

# Malaysia



**Name:** The Institution of Engineers, Malaysia

**Type of Structure:** A non-profit, learned society with its primary function is to promote and advance the science and profession of engineering in any or all of its disciplines and to facilitate the exchange of information and ideas related to engineering.

**Number of Members:** Over 50,000 members inclusive of corporate members, graduates, associates and students. IEM is the Secretariat of ASEAN Engineers, APEC Engineers and International Engineers

## ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

Tunnelling and Underground Space Technical Division (TUSTD) of The Institution of Engineers, Malaysia (IEM) has remained active and continued to undertake activities related to the promotion and advancement of the science and engineering of tunnels and underground space technologies both locally and internationally. In 2020, three successful global digital events were organised for ITA and IEM members as well as non-members.

Amidst the Covid 19 pandemic, WTC2020 was launched on 14th – 17th September 2020 for the first time in the 46 years history of ITA on a digital platform with the theme “Innovation and Sustainable Underground Serving Global Connectivity”. Digital WTC2020 successfully gathered 655 participants, 169 exhibitors and sponsors as well as 272 technical presentation authors. This added up to a total of 1,196 delegates over the 3-day congress. The ITA General Assembly was held via Zoom on 17th September 2020. There were 80 international Exhibitors and Sponsors with 8,000 visitors and 263 technical presentations with 16,000 visitors globally. E-Proceedings for free download and three volumes of perfect bound Proceedings were published. The support for the digital event was beyond expectation.

Prior to Digital WTC2020, the first ever Digital Symposium for Young Tunnellers of Asia (SYTA) was held on 12th September 2020 with 10 presentations via Webinar and about 100 participants. The ITAYm held its AGM on 15th September 2020 via Zoom. ITACET conducted a one-day Webinar on 11th September 2020.

With the success of Digital WTC2020, another grand event was organized on the occasion of the 20th Anniversary of IEM Tunnelling and Underground Space Technical Division (IEM TUSTD) and World Tunnel Day. The celebration was organised by TUSTD and managed by the IEM



Academy Sdn. Bhd. The 2-day event was held on GoTo Webinar platform on 3rd – 4th December 2020 with the main objective of bringing to attention the advanced technology in tunnelling works carried out by Malaysia in the global arena with a total of 80 participants despite the Covid 19 pandemic. Six Webinar presentations were organized and well attended by some 100 participants each.

## CURRENT TUNNELLING ACTIVITIES

The current and future development and construction works look less promising as the world is hit by the devastating effects of the Covid-19 pandemic. Malaysia is affected with a slowdown in business and tunnelling project development. Apart from some urban road/subway tunnels and underground construction works in the city areas, major tunnelling projects still ongoing in Malaysia for the year 2020 are:

### Klang Valley Mass Rapid Transit (Line 2), SSP Line

SSP Line is the second line (MRT2) of the

Klang Valley Mass Rapid Transit which began construction in 2016. With a total length of 52.2km, consisting of 38.7km of elevated tracks and 13.5km underground tunnels the line connects 35 stations and will serve a corridor with a population of 2 million people stretching from Sungai Buloh, to Serdang and ends in Putrajaya. The overall progress of the MRT2 has reached 70% completion at the end of 2019 and on schedule to achieve the full opening by January 2023. The line will commence Phase 1 operation in July 2021 from Sungai Buloh Station to Kampung Batu Station, while Phase 2 will see trains running to Putrajaya Central Station. Currently, there are six TBMs operating along the underground section between Sentul West and TRX, between Bandar Malaysia South and Chan Sow Lin, with a total tunnel excavation distance of 20km out of 23.6km or 85% completed. The mined tunnel works of the Southern elevated alignment were completed in August 2019. This section, which is over high ground, is one of the three tunnel sections of the entire 38.7km of elevated tracks. The tunnel consisting of mined and cut and cover sections with a total length of 540m. The mined tunnel is a single twin track spanning about 182m. Meanwhile the cut and cover tunnel is a twin cell box structure either side of the concrete lined tunnel with a length about 197m on the upstream side and 161m on the downstream side. The mined tunnel was constructed using New Austrian Tunnelling Method (NATM) with a permanent cast in-situ concrete lining. The completion of a pair of pipe-arched tunnels undercrossing the KL-Seremban Highway marks another milestone in the progress of MRT2. Each tunnel, measuring 60m in length and located about 5m below the road surface, were built using a combination of methods such as micro-tunnelling using mini TBM and pipe jacking, beginning in March 2019.

### East Coast Rail Link (ECRL)

As part of its overall transport development plan for the East Coast Economic Region, the Malaysian Government has proposed connecting the East Coast to Kuala Lumpur and later to Port Klang, with a new electrified standard gauge railway. The railway line would cater to both passenger and freight trains. The ERCL alignment is situated on the east coast and the central mountain area and the terminal is situated at the transitional region between the central mountain belt and the western coastal zone. The relaunch of the ECRL project in July 2019 has kick-started the

ECRL Kuantan Tunnel



construction of the longest rail tunnel along the 223km main line between Dungun in Terengganu and Temerloh in Pahang, which is also known as Section B while the other sections of the improved 640km stretch include Kota Bharu to Dungun (Section A) and Temerloh to Port Klang (Section C). The 2.8km Kuantan Tunnel, located in Jabor, is the longest among the three tunnels of the ECRL in Section B, which includes the 1.1km Paka Tunnel and 871m Dungun Tunnel, both in Terengganu. In total, the 640km route will have approximately 40 tunnels with the longest tunnel measuring 7km to be built in the Jelebu-Semenyih area. In 2021, The East Coast Rail Link (ECRL) was further enhanced by extending the original alignment of 640km to 665km as a more efficient rail alignment system. The additional alignment will encompass the original 30km which is 24km from Jalan Kastam (Port Klang) to West Port and 6km from Jalan Kastam to the North Port. The project, which is expected to be ready in 2026, has reached 20.37% completion in January 2021 compared to the original schedule of 19.39%.

**The LRT 3**

The Light Rail Transit Line 3 (LRT3) envisages the connection of two million people between Bandar Utama and Klang by 2024. Developed in line with the Greater Kuala Lumpur/Klang Valley (GKL/KV) Land Public Transport Masterplan, LRT3 will be a key feature in extending rail connectivity to the Western Corridor of GKL/KV with 2km of tunnelling works.

Merdeka 118 Tower



**Line 3 (MRT 3)**

Under the Budget 2021 MRT 3 will be a boon for construction companies. It is expected that the KVMRT Line 3 will be resumed, mostly in tunnels. Line 3, a circle line, is essentially aimed to interconnect all other transit system and serve the key major developments surrounding the Kuala Lumpur centre business district.

**STATISTICS**

**1. List of tunnels completed**

SMART (2007), Interstate water transfer tunnel (2011), KVMRTSBK (2016)

**2. List of tunnels under construction:**

MRT2 (Expected completion 2020), East Coast Rail Link (ECRL), Bandar Malaysia Underground City, LRT 3

**3. Lists of tunnels under planning & Design:**

Circle Line (MRT3), Penang Undersea Tunnel, Penang & DUKE 2A road tunnel. The soon to be iconic Merdeka 118 Tower in Kuala Lumpur when completed in 2022 will be the second tallest building in the world. The ingress and egress approach tunnels are currently under construction to the numerous levels of underground parking facilities at the tower.

**EDUCATION ON TUNNELLING IN THE COUNTRY**

MMC-GAMUDA Tunnel Training Academy in Kota Kemuning, Selangor & MMC-GAMUDA TBM Refurbishing plant in Ipoh, Perak.

Talks, Courses, Seminar, Workshop and Conferences Organised by IEM Tunnelling and Underground Space (TUSTD), IEM Academy.

**The Penang Undersea Tunnel**

This 6.5km tunnel will connect Butterworth, Seberang Perai in the east to George Town, Penang Island in the west. If materialised, it will become the first undersea tunnel in Malaysia and second in the Southeast Asia. There will be a toll plaza at the undersea tunnel.

**DUKE 2A Lingkaran Kampung Bar**

A new RM250 million road project to link Kampung Baru and the Duta-Ulu Kelang Expressway (DUKE) as well as the Ampang-Kuala Lumpur Elevated Highway (AKLEH). DUKE 2A Lingkaran Kampung Baru or LINK would commence in stages beginning this year and is expected to be completed by 2024. This (redevelopment plan) / alignment will make Kampung Baru more open to an efficient traffic network system as it is relatively isolated and connected by small roads only. This project would allow direct access to Kampung Baru from AKLEH and also to create a smoother traffic flow with a road tunnel construction.