

Singapore



Name: Tunnelling & Underground Construction Society (Singapore)

Type of Structure: Non profit, open association

Number of Members: 1160 members, 113 corporate members

ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

In 2020, TUCSS continued to promote tunnelling and underground construction through organising monthly evening seminars, training courses, Conference & site visits for dissemination of tunnelling & underground related information and best practices, as well as conducting social networking events to bring together the practitioners from the different sectors of the industry. TUCSS continued to support the accreditation of tunnelling resident site supervisory staff during the year.

TUCSS Annual Lecture

- TUCSS Annual Lecture was held on Thursday, 15th October 2020 virtually. The topic was “Tunnelling with Slurry TBM: Challenges in Soil, Mixed Ground and Rock” by Mr. Francois Dudouit, Vinci Construction Grand Projects. The Annual Lecture was attended by 340 TUCSS members.

TUCSS Corporate Members’ CNY Lo-Hei Dinner 2020

- TUCSS organised its annual Chinese New Year Lo-Hei Dinner with its corporate members and guests on 7 February 2020 at Chui Huay Lim Club, to thank the corporate members for their continuous support and creating a space for them to network. It was attended by 109 corporate members and 20 guests.

CURRENT TUNNELLING ACTIVITIES

The construction of subway, road and utility infrastructures form the bulk of current tunnelling activities in Singapore. In addition, with the limited land space available, Singapore has seen an increase in the adoption of pipe jacking as a method for the construction of underground linkways and pipelines. Some of the ongoing major tunnelling activities are as shown below:

Thomson East Coast Line (TEL)

TEL is the sixth Mass Rapid Transit (MRT) line to be built in Singapore, consisting of a total of 32 stations, inclusive of 7 interchange stations and spanning a

Monthly Evening Seminars for members:

16 January 2020	BS / EN 16191 TBM Safety Standard	Dr Ruben Duhme, Herrenknecht Singapore
18 June 2020	Rock Mass Classification and its Application in Singapore for Underground Structures	Dr Lee Young Zoo, Geoconsult Asia, Singapore Pte Ltd
16 July 2020	Large Diameter EPB Operation to Control Settlement	Dr Harry Asche, Aurecon NZ
19 August 2020	Hydrogeology in Underground Design and Construction	Mr Tom Ireland, Aurecon NZ
19 November 2020	Changing Safety Standard Tunnelling	Dr Donald Lamont, Chairman BS 6164 revision panel

total of 43km in length. Bored tunnelling works using the 27 EPBMs and 24 Slurry TBMs have completed and the line will be progressively opened in stages, with the first three stations currently operational.

North East Line Extension (NELe)

NELe adds an additional station, Punggol Coast, to the existing North East Line, bringing the total number of stations to 17. Two x EPBMs has been used to construct the 2km length of tunnels and tunnel breakthrough for both drives have completed successfully. The station is expected to be completed in 2023.

Circle Line 6 (CCL6)

Commenced in 2018, CCL6 comprises of a total of three stations and an extension to the existing Kim Chuan Depot and serves to connect the Central Business District with the rest of the Circle Line. Once completed, the 4km CCL6 will close the loop between the existing HarbourFront Station and Marina Bay Station and will bring the total number of Circle Line stations to 33, inclusive of 12 interchange stations. Three EPBMs are used in CCL6 to support the bored tunnelling works. In addition, CCL6 comprises of five underground linkways that will be constructed via pipe jacking,



with 1.2m diameter slurry TBMs supporting the works.

North-South Corridor (NSC)

Commenced in 2018, NSC comprises of 21.5km of expressway, with a large portion underground and serves as Singapore's 11th expressway, connecting the northern towns in Singapore from Woodlands down to the city centre. Envisaged to be Singapore's first Integrated Transport Corridor, NSC comprises of dedicated, continuous bus lanes as well as cycling trunk routes and pedestrian paths, connected with the existing Park Connector Network. Construction of the road tunnels will be predominantly carried out via the cut and cover method and features extensive at-grade road and utility diversion works.

Deep Tunnel Sewerage System (DTSS) Phase 2

To meet Singapore's long-term clean water needs, a used water conveyance system, the DTSS, is currently under construction. Some of the shafts were constructed using a vertical shaft boring machine which is a first in Singapore. The constructed link sewers will connect existing sewer lines with the deep tunnels via drop shafts, conveying used water via gravity to centralised water



reclamation plants for further processing and treatment. With Phase 1 completed in 2008, DTSS Phase 2 comprises of 60km of link sewers (50km of which to be constructed via pipe jacking) and 40km of deep tunnels at depths between 35m to 55m, both underground and undercrossing the sea. A total of 19 TBMs, comprising of both EPBMs and Slurry TBMs, will be used to construct the deep tunnels.

Changi East Airport Development

To support the future airport infrastructure with the planned Terminal 5 (T5), Changi Airport Group (CAG) has awarded contracts for the construction of underground bored tunnels to support services such as baggage transfer and underground people mover system for travellers as well as for cut and cover tunnels for airside roadway.

FUTURE TUNNELLING ACTIVITIES

Cross Island Line (CRL)

The CRL comprises of more than 50km of underground lines and is envisaged to increase connectivity between the western, eastern and north-eastern parts of Singapore. Construction of the CRL will be divided into three phases, with the first phase (CRL1) comprising of a total of 12 stations, inclusive of four interchange stations and spanning a total of 29km in length. In addition to the conventional EPBMs and slurry TBMs, CRL1 features the use of a large-diameter EPBM for the construction of a 3.2km length single tunnel to house both tracks. Passenger service for CRL1 is slated for 2030 and studies on the subsequent CRL phases are currently ongoing.

STATISTICS

1. Length or volume excavated - % mechanized / % conventional during 2020

Approximately 15,600m/416,042m³ (Mechanized), 9.2m/170m³ (Conventional) (Bored tunnelling and cross passage works)