TERRATEC TBMS CONTINUE TO SUCCEED IN INDIA

As Gulermak-TATA Projects JV celebrates the early completion of TBM tunnelling on Phase 1 A of the Lucknow Metro, Larsen & Toubro India Ltd. gears up for launch on Package 2 of the Ahmedabad metro

Having delivered 22 TBMs to India in the last five years (more than any other manufacturer), TERRATEC continues to complete successful projects and in late-April provided more of the same as it joined workers and officials from Gulermak-TATA Projects JV and the Lucknow Metro Rail Corporation (LMRC) to celebrate the completion of the city's first TBM-driven tunnels as part of the 22.88km-long (Phase 1 A) Lucknow Metro North-South line.

The two 6.52m diameter TERRATEC Earth Pressure Balance (EPB) Machines, the S52 TBM named 'Gomti' and the S53 TBM named 'Ganga', simultaneously broke through at Lucknow's Hussainganj underground metro station on April 28, completing their third drives for the project, two months ahead of schedule. The event also marked the completion of tunnelling on the 3.67km long Charbagh-Hazratganj underground stretch in a record time of approximately 15-months.

The TBMs mined through geology consisting of stiff to hard clayey silt and medium to dense silty sand, passing beneath historic buildings in the Capital Plaza of Hazratganj (heritage district) without any disturbance to buildings, public utilities or traffic.

The EPB machines feature a classic soil configuration with a spoke-style cutterhead and a 57 percent opening ratio. TERRATEC designed the cutterheads with cutting tools that are interchangeable with 17" roller disc cutters, allowing the TBMs to bore through station D-walls and cope with the presence of unexpected obstacles in the ground.

However, tunnelling through the heart of Lucknow posed a number of difficulties and engineers working on the project carefully planned every step involved in the tunnelling operation. The final drives from Charbagh to Hussainganj were possibly the

most challenging, as the TBMs had to pass 1m below the bed of the Haider Nallah (canal) in a highly populated area full of dilapidated structures on weak foundations.

"During this journey, the TBMs delivered excellent performance, with no major breakdowns, crossing the Haider Nallah and so many other geological challenges along the way. We are very thankful to the entire Terratec team," says Ramesh K., Assistant General Manager (P&M) with TATA Projects. "With these state-of-the-art TBMs, and a dedicated, passionate, project team, this daunting task was completed in a world-class manner with outstanding quality and before-time completion."

These tunnels will provide Lucknow – the capital of Uttar Pradesh – with its first underground metro line, bringing modern public transportation to a city that is currently experiencing rapid population growth and substantial traffic congestion.

Meanwhile, Larsen & Toubro is gearing up to launch the first of two 6.57m diameter Earth Pressure Balance machines supplied by TERRATEC for Package 2 (East-West Corridor) of the 20.7km long Line 1 of the Ahmedabad Metro.

Awarded by Metro-Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd. in January 2016, the Package 2 contract includes the construction of 3.3km of twin tube running tunnels between Kalupur Railway Station and Shahpur, two underground stations at Gheekanta and Shahpur, as well as cut & cover structures, NATM connections and TBM launch and retrieval shafts.

"In recent years, TERRATEC has emerged as one of the most dominant TBM suppliers in the Indian market, having supplied 22 TBMs in the last five years alone," says Gulshan Gill, Managing Director of Terratec India, "Our clients repeatedly return to us, opting to select TERRATEC TBMs for their new projects due to the excellent performance of these machines, as witnessed by the tunnelling fraternity in India. TERRATEC's continuing success is a result of excellent tailor-made robust TBM design, prompt onsite assistance, a readily available stock of TBM spares, and highly-skilled specialised TBM support throughout the tunnelling operation."

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TERRATEC TERRATEC EPBMS PUSHING THE ENVELOPE IN BANGKOK

At the end of April, TERRATEC celebrated the successful Factory Acceptance Test of a new 4.27m diameter Earth Pressure Balance Tunnel Boring Machine (EPBM) destined for the Chidlom Cable Tunnel Project in Bangkok, Thailand. The event was attended by representatives of Bangkok's Metropolitan Electricity Authority (MEA) and contractor Italian-Thai Development PCL (ITD).

Designed to accommodate a new high-voltage cable system, the Chidlom Cable Tunnel Project is one of a series of tunnelling projects being undertaken by the MEA, which are being built to meet increased power demands in the Thai capital. Running from the Central Embassy mall and MEA's Chidlom Electrical Facilities southwards to Lumphini Park, the project is located in one of the busiest and most built up areas of downtown Bangkok, and is subject to tight alignment constraints including the need to carefully navigate the foundations of the Chit Lom BTS Skytrain Station. To achieve this, the TERRATEC Earth Pressure Balance Machine has been designed with an extreme X-type articulation system, which can accommodate very tight radius curves.

"We have worked closely with

TERRATEC's tight radius TBMs are enabling a highly challenging project alignment for Bangkok's Metropolitan Electricity Authority in one of the city's busiest downtown areas.

TERRATEC on a number of projects in the past and were keen to work with them again," says Supak Khunviriya, Project Manager for ITD. "TERRATEC has past experience of similar projects with tight radius curves in Bangkok and the TBM has been designed to achieve a high level performance in difficult circumstances."

The TBM's soft ground cutterhead features an open spoke design with the addition of knife bits to assist break-in and break-out of the concrete shaft eyes. Universal tapered precast concrete segments will typically be installed as the machine progresses, with shorter steel segments utilised during the course of the sharp radius curves. Geological conditions along the 1.35km tunnel alignment consist of stiff to very stiff clay with lenses of sand and a groundwater head of about 2 bars.

Due to heavy traffic and the physical limitations of this built up area – which includes numerous high-rise buildings and the skytrain viaduct – logistics during the launch and operation of the TBM will be extremely challenging, especially during the transportation and delivery of oversize TBM parts for assembly at site. TERRATEC's highly-experienced Field Service staff have therefore been working closely with ITD from day one in order to ensure every aspect is planned in advance.

"We have great faith in TERRATEC's staff, who will assist us throughout the tunnel construction," says Khunviriya. "There has been a close collaboration and exchange of information with TERRATEC since the tender stage."

The machine will be now shipped to Thailand and is expected to arrive in early-May. The TBM will then be transported to site and lowered down the main shaft in a carefully-planned operation that will take place in a single night.

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TERRATEC MEETS THE GOLD STANDARD IN COLOMBIA

In early June, TERRATEC successfully completed the Factory Acceptance Testing of a TR2000 Raise Boring Machine (RBM), which will be deployed by Peruvian mining contractor INCIMMET on Continental Gold's flagship Buriticá mine development project, in Colombia. The celebration ceremony was held at the company's workshop in Tasmania, Australia.

Located approximately two-hours northwest of Medellin, Colombia's second largest city, the Buriticá project is one of the world's biggest undeveloped high-grade gold projects, encompassing an area of 74,164 hectares in the Antioquia Department. It is Colombia's first modern underground mine and was designated as a Project of National Strategic Interest (PINES) by the Colombian government, in November 2015.

After extensive research and analysis, INCIMMET selected TERRATEC to be the raise boring machine provider to support its operations. The contractor selected TERRATEC as its products deliver the best overall quality, technology specifications, competitive pricing, financing and delivery time to market.

Manufactured at TERRATEC's workshop in Tasmania, the TR2000 Raise Boring Machine is a highly robust piece of equipment, designed for ease of operation and maintenance, providing a high level of reliability. The unit it is designed to "comfortably" execute raises of up to 500m at 2.4m diameter and larger ones of 4.1m diameter (of shorter depths). It has a maximum pilot drilling

torque of 42,000Nm, reaming torque of up to 209,000Nm and breakout to 236,000Nm. The maximum down thrust force is 665kN with up thrust being 4,150kN. The total installed power on the machine is 360kW.

At the end of last year, TERRATEC marked the opening of a new office in Lima, Peru, to support its continued growth in the Central and South American Raise Boring Machine (RBM) market. The new office is focused on machine sales, as well as the ongoing servicing and maintenance of existing units working in the region.

"TERRATEC's units are in great demand due to the simplicity of their design, which ensures robust performance underground and very high mechanical availability rates," says John Alejos, TERRATEC's Regional Director of Operations (Raise Boring). "Now, Colombia's first modern underground mine will also get to benefit from the reliability and performance of these durable machines."

TERRATEC has numerous Raise Boring Machines currently working along the American continent in Canada, USA, Mexico, Colombia, Peru and Argentina. These include the company's range of Raise Boring Machines, Down-Reaming Drills and Box Holing Rigs, as well as combination of those in the form of Universal Boring Machines, all of which have been recognised for their innovative high-performance design.

TERRATEC's experienced Engineering and Field Service Team can assist buyers from the planning stage, including custom design specifications, assembly and operation on site, and lifetime servicing and maintenance support.

WATCH US ON YouTube

A video featuring TERRATEC's Double Breakthrough in Lucknow, India. Watch now!

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