunity to explore such a beautiful country. First of all, I would like to express my gratitude to Japan Society of Civil Engineer for my STG visit and their effort in making all the necessary arrangements and accommodations. I am very much thankful to JSCE for this once in a lifetime opportunity.

My second trip to Japan was valuable trip for me because I got good relationship between international students and also many experiences in civil engineering. I am really thankful to Mr. Hashimoto and Dr. Wada for caring and explaining me about civil engineering during one week stay in Japan.

I would like to express my gratitude everyone from Public Work Research Institute, Kajima Technical Research Institute, Tokyo-Gaikan Expressway Construction Site TAJRI-Area Project, Shinjuku Station Construction Project, Coordinators at 18th International Summer Symposium, and disaster restoration area in the city of Rikuzentakata at the Iwate Prefecture.

Then, I would like to express my gratitude to U Win Myint (Patron, Myanmar Engineering Society, Taunggyi Chapter), U Ye Gaung (President, Myanmar Engineering Society, Taunggyi Chapter), U Than Htike (Past Myanmar Engineering Society, Taunggyi Chapter), U Aung Myint (President, Myanmar Engineering Society), U Myint Soe (CEO, Myanmar Engineering Society), U Sai Yan Naung (Chief Engineer, Taunggyi Myoma Tower Project), and U Sai yan Aung (Project Manager, Taunggyi Moyma Tower Project), and all staffs from Hasty Power Co., ltd and my family.

The JSCE STG program serves true to its purpose. The main objective of JSCE International Summer Symposium is to provide a platform for young engineers to examine technological advances and issues, to share their ideas and research projects, and to encourage them to find research partners and teams across languages and distance. STG program gives young civil engineers from different countries to study latest technologies in Japan. STG does not only promote the growth among its participants but also a harmonious relationship.

Moreover, I will recommend to my juniors from Myanmar. I made my STG trip presentation in Myanmar Engineering Society (Taunggyi Chapter) in last week. After coming back from Japan, I have my passion to study for Master degree in Japan. Especially, I want to study in structural engineering and tall buildings. But, I need to prepare speaking skill not only English but also Japanese.

In the future, I hope to work with civil engineering related Japanese companies and to study in Japan. I will never forget my first trip to Japan with 2016 JSCE Study Tour Grant program for my lifetime. I will try to visit and study in Japan in the future. I will plan to build my dreams to become a reality.

To JSCE, Thank you very much. **Aigatogozaimaz!**