



MINING

Underground Solutions Provider

CREG TBM

Make Tunnelling Safer,
Better and Faster

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China Railway Engineering Equipment Group Co., Ltd. (CREG)'s mining tunnel technology applies to vertical shafts, production shafts, inclined vehicle access ramps, ventilation shafts, and transportation tunnels. It can deal with diameters ranging from 0.4 meters to 15 meters and reach a maximum depth of 2,000 meters. The mature and innovative technology of CREG enables safe and rapid tunneling.

As an equipment manufacturer that best understands construction and a comprehensive service provider that is most proficient in manufacturing, CREG adheres to a customer-centered concept and is committed to providing customers with all-round comprehensive solutions. With the help of tunnel boring machines of different diameters, it can make tunnel construction under various geological conditions safer, better and faster.

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The TBM used in the Pingdingshan Coal Mine is tunnelling downhill with a maximum gradient of 12%.

Cover photo:
Large scale machinery helps mankind
to exploit natural mineral resources
more efficiently.

MINING

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X Type Gripper TBM

Application Scenario:

- Mining

Main Beam Gripper TBM

Application Scenario:

- Mining

Full Face Shaft Boring Machine (SBM)

Application Scenario:

- Ventilation shaft
- Rescue shaft

Vertical Shaft Sinking Machine (VSM)

Application Scenario:

- Ventilation shaft
- Rescue shaft

Raise Boring Machine (RBM)

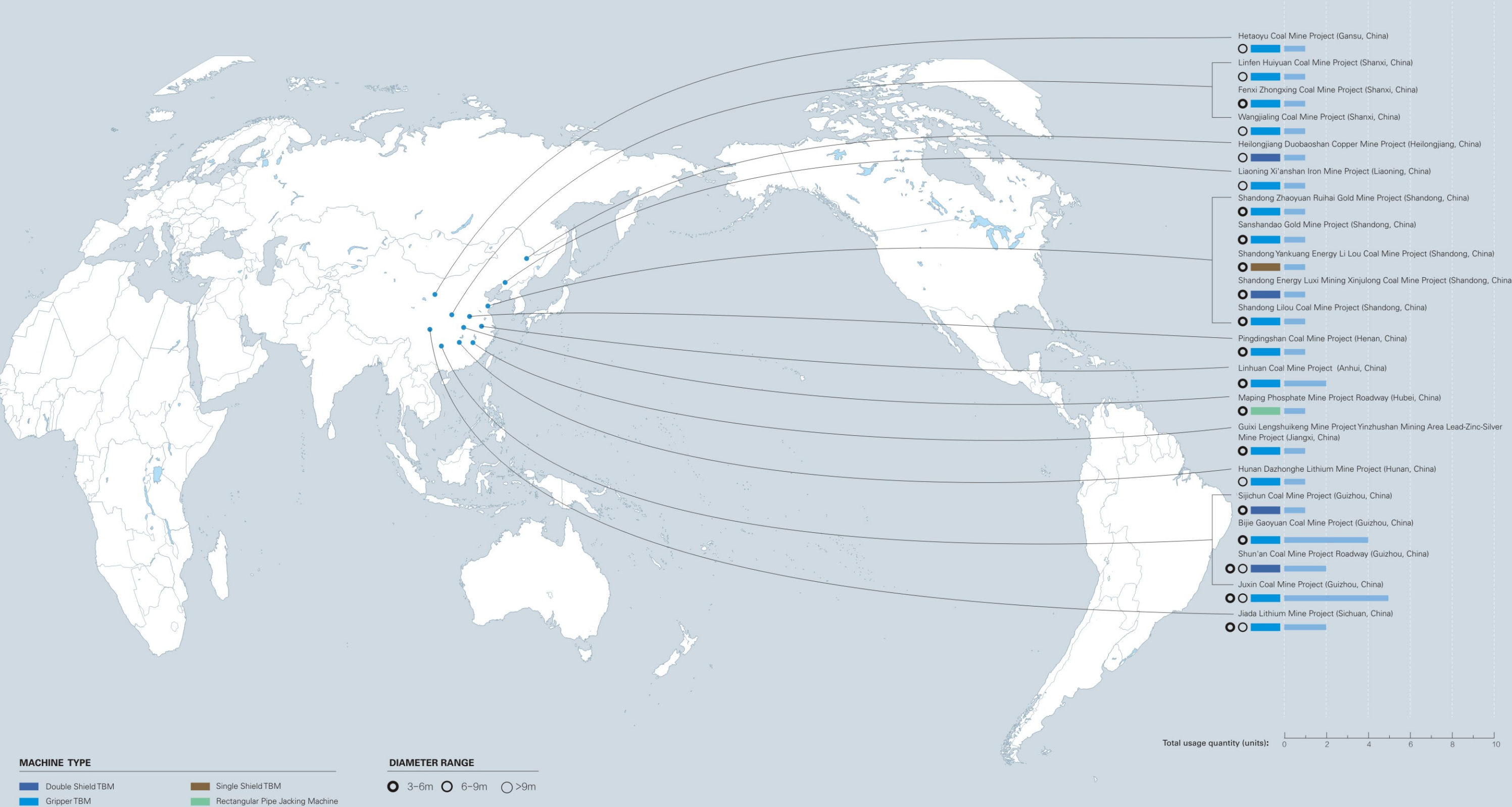
Application Scenario:

- Ventilation shaft
- Rescue shaft



GLOBAL VISION

To provide high-quality products for the world
Underground engineering equipment and services



Pingdingshan Coal Mine Project

Customized TBM enhances coal mine roadway construction

This project is a gas control roadway with a total tunnelling length of over 15 kilometers. The tunnel construction is faced with a series of difficulties, such as large overburden (at an elevation of -760 m), high crustal stress, abundant fault structural planes, short self-stabilization time of regional roadways, high ground temperature (43℃) and multiple curve with ultra-small radius. CREG has customized a ϕ 4.33 m coal mine TBM to improve the tunneling efficiency and reduce the labor intensity of workers. Since launched in September 2021, the TBM has completed tunneling on large gradients and small curve radius and achieved a best monthly advance rate of 623 m.

PROJECT BACKGROUND

Compared with the drill and blast method, TBM construction boasts advantages of less disturbance to the surrounding rock, better overall integrity of tunnel and a shorter construction period. The roadway excavation efficiency is 6-8 times that of a traditional method.

Project Information

- › Tunnelling length: 15,000 m (first section: 4,000 m)
- › Geology: Primarily sandstone and limestone
- › Contractor: China Pingmei Shenma Holding Group Co., Ltd.

TBM Parameter

- › TBM type: Coal Mining TBM
- › TBM S/N: CREG 1010
- › Boring Dia.: 4.33 m
- › Main drive power: 1,200 kW
- › FAT date: August, 2021
- › Best performance: Best monthly advance: 623 m

Project Characteristics

- › Downhill tunnelling at a gradient of 12%.
- › The TBM's turning radius reaches 40 m.



The TBM is boring steadily, advancing over 600 m in a month.



The TBM is ready to bore a 15 km long tunnel with a maximum overburden of 760 m.

Duobaoshan Copper Mine Project

Special TBM design suits 18.1% downhill tunneling.

The TBM CREG 1136 is applied to the construction of the belt conveyor transportation roadway, which features large gradient (18.1% downhill) and an ultra-small curve radius (50 m). The tailor-made coal mine TBM is specially designed to solve the problems of material transportation on large slopes, tunneling attitude control, as well as reverse slope drainage and water stoppage. Since its launch in October 2022, the TBM has completed tunneling in large gradient and small curve radius, achieving a best monthly advance rate of 503 m.

PROJECT BACKGROUND

The Duobaoshan mine boasts a rich deposit of copper, molybdenum and associated precious metal resources. However, the exploitation of the mineral resources is rather difficult because the ore bodies are deeply buried underground and the alignment varies significantly. Besides, the project faces geological condition, high safety risks and harsh weather and thus presents great construction difficulties.

Project Information

- › Tunnelling length: 3,000 m
- › Geology: Granodiorite, granodiorite porphyry, biotite adamellite, biotite monzonitic granite porphyry, etc.
- › Contractor: Zijin Mining Construction Co., Ltd.

TBM Parameter

- › TBM type: Metal mine TBM
- › TBM S/N: CREG 1136
- › Boring Dia.: 6.47 m
- › Main drive power: 2,100 kW
- › FAT date: June, 2022
- › Best performance: Best monthly advance: 503 m

Project Characteristics

- › Downhill tunnelling at a gradient of 18.1%.
- › The TBM's curve radius reaches 50 m.



Construction of the roadway faces challenges of large slope and small curve radius.



The TBM achieved tunnel breakthrough, boring over 500 m in a month.

Xi'anshan Iron Mine Project

Robust TBM overcomes multiple difficulties of the project.

The Xi'anshan Iron Mine is located in Anshan City, Liaoning Province. It involves the construction of the belt conveyor transportation inclined shaft and the auxiliary ramp. The TBM customized by CREG for this project are equipped with multiple new technologies, such as a dual support system, an advanced geological prediction and reinforcement system, a zonal support system and an online monitoring system.



Construction of the roadway faces challenges of high ground temperature and large overburden.

PROJECT BACKGROUND

As the controlling project of the whole line, the TBM tunnel section has the characteristics of a long tunneling distance, steep up and down slopes slopes, a large number of small curves (7 horizontal turning sections), large overburden and the multiple fault fracture zones, which are the key and difficult points in the construction of this project.

Project Information

- › Tunnelling length: Ramp: 6,260 m (maximum downhill slope: -15%)Inclined shaft for belt conveyor: 4,230 m (maximum uphill slope: 22.5%)
- › Geology: Strongly, moderately and slightly weathered quartzite, phyllite, etc., with the rock strength of 40-87.4 MPa
- › Contractor: China Railway Tunnel Group Second Division Co., Ltd.

TBM Parameter

- › TBM type: New type gripper TBM
- › TBM S/N: CREG 1360
- › Boring Dia.: 7.03 m
- › Main drive power: 2100 kW
- › FAT date: November, 2023
- › Best performance:
 - Best daily advance: 25.78 m
 - Best monthly advance: 420 m

Project Characteristics

- › Long distance tunneling (totally 10.49 km) and large slope (-15% to 22.5%)
- › Small curve radius (100m for horizontal curve) Class IV and V surrounding rock is up to 50%
- › Large overburden and high ground temperature



The TBM assembly is in progress. Once ready, it will bore a 10.5 km long tunnel, 6.3 km long with 15% downhill and 4.2 km long with 22.5% uphill.

Juxin Coal Mine Project

Strengthened TBM bores through karst caves.

The Juxin Coal Mine has construction difficulties such as high gas content, roadways with small turning radius and large undulating slopes. The CREC-865 TBM is equipped with a reliable probe drill system, a wind-power and gas-power interlocking system. In addition, the concrete spraying system and material transferring systems are specially upgraded, further improving the safety and efficiency of tunneling.

PROJECT BACKGROUND

Most coal mines in southwest China face common unfavorable factors such as large overburden of coal seams, complex geological structures, water-rich surrounding rocks and frequent occurrence of karst caves , making mining of coal resources in this region is extremely difficult. The efficient roadway construction by the coal mine TBM customized by CREG under the complex conditions in Guizhou region marks that the mechanized and intelligent construction of coal mine roadways in China has reached a new level, which is of great significance for promoting the high-quality development of coal mine roadway construction in China.

- Project Information**
- > Tunnelling length: 5,600 m
 - > Geology: Primarily sandstone and limestone interspersed with mudstone
 - > Contractor: Guizhou Guineng Investment Co., Ltd.

- TBM Parameter**
- > TBM type: Coal Mine TBM
 - > TBM S/N: CREC 865
 - > Boring Dia.: 6.03 m
 - > Main drive power: 2,100 kW
 - > FAT date: October, 2020
 - > Best performance:
 - Best daily advance: 29.9 m
 - Best monthly advance: 528 m

- Project Characteristics**
- > The TBM boasts a turning capacity of radius 60 m.
 - > The support beams enables simultaneous tunneling and support.
 - > Mounted probe drill enables simultaneous drilling and tunneling.



CREG has sent a technical service team to facilitate the TBM operation.



TBM method is able to build roadways efficiently in spite of the occurrence of caves and high content of gas and water.



Advanced technologies enable the TBM to cope with complex working conditions.

Hetaoyu Coal Mine Project

Special designed TBM helps safe and efficient construction of roadway.

CREG’s ϕ 6.33 m TBM is applied to the construction of the east-wing return air main roadway in the Hetaoyu Coal Mine. In view of the key and difficult points of the project, such as passing through the fault, soft rock fracture zones, high support intensity and long-distance tunneling, the TBM adopts targeted designs including a lightweight cutterhead, zonal and hierarchical support and a self-propelled belt conveyor tail to ensure smooth and efficient tunneling.

PROJECT BACKGROUND

The Hetaoyu Coal Mine has advantages such as concentrated distribution of coal seams and favorable occurrence conditions. As the key project for expanding production capacity, construction of the east-wing return air main roadway can no longer meet the requirements by traditional excavation methods and thus the TBM is adopted due to its outstanding advantages.

Project Information

- › Tunnelling length: 2,600 m
- › Geology: Primarily mudstone, followed by sandy mudstone and siltstone (weak surrounding rocks with low integrity)
- › Contractor: Huaneng Qingyang Coal Power Co.,Ltd.

TBM Parameter

- › TBM type: Gripper TBM
- › TBM S/N: CREG 1331
- › Boring Dia.: 6.33 m
- › Main drive power: 1,400 kW
- › FAT date: October, 2023
- › Best performance:Best daily advance: 16.2 m

Project Characteristics

- › The roadway has a deep overburden of 850-900 m.
- › The integrity of surrounding rock is low.
- › The ground water is high corrosive.



With the help of belt conveyor for rapid muck removal, the TBM bores 16 m one day.



The TBM rolls off production line.

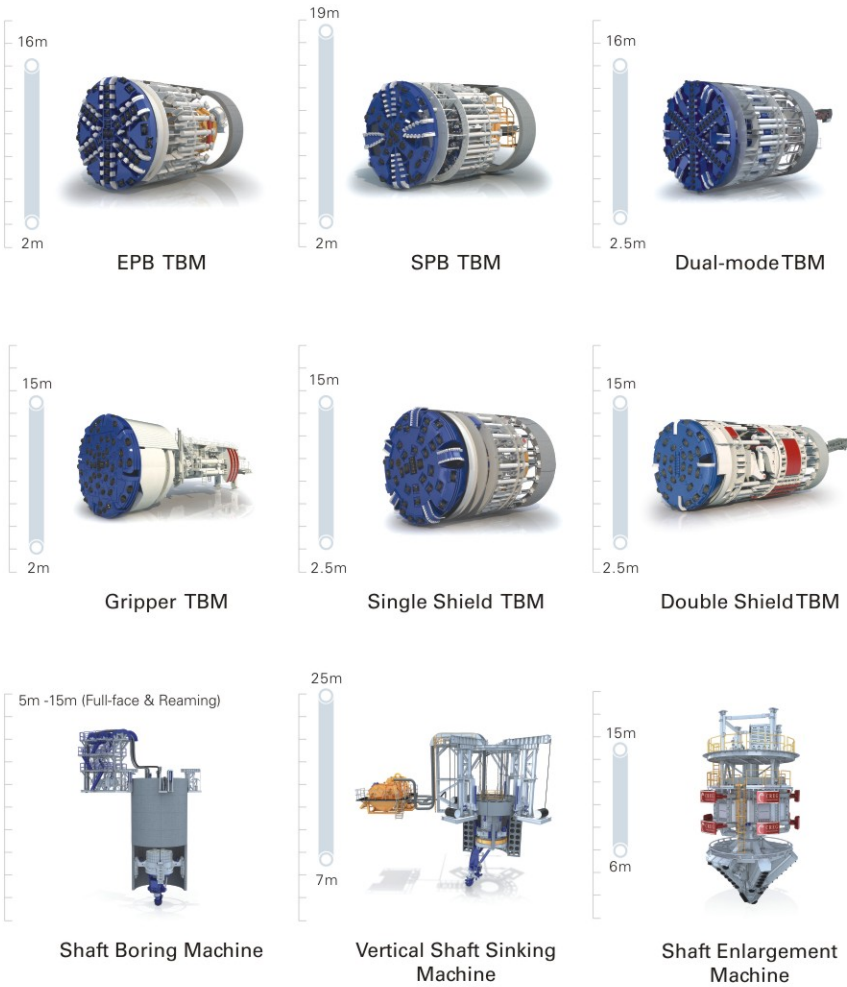
Product portfolio for mining tunnel

Tunneling technology suitable for various geological conditions and diameters

CREG is the only underground solutions provider that offers a comprehensive range of tunneling technologies suitable for various diameters and geological conditions. Furthermore, each CREG TBM or machine is specifically customized according to the geological, hydrological and

other parameters of the project. Consequently, our products are recognized for their durability, reliability and performance. We are dedicated to providing exceptional customer service, and we constantly strive to exceed customer expectations.

Product Portfolio



CREG TBM has negotiated small radius curve while boring a roadway for a phosphorus mine.

For more information of CREG, please refer to contacts at back cover.



CREG headquarters

CREG

Underground Solutions Provider

China Railway Engineering Equipment Group Co., Ltd. (referred to as "CREG") is a worldwide underground solutions provider for a full spectrum of mechanized tunnelling technology and services. The company's headquarters is located in Zhengzhou, the capital city of Henan province. We draw together more than 4,500 employees including over 700 designers to design and manufacture TBMs and associated equipment. As the largest TBM supplier in the world, CREG boasts outstanding

productivity, performance, safety and geological adaptability, impressive R&D competence, a number of invention patents, as well as excellent after-sales service and support.

CREG has 16 production bases with an annual production of more than 300 TBMs. We have supplied TBMs ranging from ϕ 2m to ϕ 18m used in all kinds of ground conditions, including hard rock, soft soil and complex geology. Our

products consist of Single/Double Shield Open-type TBM, Gripper TBM, Earth Pressure Balance TBM, Rectangular TBM, Slurry TBM, Horseshoe-shaped EPB TBM, U-shaped Open-type TBM, Pipe Jacking Machine, Shaft Boring Machine, Reamer TBM and Inclined Shaft TBM. CREG is committed to every client as an efficient and reliable partner in the tunnel construction field. Until now, CREG has exported more than 140 TBMs to 34 countries and regions including Doha, Singapore, France, Italy, Australia, Lebanon, Poland, Denmark, South Korea and Austria etc.

With our extensive research and practical experience, CREG offers a series of auxiliary mechanized tunnelling equipment and service packages. In addition to various types of TBMs, CREG also designs and manufactures Shaft Boring Machines, Cutters, Rolling Stock, Roadheaders, Three-boom Drill Jumbos, and Wet Shotcrete Machines etc. We provide a full range of tunnelling equipment and all-around solutions.

Overseas Business and R&D institutions

- CREG TBM Germany GmbH
- China Railway Engineering Equipment Group Co., Ltd. Singapore Branch
- CREG Co., Ltd. South Korea Branch
- CREG Co., Ltd. Italy Branch
- カレグ・テクノロジー日本株式会社

Full Range Services

CREG also provides high value-added customized services, including design, consultancy, tunnelling service, maintenance, remanufacturing, mechanical & electrical installation, technical service, spare parts, etc. CREG establishes remote support system for delivered TBMs to facilitate CREG rendering quick troubleshooting and real-time monitoring during tunnelling.



CREG production team is checking the cutterhead connection.

