

TERRATEC TERRATEC EPBMS READY FOR BANGKOK METRO PURPLE LINE



Two new TERRATEC TBMs will take part in Bangkok Metro Purple Line (C3) for Mass Rapid Transit Authority of Thailand.

In December, TERRATEC celebrated the successful Factory Acceptance Test of a new 6.39m diameter Earth Pressure Balance Tunnel Boring Machine (EPBM) which will be deployed for the construction of the Bangkok Metro Purple Line (C3). The event was attended by representatives from the Mass Rapid Transit Authority of Thailand and contractor ITD-NWR MRT Joint Venture. The second Factory Acceptance Test for another EPBM will take place in April 2024.

The two TERRATEC EPBM TBMs will be utilized to construct a total tunnel length of 3.12km, connecting Phan Fa Station to Memorial Bridge Station across two metro stations.

The project encounters several challenges, particularly in navigating the TBMs through the historic area of the old Bangkok capital, which includes landmarks like the Grand Palace and old temple. Another significant aspect is the interchange station at Sam Yod,

connecting the Purple Line with the existing Blue Line MRT. The Purple Line will ingeniously pass beneath the operational Blue Line tunnels. Additionally, the TBMs will undergo an impressive feat by driving under the Chao Phraya River for a stretch of 150m. The construction process necessitates meticulous planning and management to ensure minimal disruptions to the surrounding infrastructure and environment.

The geological conditions along

the tunnel alignments will encompass soft clay, stiff clay, dense clayey & silty sand. To accommodate these conditions, the TBM's soft ground cutterhead is equipped with a flat spoke type with copy cutters.

During the construction process, traditionally reinforced, 275mm thick by 1400mm wide, Universal reinforced concrete segments (5 + 1) will be installed as the machine progresses. Muck removal, segment transport, and the supply of consumables will be facilitated by rail-bound equipment using battery locomotives.

TERRATEC TBMs feature the Enzan laser guidance system, known as one of the leading

systems in the market. This advanced technology allows for remote access to the complete tunnelling system, ensuring accurate control over the TBM operations. With the Enzan system, precise navigation of the tunnels is guaranteed, improving the efficiency and effectiveness of tunnelling projects. Throughout the entire tunnelling operation, TERRATEC's highly-experienced Field Service staff will provide assistance to ensure optimal performance and successful project completion.

The Bangkok Metro Purple Line, spanning a length of 23.63km and serving the northwestern area of Bangkok from Tao Poon to Klong Bang Phai in Nonthaburi Province, is the fifth rapid transit line.

Its southern extension, which comprises a 14.3km underground section and a 9.3km elevated section, commenced construction in August 2022 and includes a total of 17 stations.

TERRATEC has a well-established regional base in Thailand, having sold its first machine in the country more than ten years ago for the Metropolitan Rapid Transit (MRT) Blue Line Extension Project. With outstanding tailor-made robust TBM design, prompt onsite assistance, readily available stock of TBM spares and specialised TBM support throughout the tunnelling operation, TERRATEC has become the country's leading TBM supplier.

TERRATEC TBM CELEBRATES BREAKTHROUGH ON CHENNAI METRO

In November, TERRATEC proudly celebrated a breakthrough of the 6.61m diameter Earth Pressure Balance Tunnel Boring Machine (EPBM) named "Podhigai" for the prestigious Chennai Metro Rail project in India. The event was attended by officials and workers from the project owner, Chennai Metro Rail Ltd. (CMRL) and contractor, Tata Projects Ltd. Chennai Metro Rail Ltd. had awarded Tata Projects Ltd. with the Package TU-01 contract back in May 2021, setting a 42-month deadline for completion.

TERRATEC TBM S97 named "Podhigai" along with six other

TBMs will play a crucial role in the construction of approximately 9 km of twin tunnels (totalling 18 km) for Corridor-3 underground section, extending from Venugopal Nagar Station to Kelly's Station. TERRATEC is supplying five out of the seven TBMs required for this significant package, showcasing expertise and commitment to delivering exceptional tunnelling solutions.

TERRATEC commenced the dispatch of the five TBMs in 2022. Notably, TBM S96 achieved its breakthrough in August 2023 at Madhavarani High Road, while TBM S98 accomplished its breakthrough

in June 2023, moving from the same shaft at Madhavarani Colony towards Venugopal Nagar Station (of Line-5) to Kelly's Station. TBM S99 also celebrated its breakthrough in September 2023 at Venugopal Nagar Station.

The Chennai Metro Project Phase 2 - Corridor 3, Package - TU01 encompasses various construction tasks, including diaphragm walls and the creation of entry and exit structures for Madhavarani Milk Colony Station, Murari Hospital Station, Ayanavaram Station, and Purasaiwakkam High Road Station. Additionally, the project involves the establishment of launching

TERRATEC TBMs achieve another breakthrough on the Chennai Metro Rail Phase-II Corridor 3, a 9km twin-tube tunnel (totalling 18km) in India.





and retrieval shafts at the aforementioned stations. The project also poses challenges in tunnelling beneath historical structures in densely populated areas.

TERRATEC's TBMs are equipped with versatile mixed-ground dome-style cutterheads that effectively handle various geological conditions, such as sand, silt, clay, and weathered rock. The TBMs progress with the installation of 1,400mm wide and 275mm thick universal reinforced concrete lining rings, comprising five segments and a key, ensuring stability and structural integrity throughout the tunnelling process.

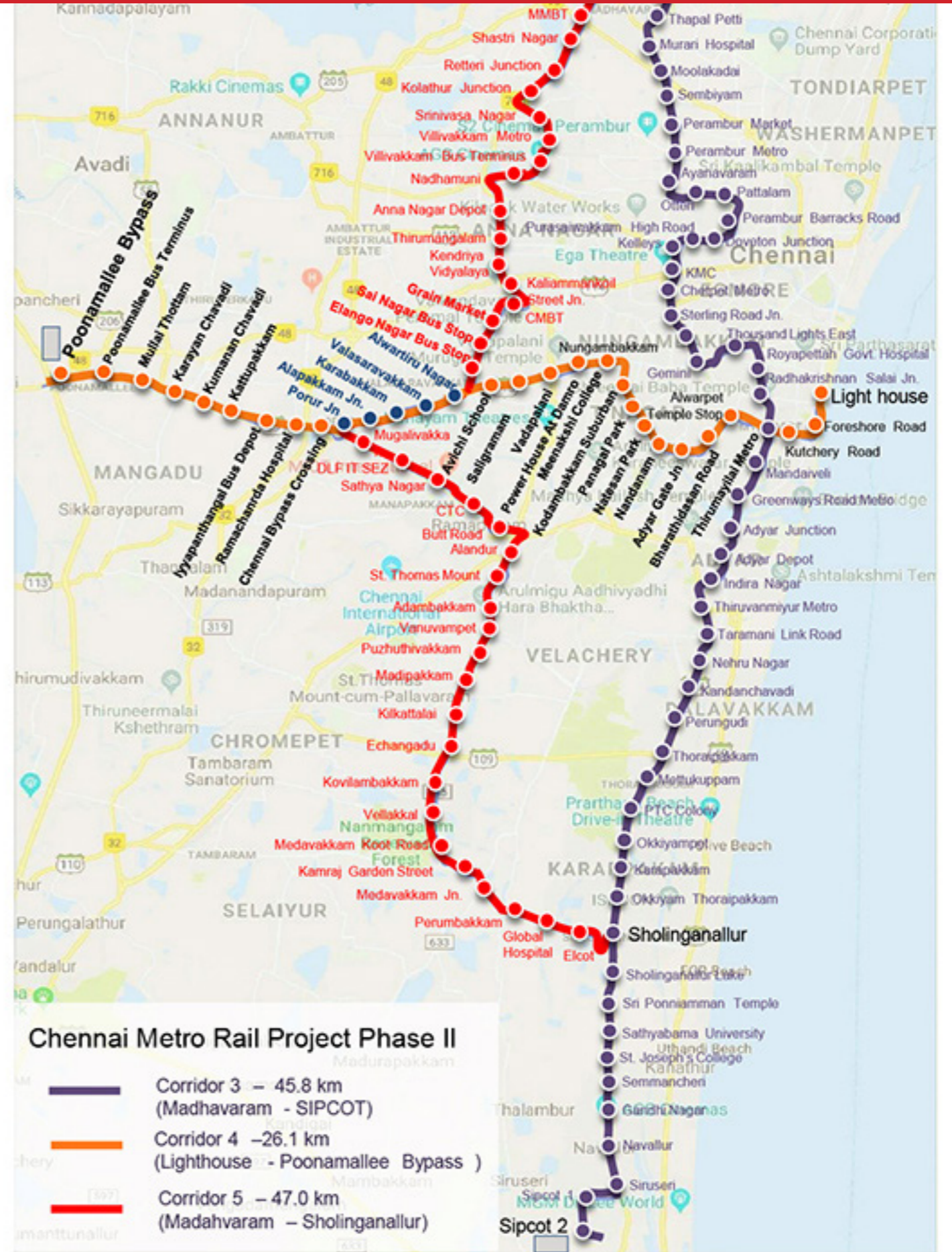
To ensure optimal machine

performance and successful project completion, machine operation is assisted at all times by TERRATEC's highly experienced Field Service staff. This commitment to after-sales assistance guarantees high-quality service at all times.

The rapid population growth and increasing traffic volumes in Chennai have put significant strain on the city's urban transport system. To address this, the government of Tamil Nadu has undertaken the Chennai Metro Rail Project, providing the people of Chennai with a modern, efficient, and affordable mode of public transportation. The project is scheduled to be completed within a tight timeframe of approximately

four years.

TERRATEC's continuing success on projects such as Phase III of the Delhi Metro, Lucknow Metro, Ahmadabad Metro, Kanpur Metro, Surat Metro, Pune Metro and Mumbai Metro is a result of tailor-made robust TBM design, prompt onsite assistance, readily available stock of TBM spares and highly-skilled specialised TBM support throughout tunnelling operations.



TERRATEC ROCK EPBM IS READY FOR DELHI METRO

In late August, TERRATEC celebrated the successful Factory Acceptance Test of a new 6.61m diameter Rock Earth Pressure Balance Tunnel Boring Machine (EPBM) destined for Delhi Mass Rapid Transit System Project - Phase-IV, Contract DC-08 in India. The event was attended by representatives of Delhi Metro Rail Corporation Limited and contractor J.Kumar Infraprojects Ltd.

TERRATEC has successfully delivered three machine orders for this project. This includes a combination of both brand-new and refurbished EPBMs, with the new TBM (S111) specifically

assigned to construct the 23.62km long, 5.7m-wide Silver Line tunnel, connecting Aerocity to Tughlakabad via 16 stations. The anticipated launch point for TBM S111 is the Aerocity Shaft, while the previously launched TBMs, S63B and S64B, have already commenced their operations from the Kishangarh Shaft.

This new 6.61m diameter Rock Earth Pressure Balance (EPB) machine named "Narayani" marks the third deployment by J.Kumar for the construction of twin tunnels spanning 6.116 km within the 65.1 km Delhi Metro Phase 4 project's Package DC-08, between Aerocity

and Kishangarh stations. A milestone for this project is the manufacturing and assembly of the TBM in India with key components arriving from overseas and a range of high-quality equipment meeting TERRATEC's exacting standards manufactured or procured in India.

The versatile TERRATEC EPBM has a robust mixed-face dome-style cutterhead designed to work effectively in the expected mixed ground geological conditions. The tunnel alignments are expected to encounter quartzite, sandy silt,

TERRATEC's new Rock TBM is set to play a crucial role in the Delhi Mass Rapid Transit System Project - Phase-IV, Contract DC-08 for the Delhi Metro Rail Corporation Limited in India.



silt, and rocks.

As the TBM progresses, 1,400mm wide by 275mm thick universal reinforced concrete lining rings will be installed, which consist of five segments plus a key. Muck removal, segment transport and supply of consumables will be facilitated using rail-bound equipment powered by battery locomotives.

TERRATEC's Field Service staff will be present throughout the machine operation, providing unwavering support to ensure optimal performance and the successful completion of the project.

In a significant achievement, TERRATEC's refurbished Earth

Pressure Balance (EPB) machine (S86) with a diameter of 6.52m made its second breakthrough at Delhi Metro's Krishna Park Extension Station in November 2022. This breakthrough not only marked the successful completion of a 2.03 km underground extension for package DC-06 but also played a crucial role in expanding the 38.235 km Magenta Line (Line-8). The unwavering performance of TERRATEC's EPB machine highlights its reliability and effectiveness in delivering high-quality tunnelling solutions for the Delhi Metro.

TERRATEC has been chosen again for the underground tunnel package in Delhi Metro Project due to TERRATEC's consistent success on previous projects such

as Lucknow Metro, Pune Metro, Kanpur Metro, Ahmadabad Metro, Surat Metro and Mumbai Metro. This is a result of TERRATEC's tailor-made and robust TBM design, prompt on-site assistance, a readily available stock of TBM spares, and a highly skilled and specialized TBM support team that remains dedicated throughout the entire tunnelling operation.

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