

thyssenkrupp rothe erde

Precision and durability in tunneling applications



thyssenkrupp





Applications for extremely high demands

We at thyssenkrupp rothe erde are the leading global manufacturer of slewing bearings and one of the largest producers of rolling bearings and seamless rolled rings. Ever since the beginnings of tunnel boring technology, thyssenkrupp rothe erde has been actively working in this field. We manufacture slewing bearings up to diameters of approx. 9,600 mm as a seamless rolled ring design, and segmental bearings exceeding bearings up to 18,000 mm.

As a long-established company thyssenkrupp rothe erde has a global manufacturing network in order to serve the customer's unique requirements. Starting with processing the raw material to finishing the product, as well as distribution and after-sales service – our commitment is to deliver the best quality and the most durable products to meet the most demanding requirements. Every day, we contribute to keeping everything rotating smoothly – all around the world.

Applications used in tunneling require products with a particularly high degree of precision and durability under exceptional operating conditions. Therefore, our products are designed to set the highest standards in terms of reliability during the entire operational lifetime. Every bearing is individually designed for the specific application requirement.

Product types

Tunnel boring machines (TBM)

Main shield bearing

More than 2,000 TBM cutter heads have been equipped with main bearings from thyssenkrupp rothe erde in a diameter range from below 2,000 mm to nearly 10,000 mm.

A multitude of aspects must be considered when building a tunnel, especially the geology, hard rock formations and tunnel length. By default, our rothe erde® slewing bearings are designed and manufactured as ready-to-install elements. In the event that installation circumstances or transport restrictions hinder the use of a slewing bearing in seamless rolled ring design, we are able to offer the same sophisticated solution in a segmented version – and up to an outer diameter of 18,000 mm.

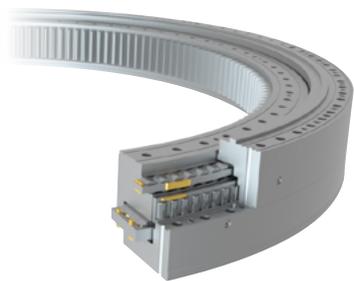
Our highly skilled service engineers will, of course, come to your premises or even to your job site – no matter how remote – to assemble and install your slewing bearing into your machine.

Erector bearing

Our single-row four-point bearings have been used successfully in hundreds of TBM-erectors all over the world. Here too, we offer customized solutions for your project.

Disc cutter

thyssenkrupp rothe erde Slovakia a.s. can furnish a wide range of rolling bearings for the disc cutters of your TBM's cutter head.



Three-row roller bearing



Single-row bearing



Single-row tapered roller bearing



Vertical & horizontal boring machines

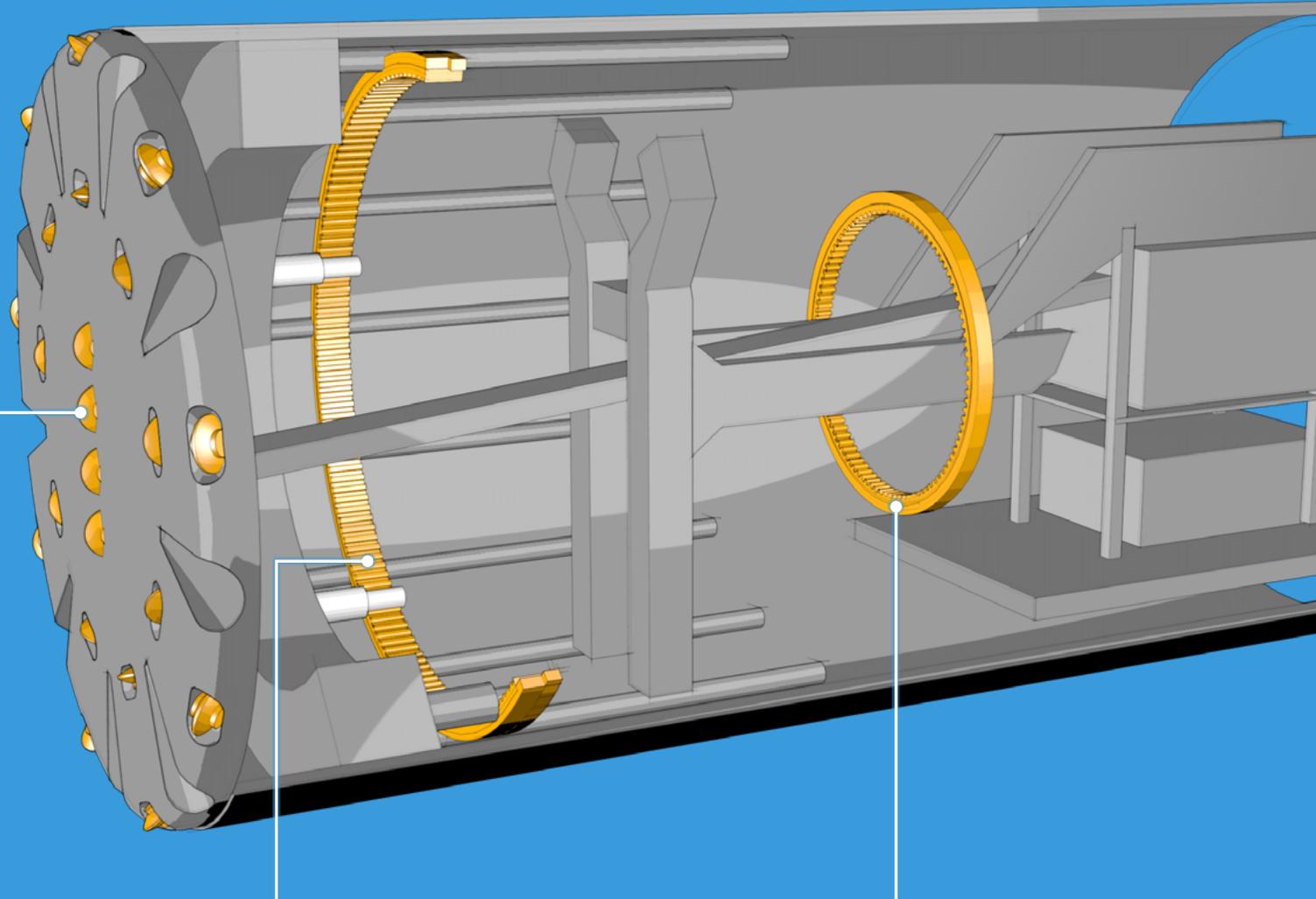
There are different vertical and horizontal boring machines to suit different usage scenarios. These machines work with roller bearings, which are specially made to meet these demands.



Road headers

Road headers are equipped with our roller bearing slewing rings, which are designed and produced to successfully accomplish your project.

Product examples



Disc cutters

psl® rolling bearings

Main shield bearing

- Three-row roller bearing with
- internal gearing
 - without gearing + separate geared ring
 - external gearing

Erector bearing

- Single-row bearing with
- internal gearing
 - external gearing

Tuen Mun Chek Lap Kok Link

Hong Kong, China



The major Tuen Mun – Chek Lap Kok Link project in Hong Kong links the airport with the Tuen Mun city district via a gigantic twin-tube road tunnel under the sea. The high safety requirements for vehicle traffic demand cross passages at regular intervals as escape and rescue tunnels between the tunnel tubes.

In order to drill Hong Kong's deepest, longest, and largest underwater tunnel the largest tunnel boring machine was

used. The gigantic mixshield with a diameter of 17,630 mm is driven by a rothe erde® slewing bearing.

The production of this type of bearing takes place based on a concrete load spectrum, consisting of axial and radial forces, resulting tilting moments and eccentric axial or radial forces. It is also important to take the speed and duty cycles, as well as the required service life of such a high-performance bearing, into consideration.

Customer	Herrenknecht
Tunnel length	10,518 m
Shield diameter	17,630 mm
Main shield bearing diameter	7,600 mm
Main shield bearing type	four-row roller bearing



Gotthard Base Tunnel

Switzerland



Since June 2016, the Gotthard Base Tunnel connects the two Swiss cities Erstfeld and Bodio. With a length of 57 kilometers, Switzerland unites northern and southern Europe by rail through the Alps. This once-in-a-century project is the longest railway tunnel in the world and consists of two single-track tunnels. The Gotthard

Base Tunnel allows high-speed trains to travel through the tunnel at speeds of 200 to 250 kilometers per hour.

Even though gneiss, granite, slate, different altitudes and unforeseen events made this project to a very difficult and time-consuming endeavor, it had a very successful outcome.

Customer
Tunnel length
Shield diameter

Main shield bearing diameter
Main shield bearing type

Herrenknecht
57,000 m
2 × 9,580 mm +
2 × 9,430 mm
5,088 mm
three-row roller bearing



Shantou Haiwan Tunnel

Shantou, China



The Shantou Su'ai Sub-sea Tunnel is a new high-performance road tunnel in the Chinese port city of Shantou.

With three lanes per tunnel tube it significantly improves the connection between the north and the south of the city. 3,047 meters of the 6,680 meter long Shantou Su'ai

Sub-sea Tunnel are being excavated by means of mechanized tunneling using two tunnel boring machines (TBMs). The machine was launched on October 26th, 2018 from the southern bank and successfully completed the Western Route tunnel on August 7th, 2020, which runs entirely under the South China Sea.

Customer

Tunnel length

Shield diameter

Main shield bearing diameter

Main shield bearing type

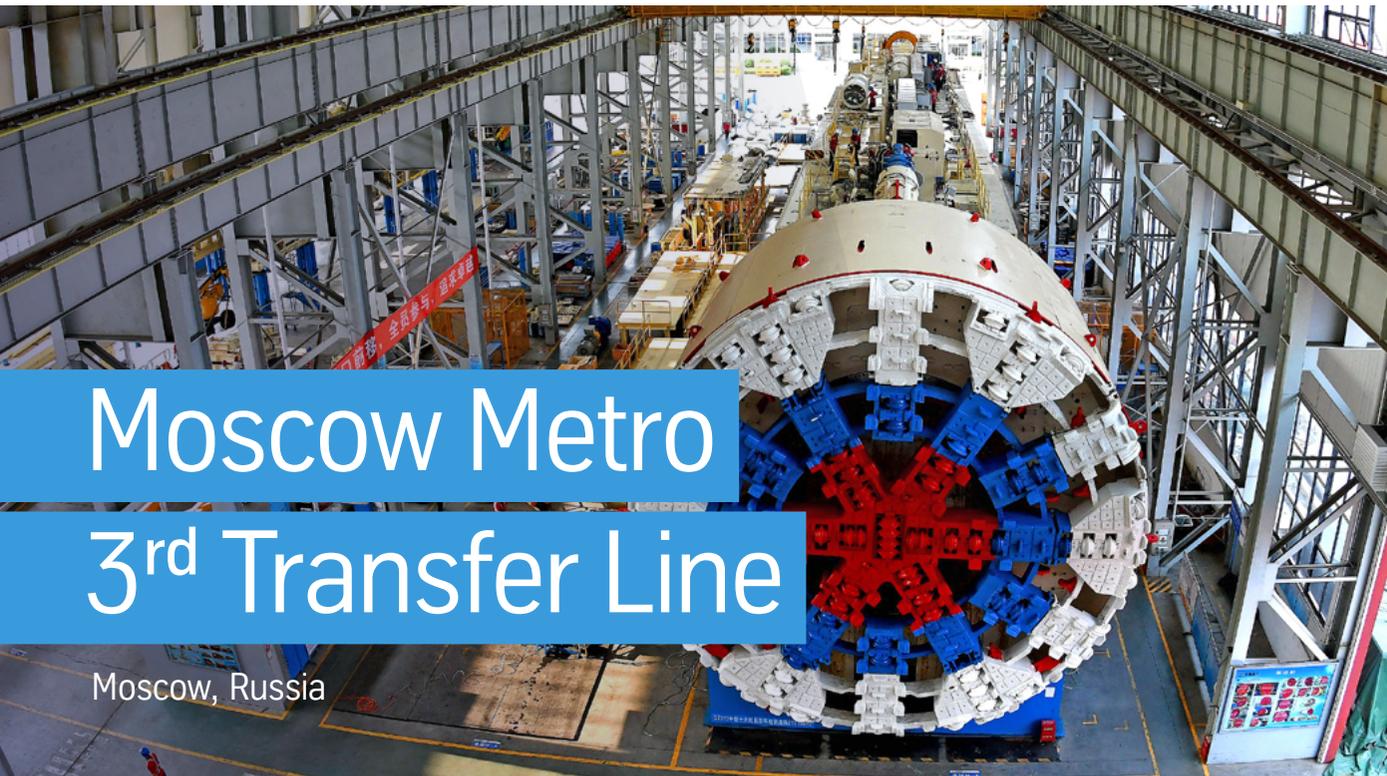
China Railway Tunnel Group Co., Ltd. (CREG)

3,047 m

14,960 mm

7,600 mm

three-row roller bearing



Moscow Metro 3rd Transfer Line

Moscow, Russia



In 2017, five sets of 6m-class Earth-Pressure-Balance machines started launching (one after the other) at Moscow Metro Southwest Ring Project, where the record of 35 m a day was achieved.

The Moscow metro southwest ring section has a length of 4.6 km, with designed segment outer diameter of 6 m. The section mainly consists of clays and sand layers, rich of pressure water. The line has high slope and small turning

radius with some concrete walls to drill through. Due to the extreme coldness in winter, CRCHI developed a drive unit, which can endure -30° low temperature, with additional hydraulic pump stations and converters as auxiliary heaters, which show excellent adaptabilities in extreme cold weather.

Due to the excellent performances of the five sets of 6m-class EPBs, Moscow Metro placed an additional order for this 11m-class large diameter shield machine.

Customer

Tunnel length

Shield diameter

Main shield bearing diameter

Main shield bearing type

China Railway
Construction Heavy
Industry Co., Ltd. (CRCHI)

2,947 m

10,840 mm

6,010 mm

three-row roller bearing



Our quality promise

Economic efficiency as well as reliability during the entire operational lifetime are always our primary concerns. Key components are tested and qualified in our 11,000 m² research and development center for slewing bearings. In this way, we have ensured that our products have been state-of-the-art for decades and have proven themselves in practice in a large number of applications.



For more information please contact us.

If you are interested in tunneling products please contact us for more information or click on www.thyssenkrupp-rotheerde.com/tunneling

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