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Conveyor Systems

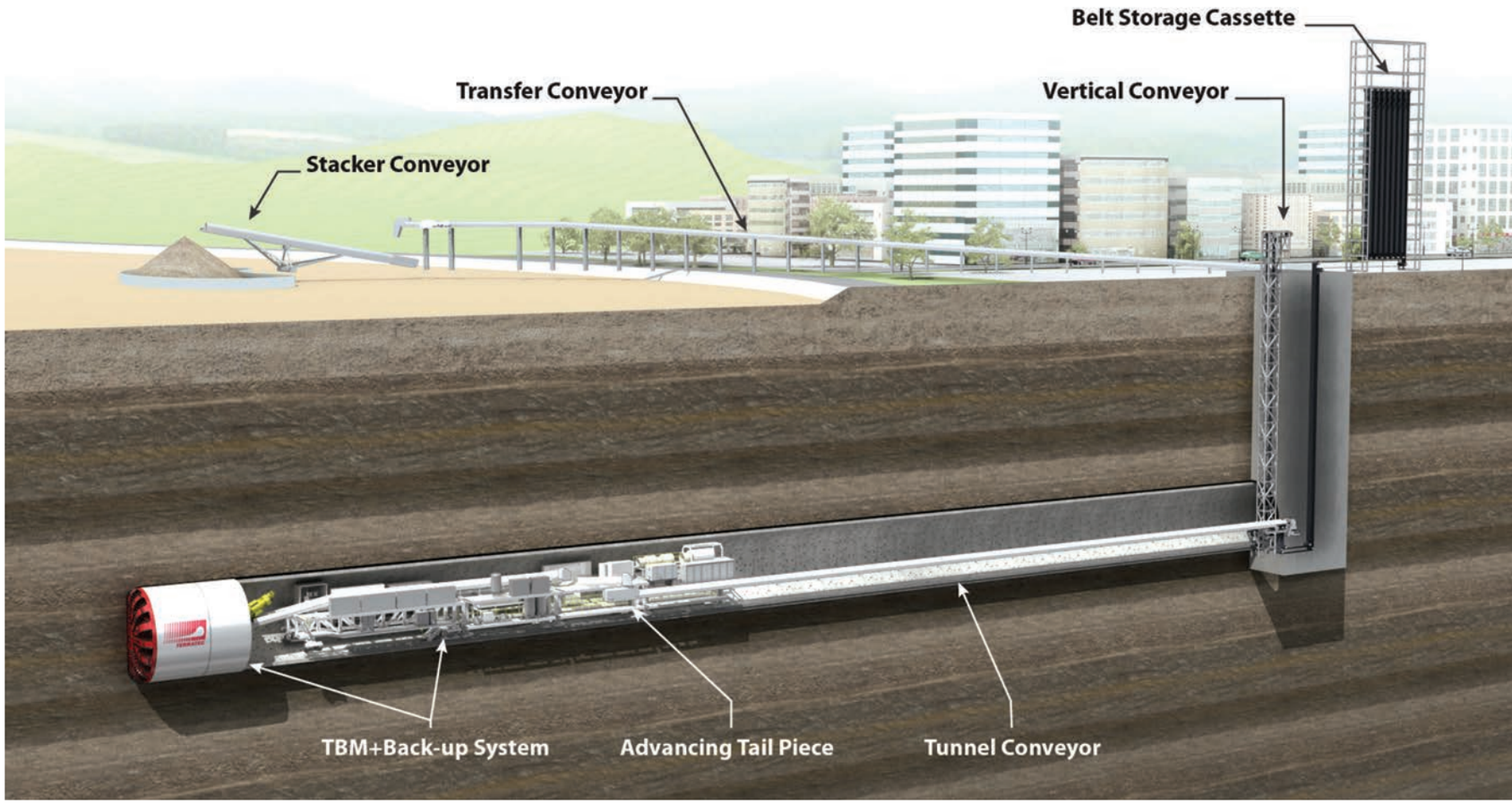
Conveyor Systems

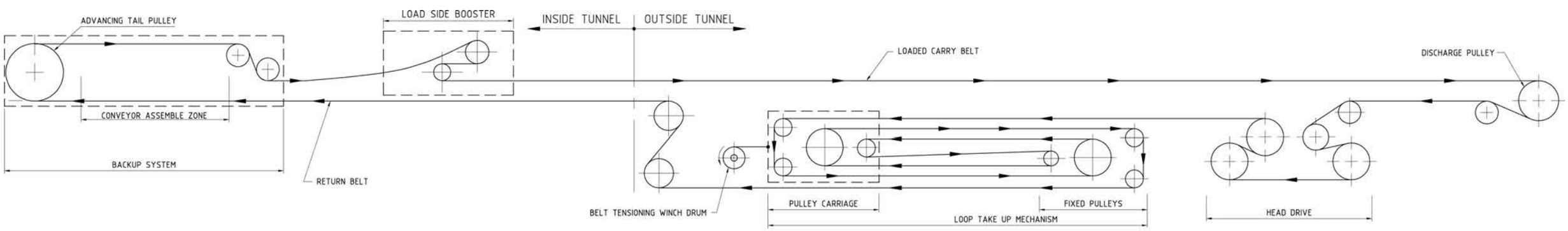
The success of the construction of a tunnel not only depends on the selection of the most suitable tunnelling machine, but also on the most efficient system to evacuate the spoil excavated by the TBM out of the tunnel. Disruption in the evacuation works very often leads to the TBM boring availability and subsequently, stoppage of the overall production of the project.

The use of a Conveyor System has numerous advantages, especially when tunnels are long, slopes are steep or the space for unloading spoil is limited in the tunnel portal. Conveyor Systems have many benefits over evacuation by Muck Cars in terms of productivity, safety, operation and maintenance costs.

Since 1990, TERRATEC has designed and built sophisticated continuous conveyor systems specifically for individual tunnel and TBM conditions. These systems include continuous conveyor systems in the tunnel, transfer systems, vertical conveyors and stacker systems at the tunnel portal.

TERRATEC Conveyor Systems have been successfully installed on its own TBMs or TBMs manufactured by other suppliers, to convey either hard rock or soft soil, with excellent results in numerous projects for different applications.





Conveyor Systems

TERRATEC's in-house Engineers detail design each component ensuring the smooth and synchronized operation of all the conveyors working at the project site.

TERRATEC's Continuously Advancing Conveyor Systems can be side wall or crown mounted. The crown mounted type can be installed in tunnels as small as 3.0m in diameter. This unique design allows the one system to traverse very sharp horizontal curves in small diameter tunnels.

The carry and return roller sets are wider than standard for the size of belt to allow increased tolerance for belt wander and additional control in horizontal curves. Roll Vee return idlers are used throughout to control return belt tracking.

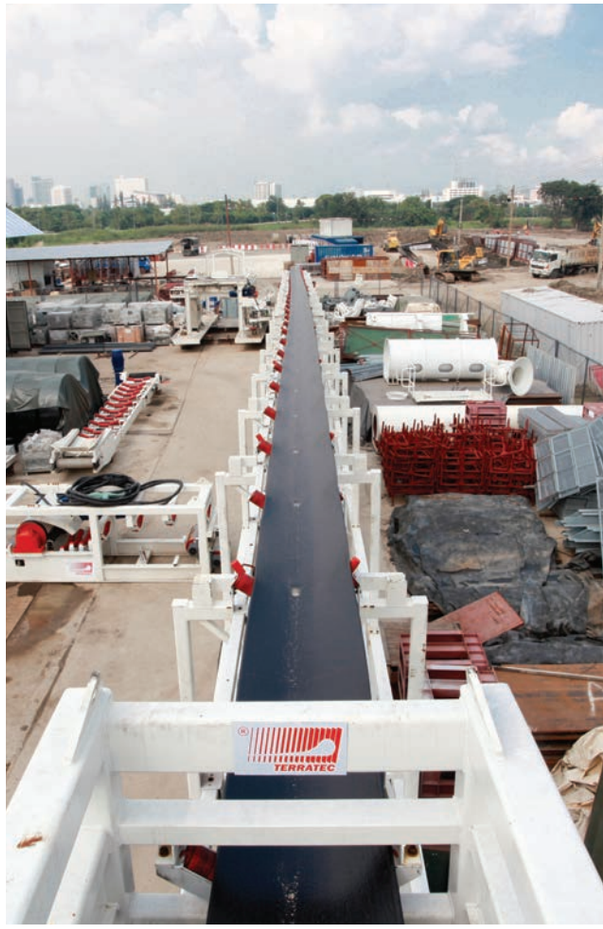
TERRATEC's unique and patented design of the Advancing Tail Piece levels the Tunnel Conveyor by an active hydraulic system to match the steering/rolling position of the TBM. This allows the smooth negotiation of any horizontal and vertical curves.

TERRATEC's Belt Storage Cassette is custom designed, Horizontal or Vertical Type, for each project, depending on the available space at the Jobsite. Generally the Belt Storage Cassette can store 500m of belt, which will allow the TBM to bore 250m of tunnel without any interruption. Terratec's Winch Drives use Flux Vector Control Technology with control hardware and software logic that ensures close to perfect control of take up tensions.

Tunnel Conveyor (Continuously Advancing)

TERRATEC has designed and built sophisticated continuous conveyor systems specifically for individual tunnel and TBM conditions.

Especially when tunnels are long, when slopes are steep or when the space for unloading spoil is limited in the tunnel portal, the usage of a Tunnel Conveyor has innumerable advantages over evacuation by Muck Cars in terms of productivity, safety and operation and maintenance costs.



Case Study: Vishnugad-Pipalkoti Hydroelectric Project

Project Name: Vishnugad-Pipalkoti Hydroelectric Project
Location: Pipalkoti, INDIA
Year: 2014
Client: Hindustan Construction Co. Ltd
Tunnel Length: 13Km
TBM Type: Ø9.86m Hard Rock Double Shield TBM

The Vishnugad-Pipalkoti Hydropower Project is a significant infrastructure development located in Uttarakhand, India. The project is to be found approximately 500km northeast of Delhi and involves the construction of dams, waterway tunnels, vertical shafts, and a powerhouse with a generation capacity of 444 MW. The project is designed to produce 1657.09 MU of energy. Of the 13% free power that is allocated to Uttarakhand, the home state, 1% will be dedicated to local area development.

TERRATEC is supplying the Continuously Advancing Tunnel Conveyor for the project. The TERRATEC Continuously Advancing Conveyor, designed to meet the project's unique requirements, will be 13 km long and operate at a rate of 1200t/h. The conveyor is designed to efficiently transport the various materials extracted by the Tunnel Boring Machine along the entire length of the tunnel. The materials to be conveyed range from sandy gravel to boulders, demonstrating the robust capabilities of TERRATEC's conveyors. TERRATEC's unique and patented design of the Advancing Tail Piece uses an active hydraulic system to level the Tunnel Conveyor to match the steering/rolling position of the TBM. This allows for the smooth negotiation of any horizontal and vertical curves.

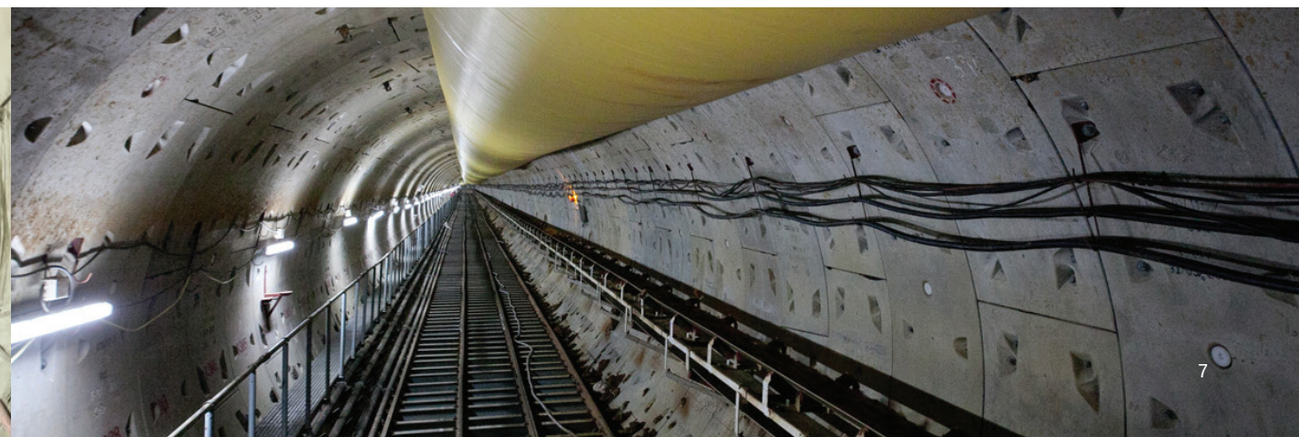
Case Study: Bangkok Metro: Blue, Orange & Purple Lines

Project Name: Bangkok Metro: Blue, Orange & Purple Lines
Location: Bangkok, THAILAND
Year: 2012, 2017, 2023
Client: ITD-NWR MRT Joint Venture,
Italian-Thai Development PCL (ITD)
Tunnel Length: 3.2Km
TBM Type: Ø6.39m diameter Earth Pressure Balance TBM

Bangkok's metro has existed since the early 2000s and seems to be constantly upgraded and extended. TERRATEC has been involved throughout this period of growth, supplying a total of 4 TBMs on projects over the last decade and a half with a total of 12.2km of metro tunnel excavated by early 2024.

Blue Line Extension: The contractor excavated the tunnel using a 6.44m diameter EPBM, which was designed and produced by Terratec in cooperation with Japan Tunnel Systems Corporation (JTSC), a subsidiary of Japanese-Giant IHI Group. The EPB shield had been specifically customized for the project, with a unique IHI-designed cone-type cutterhead for cutting concrete piles expected along the alignment. Terratec also provided the Tunnel Belt Conveyor System and had deployed a team of engineers and operators to assist during the assembly and commissioning of the TBM and Conveyor System.

Execution - Blue Line Extension: The average daily advance was over 15 meters. Ground conditions consisted primarily of soft to stiff clay and dense sand, coupled with high water pressure. The segmental liningconsists of reinforced concrete segmental rings with an outer diameter of 6300 mm, inner diameter of 5700 mm, and length of 1200 mm. The contractor, Italian-Thai Development PLC, used the machine to bore this 2,800 meter long alignment in one go, crossing two unexcavated stations and one ventilation shaft on its way. As well as other drives where the station were completed as when the TBM arrived, so it was dragged through those.



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