



Webinar on “Some Considerations in Design, Planning and Construction of Infrastructure Development”, presented by Er. Jee Yi Yng (AECOM, Singapore)

by Ir. Frankie Cheah

Ir. Frankie Cheah is currently a committee Member of Tunnelling and Underground Space Engineering Technical Division (TUSTD).

The webinar on “Some Considerations in Design, Planning and Construction of Infrastructure Development” was organized by the Tunnelling and Underground Space Technical Division (TUSTD). The talk was held digitally via ZOOM platform on 24 November 2020 from 530pm to 730pm. The evening talk was attended by 88 members of IEM. The webinar was delivered by Er. Jee Yi Yng with Ir. Frankie Cheah from TUSTD as the moderator for the webinar.

Er. Jee began the webinar by giving an overview of infrastructure demand, particularly in South East Asia (SEA) by 2040, especially in view of the need for continued population growth, urbanization, climate change and demographic shifts. Given infrastructure demand, engineers' roles are crucial in ensuring that SEA continues to be successful in infrastructure transformation. The webinar covers some considerations that are important in planning and construction of infrastructure development:

- Constraints by road reserve, ground conditions, existing structure and allowable construction method;
- Space proofing within structure;
- Future development; Risk and mitigation measures;
- Available resources such as machine/equipment capabilities;
- Environmental impact.

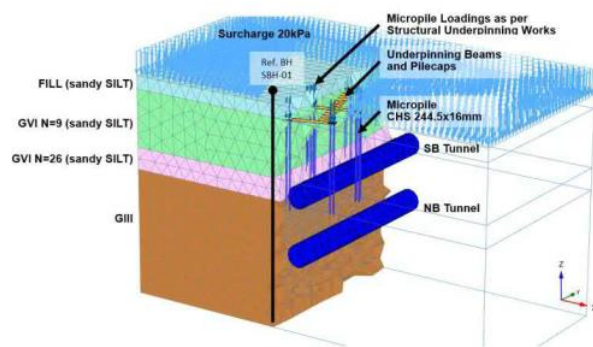


Figure 1: Typical impact assessment analysis for the adjacent structure with finite element analysis

It is inevitable to design and build in the vicinity of existing buildings especially in build-up areas. As-built information of existing building structures (EBS) such as type of structures, foundation type, ground type, construction methodology adopted for the built structures would need to be carefully examined. Impact assessment shall be conducted based on all information collated and Most Probable soil parameters to predict the impact of the proposed construction to the EBS as shown in Figure 1. Based on the predicted impact, protection measures are evaluated at design stage and

implemented at construction stage to mitigate the risks of adverse impact due to the proposed construction.

Er. Jee elaborated on one of the important considerations in planning and design of infrastructure, i.e., space proofing to fulfil the project requirements. It is important to design according to the project requirements both during permanent and temporary stages, for example, considering optimised tunnel diameter to accommodate the rolling stock, mechanical ventilation system, escape route, auxiliary electrical systems; whilst considering space required for temporary site utilisation facilities e.g., temporary staircases, temporary air inlet and outlet, emergency evacuation lift etc. during the

temporary construction stage. Toward the end of the webinar, Er. Jee shared several key observations / lessons learnt based on her personal experience to everyone that joined the webinar:

- i. In the absence of documented information for EBS, detail investigation is prudent to identify the foundation type of the EBS such that the assessment of impact of the proposed construction could be appropriately evaluated.
- ii. Targeted Recharging to address ground settlement due to pore water pressure drop.
- iii. Type of Grouting are dependent on soil type and shall be carried out such that the grouting does not cause adverse impact to EBS. It is important to relate the method statement of grouting to the design intent of the grouting.
- iv. Sensitivity analyses shall be carried out to assess the impact of varying geotechnical design parameters based on geological strata and ground water pressure It is prudent to set realistic review levels for instrumentation which are predicted values of movements, tilt, extension of structural frame, drop in water pressure that the construction works are bench-marked against during the whole period of construction.
- v. Engineers shall pay attention to the detailing of reinforcements to ensure constructability of the structural elements.



Figure 1: Final TBM Breakthrough at Singapore MRT project.

Prior to the end of the webinar, Er. Jee also shared a happy moment (video) for the final TBM breakthrough at one of the Singapore MRT project she worked on as shown in Figure 2. The webinar ended at 730pm after active Q & A session.

The moderator thanked Er. Jee for her time to deliver the webinar to the members of IEM.



Speaker