

# BREAKING THROUGH AHEAD OF SCHEDULE IN LAOS



*SELI Overseas has completed excavation of the 11.5km long headrace tunnel at the Xe-Pian Xe-Namnoy Hydroelectric Project, in southern Laos, more than three months ahead of schedule.*

**O**n March 18, 2017, TERRATEC's 5.74m diameter H43 Double Shield TBM broke through into a reception chamber on the Xe-Pian Xe-Namnoy Hydroelectric Project, in Laos, successfully completing a 11.5km long drive for the project's low-pressure headrace tunnel.

Mucking out with rolling stock, SELI Overseas achieved impressive production rates with the powerful TERRATEC

TBM during the course of the project – including a record-breaking single month advance of 1,005m in July 2016 – allowing the contractor to finish excavation three and a half months ahead of schedule.

The machine faced several challenges while boring through the region's mudstones, sandstones and siltstones, which required SELI Overseas and TERRATEC to collaborate closely over the course of the

design, commissioning and operation of the machine.

The TBM's cutterhead features 39 x 17in back loading disc cutters and four large bucket openings. A 2000kW electric VFD main drive provided maximum speeds of 7rpm in hard rock zones, while delivering a torque of 8,000kNm to cope with a number of fractured fault zones, while delivering a torque of 8,000kNm to cope with a



number of fractured fault zones along the alignment. In order to mitigate potentially difficult ground conditions within these fault zones, a high-power probe drill was also installed within the TBM, in order to conduct any drilling or grouting deemed necessary.

The use of pea-gravel to backfill the annulus behind the project's pre-cast hexagonal segment lining rings also prompted some unique design features, including a hydraulic lift within the pea-gravel bays on the back-up to lift and empty the gravel cars; and a double capacity pea-gravel pumping system to facilitate the anticipated high advance rates of the machine.

"This tunnelling experience has

been very good," says Dario Vizzino, Project Director for SELI Overseas. "The TERRATEC TBM is very powerful and has performed extremely well. I think it is proof of the quality of the TBM, the team and also all of the systems that we chose for this project. Terratec deserves special appreciation for its support on site, as well as the attitude of all its staff. I can say that working with TERRATEC it feels really like one group and jointly we have achieved a wonderful result."

The tunnel drive finished underground in a TBM disassembly chamber that was excavated by drill and blast. The entire machine will now be dismantled and its components will be brought all the way back through the tunnel.

The Xe-Pian Xe-Namnoy Power Company's (PNPC) US\$1.02 billion Xe-Pian Xe-Namnoy Hydroelectric Power Project is located in the south of Laos, about 35km northwest of Attapeu and 80km east of the Mekong River town of Pakse.

PNPC is a consortium of Korea's SK Engineering & Construction (SK E&C), Korea Western Power (KOWEPO), Thailand's Ratchaburi Electricity Generating Holding (Ratch), and Lao Holding State Enterprise (LHSE). SK E&C is undertaking the EPC contract for the project, while SELI Overseas was awarded the subcontract to excavate the TBM section of the headrace tunnel, along with the operation of the project's on-site segment facility.

## TERRATEC OPENS BRAND NEW LARGE-DIAMETER TBM FACILITY

**A**t the end of January, TERRATEC held an official ceremony to mark the opening of its new large-diameter production facility in Guangzhou, China. The new plant – which has the capacity to produce a maximum of 20 large diameter (>6m) tunnel boring machines per year – will augment the company's existing international production capabilities in order to facilitate the increased demand for multiple machine orders on numerous large scale tunnelling projects currently ongoing throughout Asia.

"We are proud to mark this occasion and celebrate the continued growth of

TERRATEC in one of its principal markets," says Sales & Marketing Director, Bruce Matheson. "As a privately-owned and independent company, TERRATEC has achieved considerable success in Asia to date, which is largely due to our ability to remain flexible and highly-efficient in a competitive industry that demands dynamic solutions. This company stability and success has led to an increase in return-customer driven demand that has required us to further expand our large-diameter TBM production capabilities."

The new factory – which is approximately an hour by

ferry from TERRATEC's Asia Headquarters, in Hong Kong – will replace existing large-diameter TBM production in Wuhan and will be solely managed by Terratec China, a 100% subsidiary of the Terratec Group, ensuring complete production control by TERRATEC and its personnel.

"The new plant allows us to assemble four 6m diameter TBMs simultaneously or a mixture of machine diameters of up to 15m," says Chris Liu, Terratec China's Managing Director. "From now on, we expect to produce between 10 and 20 large diameter TBMs per year here, depending upon market demand."



## TERRATEC'S MICROTUNNELLING SYSTEMS EXCEL IN BANGKOK

In February 2017, TERRATEC Micro Tunnel Boring Machines (MTBMs) achieved several milestones on the Bangkok Metropolitan Electricity Authority's (MEA) new cable tunnel system, in Thailand. In recent years, the Australian-based TBM manufacturer has sold more than 20 Pipe Jacking and Microtunnelling Systems to contractors working on utility and drainage tunnel projects in the Thai capital, as well as a number of larger diameter Earth Pressure Balance (EPB) and Double Shield TBMs.

At present, four Total Solution

Pipe Jacking Systems are at work on two separate projects for the MEA's 230kV ultra high-voltage underground cable tunnel programme, which is being undertaken to meet the ever-increasing demand for energy consumption in major business areas of the city.

These include two DN1500+ Slurry MTBM Systems for the Italian-Thai Development Public Co. Ltd.'s (ITD) contract on the MRT Green Line (North) Cable Tunnel Project and two DN1800+ Slurry MTBMs that are being employed by Drill Tech (Thailand) Co., Ltd. on

the Chaloeprakriat RAMA IX Cable Tunnel (Srinakarin to On-nut section).

The M46 and M47 MTBM Pipe Jacking Systems at work on ITD's 8,696m-long MRT Green Line (North) Cable Tunnel Project were launched respectively in February and May 2016, and feature soft ground cutterheads with an open-style configuration suited to Bangkok's geological conditions. They are designed to handle standard 1500mm i.d., 3000mm long, concrete pipes and are able to excavate tunnel drives up to 350m with



the assistance of Intermediate Jacking Stations. To date these MTBMs have been averaging 206m per month, and with 6,856m (79%) of the tunnelling works now complete on the project, progress is currently an impressive 40 percent ahead of schedule.

TERRATEC's scope of supply includes the MTBM Shields, Main Jacking Stations, Intermediate Jacking Stations, Slurry Transport and Lubrication Systems, digital Guidance Systems and Control Rooms on the surface.

On the Chaloeprakriat RAMA IX Cable Tunnel (Srinakarin to On-nut section), two DN1800+ Slurry MTBMs (M41 and M49)

began tunnelling in August and October 2016 respectively and are already 15% ahead of schedule on the 6,457m-long tunnel, despite night-only working on the project.

The MTBM systems were all designed by TERRATEC at its Engineering Centre in Hobart, Australia, with production and assembly taking part at TERRATEC's speciality Microtunnelling Systems Production and Service Center in Nonthaburi, north of Bangkok.

In recent years, the company has sold more than 20 Microtunnelling Systems in Thailand – with diameters ranging from 300mm to

1800mm – a trend that prompted TERRATEC's management team to set-up its Thai production and maintenance centre.

"TERRATEC is well known in the industry as a leading TBM and Raise Boring Machine manufacturer and our Microtunnelling Systems complete this range of machinery," says Krittapon Jitpakdee, Managing Director of Terratec Tunnelling in Thailand. "The proven success of our MTBM solutions is reflected in the level of repeat business we are witnessing, both in terms of new and refurbished machine orders and also Field Service requirements. We are working hard to cultivate this growth."

## WHEREABOUTS

Meet TERRATEC at the following conferences and exhibitions!



4th Latin American Tunnelling Seminar - LAT 2017  
Apr 3-5 | São Paulo, Brazil



Expominas Ecuador  
Apr 6-8 | Quito, Ecuador



Arminera 2017  
May 4-6 | Buenos Aires, Argentina



**RETC2017**

June 4-7, 2017  
Manchester Grand Hyatt  
1 Market Place, San Diego, CA

RETC 2017  
June 4-7 | San Diego, USA



WTC 2017  
June 9-15 | Bergen, Norway

## WATCH US ON YouTube

A video featuring SELI Overseas' TERRATEC Double Shield TBM breaking through on the Xe-Pian Xe-Namnoy Hydroelectric Project, in Laos, can be found here: Watch now!



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