



Press Release

HERRENKNECHT

Mega project in China: 17.5-meter TBM “Shanhe” is ready for construction site

June 4, 2024

Jinan, China

Herrenknecht has built a Mixshield tunnel boring machine (TBM) for the construction of a two-storey road tunnel with three lanes in both directions in the eastern Chinese city of Jinan. The Mixshield technology is designed for the extreme conditions of the upcoming undercrossing of the Yellow River. The TBM is currently being dismantled and then reassembled on the construction site. A machine of this diameter has only been used twice before in the history of tunnelling - the largest in 2015 in Hong Kong, also a Herrenknecht Mixshield (diameter: 17.63 meters).

_____ The order for the Herrenknecht subsidiary Herrenknecht Tunnelling Machinery (HTM) in China was a tough one: the request was for a machine to cross under the Yellow River in Jinan in eastern China, in a geological environment with high groundwater pressure and to create just one tunnel tube for both directions of travel. A correspondingly large diameter was therefore required: 17.5 meters over a section of 3.3 kilometers.

Jinan is located around 400 kilometers south of Beijing, has a population of nine million and is the capital of the Chinese province of Shandong and an important business location. The road tunnel project to cross under the Yellow River is already the second one in 2024. Tunnelling is scheduled to begin in late 2024. The project aims to improve the connection between the two sides to the north and south of the Yellow River.

Adaptations to the geology

To adapt to the clay, sand and silt geology and the 7.5 bar groundwater pressure under the Yellow River, a Mixshield TBM was selected. The Mixshield technology developed by Herrenknecht is an advance on conventional slurry technology. The support pressure in the excavation chamber is precisely managed using an automatically controlled air cushion. This means that heterogeneous geologies and high water pressures of more than 15 bar can be controlled safely even with very large

Herrenknecht AG
Schlehenweg 2
77963 Schwanau

Corporate Communications
Tel. +49 7824 302-6065
pr@herrenknecht.de

www.herrenknecht.com



excavation diameters. An individual, new slurry circuit was designed especially for TBM “Shanhe”.

“We have also equipped the machine with our special telescopic camera in order to better monitor the tool change and the face,” says Herrenknecht project manager Zhao Bin, who has already supervised several projects for clients in China. Most recently, he supervised the two TBMs that are also crossing under the Yellow River just a few kilometers away from the new construction site and building a road tunnel with two tubes (shield diameter of the two Mixshields for the Jinan Jiluo Road North Extension Tunnel project: 15.71 meters).

Connection for millions of people

Wang Hai is Deputy General Manager of the Herrenknecht office in Beijing and is advising the customer on the challenging project. He says: “Thanks to its efficiency, the new single-tube tunnel supports the national strategy of ecological protection and high-quality development of the Yellow River Basin. It removes a bottleneck of traffic across the river and is calculated to absorb 7.4 percent of the traffic volume in one go.”

PROJECT DATA JINAN HUANGGANG ROAD YELLOW RIVER CROSSING TUNNEL

- › Client: Jinan Urban Construction Group Co
- › Contractors: China Railway 14th Bureau Group Co.
- › Application: Road
- › Drive length: 3,290 m
- › Geology: Clay, Silty Clay, Sand, Silt, Calcareous Nodules, Glued Sand

MACHINE DATA

- › Machine type: Mixshield
 - › Max. excavation diameter: 17,505 mm
 - › Cutterhead drive power: 5,600 kW
 - › Torque: 35,017 kNm
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Photos



Photo 1

The factory acceptance ceremony with representatives of manufacturer Herrenknecht on the picture.



Photo 2

The Herrenknecht TBM "Shanhe" with a diameter of 17.5 meters and the face of a qilin creature painted on its cutting wheel.



Photo 3

The cutting wheel of TBM "Shanhe" is painted with the face of a qilin, one of the four divine creatures in Chinese mythology.

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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 5,000 people worldwide, including approximately 200 apprentices and trainees. With more than 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.

› <https://www.herrenknecht.com/en/references/>

Your contact:

Anja Heckendorf

Head of Corporate Communications

Phone +49 7824 302-6065

pr@herrenknecht.de

Herrenknecht AG
Schlehenweg 2
77963 Schwanau

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