Report of Japan-Turkey Cooperative Program on Resilience Engineering for Engineering for Energy and Urban Systems

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Representatives of Tokyo Institute of Technology, University of Tokyo, Istanbul Technical University shared basic information on each university. Students and researchers of three previous universities and also Boğaziçi University gave the short presentation about their research such as Structural Health Monitoring Systems, Axial Behavior of Prismatic HPFRCC Externally Confined by CFRP Sheets, Risk Management against External Events and Nuclear Power Plant Project in Turkey.

On February 24 2016: Site visit to ERSEL Heavy Machinery Plant and Eurasia Tunnel Construction site.

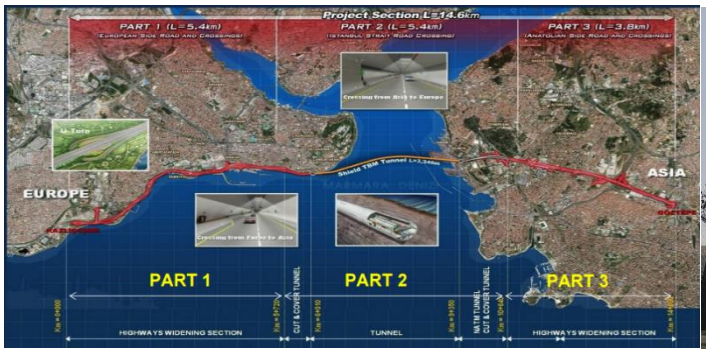
ERSEL Heavy Machinery-Manufacturing Plant is capable to research and develop, design and produce heavy machines, equipment and also install equipment in plants in various fields especially Cement, Mining, Defence, Ship Building, Work Machines and Wood Industries. In work processes,

1. ERSEL engineer designs machines according to requirement of customer and regulation or standard and also produce method.
2. Casting process is modelled by computer program to simulate the real casting process and find the defect in product. If defect is found, produce method will be revised.
3. Actual produce
4. Before sending machines to customer, product quality is checked by non destructive testing.

Mill

Producing Process

Eurasia Tunnel is constructed pass under Bosphorus strait to save time crossing between Europe side and Asian side. Group participants visited tunnel construction site in Kadikoy which is located on Asian side. TMB is used for excavation under the sea. Diameter excavation is 13.7



Project Plan

Cross section of tunnel

meters, while inner diameter is 12 meters. Tunnel consists of two roadways, emergency passages and rooms at every 300 meters and emergency lane. For safety, electronic monitoring of air quality, CCTV, emergency communication, fire detect system, fire fighting system and intelligent light system are applied to the tunnel. Due to probable earthquake, special connection provide elastic movement up to 70 mm. Total investment cost of this project is 1,237 millions US dollars.

On February 25 2016: Technical visit to AFAD Disaster Management Center, Energy and Civil Engineering Laboratories at ITU.

AFAD (Disaster and Emergency Management Authority), the organization working to prevent disasters, reduce disaster damaged and plan & coordinate after disasters. In case of disaster occur, related authorities will gather in the main meeting room to response the disaster, especially Istanbul mayor, AFAD director. This room provide essential communication system and equipment. AFAD center provide electricity, water and food by itself for 15 days and can stand severe earthquake with minor damage. Last disaster which AFAD worked on is snow in Istanbul. Truck is used to access where disaster occur and designed for travelling in trouble circumstances.

Meeting room

Rescued truck

Energy institute, the laboratory work on research about nuclear energy. This laboratory model nuclear power plant structure. Due to prevention of radiation, containment structure is constructed by special high density concrete by adding heavy material in concrete mix. Reactor sinks under water because water reduces radiation. The first hierarchy in work this laboratory is safety. SRAM button will be pressed in emergency case to shut down everything in laboratory and power plant.

Civil engineering laboratory provides sufficient tested equipment for civil engineering work. For example, remarkable equipment are standing wall with hydraulic jack and small shake table. There are some recent completed project such as testing rectangular RC column with and without FRP, short column with FRP and testing main computer container structure on shaking table.

Rectangular RC column with FRP

Short column with FRP