Press Release

HERRENKNECHT
Mechanical tunnel enlargement while rail operations continue

Schwanau, Germany

Hundreds of railway tunnels from the 19th and early 20th centuries need to have their tunnel cross-section adapted to current clearance profiles in order to facilitate the modernization of the railroad infrastructure. The Tunnel Enlargement System (TES) developed by Herrenknecht in collaboration with PORR enables the safe renewal and widening of old rail tunnels while rail operations continue. The system simultaneously serves as a carrier for excavation and safety work as well as a protective enclosure for rail traffic. TES has been nominated for the 2025 bauma Innovation Award in the "Mechanical Engineering" category.

_____ Compared to building a new tunnel, mechanized tunnel renewal during ongoing rail traffic operations massively limits the possibilities for the deployment of people and machines: the space for enlarging the existing cross-section is very limited. In addition, there are impairments due to the simultaneous rail operation. The requirements for spatial separation and safety of the working process are correspondingly high. Thanks to innovative solutions in machine technology, the Tunnel Enlargement System (TES) from Herrenknecht makes it possible to safely expand older rail tunnels using the so-called tunnel-in-tunnel method and make them fit for the future.

The TES is based on experience with classic tunnel boring machines in hard rock and accommodates the necessary excavation and safety equipment in less than half the available space. In view of the stringent safety requirements during rail operations, the protective housing is a key system component. The TES consists of three parts: The front machine section protects the tunnel and the railway from collapse and falling rock. The two rear sections form the working area. The middle section carries the necessary equipment such as telescopic drill rigs, hydraulic hammer and shotcrete system for excavation and securing work. The gantry houses the production logistics with aggregates, compressors, ventilation and dust extraction systems, electrics and material storage.
With the TES, Herrenknecht, in collaboration with PORR, has innovatively adapted existing machine technology and created a new product that enables a high degree of

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modularity. Users benefit from an integrated system for drilling, loading, blasting, reprofiling and securing with shotcrete, mats, arches and anchors. With its perfectly coordinated equipment, the TES increases work safety and raises the level of mechanization.

The TES enables tunnels to be widened while rail operations continue, as it also acts as an enclosure to protect rail operations. Line closures can be reduced to a minimum and the original alignment of the railway line is retained. Due to the retention of spatial planning, this can not only minimize planning approval or plan amendment procedures, it can also reduce further impacts on protected assets such as people and the environment. Ergonomic features such as fixed working platforms improve occupational safety, while mechanized and remote-controlled equipment reduces manual work in potentially hazardous areas.

In view of the fact that around 800 railway tunnels were built in the German-speaking countries alone between 1850 and 1910 and are now ageing, the TES makes a significant contribution to the efficient, sustainable modernization of infrastructure: with low maintenance costs, the tunnel is fit for the next 100 years of operation.

Since January 2024, PORR has been using two TES to renew two 160-year-old tunnels on the Lahn Valley Railway. The 426-meter-long Fachingen Tunnel and the 732-meter-long Cramberg Tunnel will be widened by a good two meters in radius using the tunnel-in-tunnel method while rail operations continue, thus achieving a clearance profile that corresponds to current new tunnel construction. The distance between the tracks will be increased to 4 meters. At the Fachingen Tunnel, the tunnelling work was successfully completed in November 2024 with the breakthrough.

Photos:

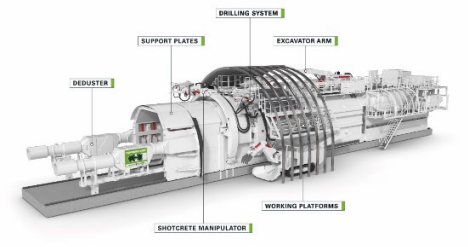

Photo 1

Tunnel Enlargement System (TES) from Herrenknecht: machine technology – 3D representation of the overall TES system

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Photo 2

Tunnel Enlargement System: breakthrough at Fachingen Tunnel

Photo 3

Tunnel Enlargement System during ongoing rail operations.

For further information: Please contact us.

Herrenknecht AG

Herrenknecht AG is the only company worldwide to deliver tunnel boring machines for all geologies and in all diameters – ranging from 0.10 to 19 meters. The product range comprises tailor-made machines for traffic, supply and disposal tunnels, technologies for pipeline installation as well as additional equipment and service packages. Herrenknecht also manufactures drilling equipment for vertical and inclined shafts as well as deep drilling rigs.

In 2023 the Herrenknecht Group achieved total output of 1,296 million euros. The independent family business employs about 5,125 people worldwide, including approximately 200 apprentices and trainees. With over 60 domestic and overseas subsidiaries and associated companies working in related fields, Herrenknecht provides comprehensive, fast and targeted services close to each project and contractor.

› http://www.herrenknecht.com/en/references

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