Tunnelling work on SBK Line enters final year

21 May 2014

There is only one more year to go before the tunnel-boring work of the Klang Valley MRT's Sungai Buloh-Kajang line (SBK Line) concludes, according to local media.

By the end of this year only two TBMs will still be mining, and the last unit is set to be retrieved from the ground in May 2015, the reports said, adding five TBMs are currently working on forming the 9.5km-long pair of tunnels.

Supervised by project owner Mass Rapid Transit Corporation Sdn Bhd, the contractor for the underground portion, MMC Gamuda KVMRT (MGKT), is currently working around the clock to ensure that the TBMs are running at optimal efficiency.

"Tunnelling work is easier when the TBM encounters relatively uniform ground conditions. These machines are geological condition-specific, meaning they are always made to order to suit the unique ground conditions of each project. But things get a bit interesting when those ground conditions vary," says Dr Ooi Lean Hock, head of geotechnics for MGKT.

The ground conditions for this particular project are particularly challenging because the SBK Line tunnels have to pass through two major soil formations: the Kenny Hill sedimentary rock and sand formation and the Kuala Lumpur limestone formation.

While the former is a typical and more predictable geological formation found widely within the vicinity of Kuala Lumpur and in the Klang Valley, the Kuala Lumpur Limestone formation is highly weathered karst.

"The great challenge comes when a TBM punctures through into these voids - equilibrium is rapidly disturbed. The groundwater and the slurry required by the machine to maintain working pressure will dissipate quickly through the network of channels," says Ubull Din Om, MGKT's general manager for underground works. "This is why building a large tunnel through karst is such a demanding job."

"While mining through karst is already very challenging, it becomes doubly difficult when a TBM has to pass through karst that is overlayered with other soil profiles. Tunnel-boring machines are at their most efficient when tackling uniform ground conditions - be it all rock, all soft soil, or all sand. But men and machine will be pushed to their limits when presented with mixed ground conditions," Ubull says.

In May, a pair of TBMs were due enter an area where undulating karst is layered with the material of the Kenny Hill formation - and this interface comes in rather unpredictable patterns, which tunnellers hate.

The difficult area lies close to the shopping mall Fahrenheit88 and Menara Keck Seng, both on Jalan Bukit Bintang. At this location, the tunnels will be stacked one on top of the other, with the crown of the upper tunnel just 16m below the ground's surface.

On average, the tunnels run about 30m below ground, with the deepest portion at the Pasar Rakyat MRT station with depths of 45m.

Since station excavation and tunnelling works began in 2012, MGKT has not encountered any major geological problems, which has implied to

engineers that initial geological surveys and calculations are correct.

Despite the use of state-of-the-art equipment, construction techniques and comprehensive management, Bukit Bintang remains a highly formidable stretch to tackle.