



Terratec is renowned for its expertise in designing & supplying large diameter TBMs and TBMs that can handle sharp curves along the alignment

#### **GULSHAN GILL**

Managing Director, Terratec India

#### **How many different Tunnel Boring Machines (TBM) models does your company offer? What are the specifications and capabilities of each model?**

There are two main types of tunnel boring machines (TBMs): shielded (such as EPB and Slurry) and non-shielded (like Open TBM). In India, Terratec has constructed and utilized various TBMs, including EPB, Slurry, Open TBM, Hard Rock Double shield, and Dual mode machines, among others. Currently, Indian projects are employing Terratec TBMs of different sizes, ranging from the smallest EPB TBM for sewerage tunnels to the largest Double shield rock TBM for hydro projects.

#### **Do you offer customized TBMs to meet specific project requirements? Are there specific TBMs for different types of soil and rock conditions?**

Each tunnel boring machine (TBM) is custom-made to meet the specific requirements and geological conditions of the project. In the Indian market, EPB TBMs are the most commonly used machines. They are capable of operating in both soil and rocky conditions, providing the highest level of safety in urban areas. Slurry TBMs are the second most prevalent type, typically deployed in projects involving extremely hard rock and areas with heavy water ingress. For alignments where the geological composition consists of mostly good rock (over 90 percent) with some not-so-good rock (around 10 percent), Dual mode TBMs are offered. Terratec has successfully demonstrated the excellent performance of all these types of TBMs in the Indian market.

---

Terratec offers a highly efficient and skilled field service team responsible for managing TBM maintenance and providing support throughout operations.

---

#### **Mention some notable tunneling projects where your TBMs have been used.**

Terratec has supplied more than 45 tunnel boring machines (TBMs) for various tunnel projects across India that have utilized TBM technology. Some notable examples include DMRC Phase-III, Mumbai Metro Line 3, Ahmadabad Metro, Lucknow Metro, Amar Mahal Water Project, Priority Sewerage Project, Pune Metro, Kanpur Metro, and many others. Currently, TATA projects in Chennai are utilizing five Terratec TBMs for package TU01 of Chennai Metro's second phase of construction. These TBMs have been publicly recognized for their exceptional performance and timely completion in the challenging geological conditions of Chennai. On the smaller diameter front, our smallest EPB TBM is making remarkable progress in Mumbai. The 3.14 EPB TBM, operated by JK-Michigan JV, has achieved an average monthly progress of 370m so far in the ongoing Mithi River project.

#### **What are the latest technological advancements in your TBMs?**

Terratec is renowned for its expertise in designing and supplying TBMs that can handle sharp curves along the alignment. In line with this, Terratec is currently developing a TBM specifically for the Indian market, capable of navigating a 90mR radius curve. These TBMs are particularly beneficial in urban areas where constructing shafts can be difficult, resulting in significant time and cost savings. Additionally, our Dual mode TBMs have gained significant popularity

due to their remarkable success in the Mumbai Metro Line 3 Project.

### **How do your machines address challenges like ground settlement, noise, and environmental impact?**

Our machines are equipped with sensing instruments that provide early warnings if there is any settlement exceeding the permissible values. This allows the tunnel team to promptly take necessary measures to ensure safe progress. Moreover, our machines are electrically driven, resulting in a noise pollution-free operation. Additionally, detectors for various gases are installed on the TBM to protect against any potential harmful environmental impacts.

### **How do you ensure high operational efficiency and minimize downtime?**

We have a robust design combined with a highly efficient Field Engineering Service team consisting primarily of expert expatriates in their respective engineering fields. This team is capable of reaching the job site within a few hours of receiving notice. Additionally, our central store in Mumbai maintains a stock of spare parts worth over 20 crores, while our site store network at all job sites ensures immediate delivery of spare parts as required during operations.

### **What type of maintenance and support services do you provide to clients? Is there any remote monitoring or diagnostic system for TBMs?**

As mentioned earlier, Terratec offers a highly efficient and skilled field service team responsible for managing TBM maintenance and providing support throughout operations. They are readily available for emergency calls and also conduct regular maintenance activities. Additionally, the Terratec monitoring team closely monitors TBM parameters, which can be accessed remotely. In the event of any issues, they can offer suggestions and guidance to the customer to address the problem.

### **What safety features are integrated into your TBMs to protect workers and the environment during tunneling operations?**

The design of our TBMs adheres

to international safety standards and guidelines for TBM manufacturing. To ensure the safety of workers and operators, the TBM is equipped with multiple interlocks that safeguard against any unfavorable operational situations. Additionally, all logic systems within the TBM are controlled by programmable logic controllers (PLCs).



### **Does your company take any specific measures to ensure sustainable manufacturing and usage of TBMs?**

Upon project completion, we offer our clients the choice to either retain or sell the machine back to us. We have established arrangements within the country to refurbish the machines according to international ITA standards, and subsequently provide them to the next user at cost-effective terms. Furthermore, we have provided solutions to clients who wish to repurpose the used machines for another project by making appropriate replacements or refurbishments to adjust the boring diameters as needed.

### **Do you provide training for operators and maintenance personnel? Is there any technical support available during project execution?**

Terratec offers on-site and factory training for operators and technicians based on the specific requirements of our customers. We are committed to promptly resolving any issues for our customers, and our team is capable of providing support both online and offline, depending on the nature of assistance needed. ■

---

Each tunnel boring machine (TBM) is custom-made to meet the specific requirements and geological conditions of the project.

---