

VISITS TO MRT PROJECT SITES AT BANDAR MALAYSIA NORTH AND CHAN SOW LIN

TUNNELLING AND UNDERGROUND SPACE ENGINEERING TECHNICAL DIVISION

reported by



Dr Boon Chia Weng

The Tunnelling & Underground Space Technical Division (TUSTD) organised two technical site visits to the Klang Valley Mass Rapid Transit Project, Sungai Buloh-Serdang Putrajaya (SSP) Line to allow IEM members to see the challenges faced in deep excavations and the solutions adopted in the construction of the underground metro.

The visits included taking a look at deep excavations from viewing platforms as well as at surface plants and facilities used in tunnelling works.

The first visit on 28 March, 2019, comprising 18 participants, was to Bandar Malaysia North site. Upon arrival at the site office, the visitors attended a technical presentation conducted by a team of engineers from MMC-Gamuda KVMRT (T) Sdn. Bhd. They were briefed on the capabilities of the Variable Density Tunnel Boring Machine (TBM), an award-winning innovation developed by MMC-Gamuda KVMRT (T) Sdn. Bhd., in collaboration with TBM manufacturer Herrenknecht, for mining in karstic

limestone conditions of Kuala Lumpur.

The team explained the challenges faced in the deep excavation at 28m below ground level (bgl) at the Bandar Malaysia North site. Secant bored piles of different diameters were constructed down to rockheads of varying depths as a retaining wall. The need to use a heavy lifting crane to lower the TBM into the launching shaft site and the logistic constraints in relation to the retaining system were highlighted.

After the technical briefing and a safety briefing, we visited the TBM control room, where measurements from the geotechnical instrumentation near the TBM position and feedbacks from the TBM sensors could be viewed in real time on a large display screen. An auto-steering function, which had been configured into the TBM, was also introduced and presented. The participants were then led to a viewing platform to look at the deep excavation where a station is being constructed.



Posing for a group photo at Chan Sow Lin Station site at the end of the visit

There were 20 participants for the second visit on 29 April, 2019, to the Chan Sow Lin Station site. The challenges faced in the deep excavation of 40m bgl for construction of the station were described: Careful rock face mappings had to be carried out to enable excavation of shear keys to resist uplift water pressures upon completion of the permanent structure. The face mappings at different elevations of the rock face had to be reconciled to identify the presence of persistent fractures which formed a non-favourable wedge. Depending on the fracture properties, alternative solutions such as using tension piles, were explored.

After a safety briefing, the participants visited the surface plants such as compressed air plant, water tank, centrifuge and slurry treatment plant. Short explanations were given by the tunnel engineers. Then the participants went to a viewing platform to watch the pulling-through of the TBM which was launched from Bandar Malaysia North site. It was pulled across the deep excavation at Chan Sow Lin Station site and re-launched at the opposite face.

The construction of a long TBM network has enabled MMC-Gamuda KVMRT (T) Sdn. Bhd. to efficiently manage the construction programmes of both station sites with respect to excavation and tunnelling works, by selecting strategic shafts or stations for launching, and others for boring or pulling-through and finally, for retrieval. ■
