DIGGING GIANT!

An increase in infrastructure in the railway, metros and road highways has been driving the growth of the tunnel boring machine (TBM) market. **Equipment Times** looks at the India operations, products and services, major projects underway, machine's versatility, cost-effectiveness and performance advantages in all strata and future of TBMs in India.

The scope of the work includes the building of 18km of bored tunnels. Terratec is supplying five out of the seven TBMs needed for the package. At the start of this year, Terratec began supplying the TBMs.

The first TBM S96, which was delivered on-site, is being assembled. It will shortly deliver the second TBM S97, while the third TBM S98 was dispatched after the completion of its factory acceptance test (FAT).

INDUSTRY LEADERS SIGNALS A BOOMING ECONOMY....

Kapil Bhati, Managing Director, Robbins Tunneling & Trenchless Technology, Robbins

KAPIL BHATI
Managing Director
Robbins Tunneling and Trenchless Technology

in India has been existing since 2005 and have worked in many projects of Metro, Irrigation, hydro and water transfer tunnels. Robbins TBM's has finished Projects in Delhi Metro phase II, Jaipur Metro and Water Transfer tunnel of 8.3Km in Mumbai establishing an Indian tunnelling record of 870 m in a month and completed the entire tunnelling in 18 months. Apart from this, Robbins have supplied 2 X 10m Double shield Hard Rock machines for Alimineti Madhava Reddy project and running with the expert crew of Robbins India on per meter basis which have completed 33km from total of 43.5Km. said, "

Manoj Garg, Managing Director, Herrenknecht India, says, "Modern tunnel boring machines and construction technologies make it possible to build routes that run very

MANOJ GARG
Managing Director
Herrenknecht India

close to ideal lines, bringing a real breakthrough for routes that would have been inconceivable in the past. The machines used are always designed for the purpose in question in each case depending, for example, on the geology, hydrology, the diameter or the construction

site circumstances. In comparison to other methods, the potential environmental impacts in terms of noise, dust and visual on sensitive receives are significantly less, and are restricted to those located near the launching and retrieval shafts. Compared to the cut-and-cover approach, disturbance to local traffic and associated environmental impacts and the quantity of C&D materials generated, are much reduced."

Gulshan Gill, Managing Director, Terratec India, said, "Terratec is well-known

GULSHAN GILL
Managing Director
Terratec India

in India for its high quality of products and services to the tunnelling industry. Terratec has developed TBMs that can accommodate very tight curves, 43.7m-radus on a 2% up-grade trajectory.

These TBM machines can only be designed and operated by a highly qualified engineering team. Terratec provided dual mode TBMs for the Mumbai Metro.

In a busy city like Mumbai, these TBMs performed admirably, excavating 300+/month and 23.78m in 24 hours. Terratec always provides customized solutions for projects based on the project requirement." ■

Terratec has developed TBMs that can accommodate very tight curves, 43.7m-radius on a 2% up-grade trajectory.

GULSHAN GILL
Managing Director, TERRATEC INDIA

Tell us about your company's India operations, products and services for this market?

Terratec is a world-renowned manufacturer for Tunnel Boring Machines (TBMs), Raise Boring Machines (RBMs), Conveyors, and Railed Based Equipment. Terratec has supplied TBMs for a wide range of infrastructure projects in India including metros, semi-high-speed rail, hydropower, sewer, and fresh water tunnels. This covers all of the major types of TBMs, such as Open TBMs and Double Shield TBMs for hard rocks, Earth Pressure Balance Tunnel Boring Machines (EPBs) for soft and mixed ground, and open TBMs for deep shaft tunnels for fresh water. Terratec has field service members on-site at all times to provide highly-skilled TBM service for the vast fleet of TBMs deployed across India.

What are the major projects underway for your company (in India)?

CHENNAI

Terratec is proud to be providing five out of the seven TBMs required for the Chennai Metro Rail project in India. Five ordered 6.61m diameter Earth Pressure Balance Tunnel Boring Machines (EPBMs) will be used by Contractor, Tata Projects Ltd. for its underground works contracts on Chennai Metro Rail Phase-II Corridors India.

The new TBMs will be used on Chennai Metro Rail tunnelling contract for Chennai Metro Rail Limited (CMRL) to build Phase 2 - Corridor 3, from Venugopal Nagar Station to Kellys Station. The work involves the construction of 18 km of bored tunnels.

KANPUR

Two 6.52m diameter Terratec Earth Pressure Balance (EPB) Tunnel Boring Machines have been delivered for Uttar Pradesh Metro Rail Corporation (UPMRC) for the Corridor-1 of Kanpur MRTS Project (KNPCC-05) in India.

The TBMs will be utilised by the Gulermak-Sam India JV for the execution of the tunnelling works on the first underground tunnelling package (KNPCC-05) of the 32.4 km Kanpur Metro Phase 1 project's 8.6 km underground section.

SURAT

Terratec has secured all machine orders for Phase I of Surat Metro Rail Project in India. Four 6.61m diameter Earth Pressure Balance Tunnel Boring Machines (EPBMs) will be used by Contractors Gulermak and JKumar for Phase I of Surat Metro Rail Package UG-01 & UG-02 which consist of a 7km underground tunnel and six underground stations. Terratec provides all spare parts, onsite technical assistance and a key field service engineer for the whole refabrication. Terratec is proud to be the sole provider of all the TBMs for the project.

The Surat Metro is an under-construction rapid transit rail system for Surat in Gujarat state of India. Two corridors with a combined length of 40.35 kilometers are under construction since January 2021.

MUMBAI

Water Tunnel AMT-I & AMT-II: In 2020 & 2021, Terratec has delivered two new 3.2m Diameter Open TBMs for the Municipal Corporation of Greater Mumbai's (MCGM) Amar Mahal I & II Tunnel Project in Maharashtra. Contractors Soma Enterprise Limited and Patel Engineering Limited are currently building water transfer tunnels in Mumbai, India.

The two 3.2m diameter Terratec Open

TBMs are used to augment and improve its water distribution system and ensure reliable supply. A major challenge is to assemble the TBM in a depth of 110m and the space inside the tail tunnel and the jobsite is extremely tight.

One of the special features of the TBM is that it has been designed to be disassembled with all components being removed through the completed tunnel. The largest part is the cutterhead and this is designed with a flange that allows the cutterhead to be removed in two pieces.

The two Open TBMS are excavating 14km tunnels 90m deep in Mumbai. TBMs achieved a peak performance of 650m/month and an average of 300+m/m.

Sewer Disposal Project Stage II Priority Works (MSDP) Project: In 2020, Terratec has deployed a new 3.14m diameter Earth Pressure Balance Machine (EPBM) for the Mumbai Sewer Disposal Project (MSDP) Stage-II Priority Works Project, in Mumbai, India. The machine is used by contractor Michigan Engineers Pvt. Ltd. for Municipal Corporation of Greater Mumbai (MCGM).

Designed to provide a healthier and improved environment for the citizens of Mumbai, MSDP Project is one of a series of sewage projects being undertaken by the MCGM, which are being built to meet and improve the quality and reliability of the wastewater collection, treatment and disposal infrastructure for the ever-growing population.

Machine operation are assisted at all times by Terratec's highly-experienced Field Service staff, providing quality after-sales support to ensure optimum performance and successful project completion.

The various methods for tunnelling have their advantages and limitations. As a leading manufacturer of TBMs, what is the machine's versatility, cost-effectiveness and performance advantages in all strata?

TBMs are very output-oriented equipment. They need proper maintenance and spare parts availability to operate efficiently. TBMs are very useful in urban areas where conventional excavation methods are not feasible. TBMs are cost effective when they are used for longer section of tunnels. The production rate is higher than the conventional methods.

How your company does differentiate itself from other players in the industry in terms of technology?

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trajectory. These TBM machines can only be designed and operated by a highly qualified engineering team.

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How do you foresee the future of TBMs in India?

India is a vast country and rapid development is essential. India needs to build a lot of metros and the bullet train is just getting started. It will cover the country in a decade. These are the most urban projects that require tunnelling in urban areas. India is a driving force in the tunnelling industry. With a requirement for more equipment and more specialists. To achieve this end, Terratec has been investing in Terratec India for many years and we are proud to be expanding our organization all the time in facilities and personnel with local as well as expatriate staff. We are not just adapting to this rapid progress we welcome it.

We believe that the future of TBMs is very bright and as we say at Terratec 'Always Advancing'.

Terratec is proud to be part in this development. ■