ROBBINS MAIN BEAM TBMs

HOW THEY WORK

Robbins Main Beam machines feature High Performance (HP) options including large diameter cutters, variable frequency electric drive motors, and adaptable ground support systems.

Their design consists of a rotating cutterhead that holds disc cutters (ranging from 17 inches to 20 inches in diameter), which are positioned for optimal boring. As the cutterhead turns, hydraulic propel cylinders push the cutters into the rock. The transfer of this high thrust through the rolling disc cutters creates fractures in the rock and chips that break away from the tunnel face.

A unique floating gripper system pushes on the sidewalls and is locked in place while the propel cylinders extend, allowing the main beam to advance the TBM. The machine can be continuously steered while gripper shoes push on the sidewalls. Buckets in the rotating cutterhead scoop up and deposit the muck onto a belt conveyor inside the main beam. The muck is then transferred to the rear of the machine for removal. At the end of a stroke the rear legs of the machine are lowered, the grippers and propel cylinders are retracted. The retraction of the propel cylinders repositions the gripper for the next boring cycle.

BEST TBM DESIGN FOR

- Massive to slightly fractured medium to hard rock
- Hard rock up to and over 400 MPa UCS
- Abrasive conditions
- Non-pressurized tunneling (can operate in significant water inflows)
- Squeezing ground
- High cover tunneling
- Tunnels that do not require segmental lining

DESIGN OPTIONS

- Abrasion-resistant wear plating on the cutterhead
- Roof drills to stabilize weak rock
- McNally Ground Support System for stabilization of very fractured rock
- Customized materials handling systems
- Ring beam erectors for quick installation of tunnel support
- Shotcrete application systems
- Back-loading cutterhead for faster and safer cutter changes
- Methane and other gas detectors
- Data acquisition system: automatic acquisition, monitoring and storage of real-time data from machine functions
- Automatic guidance system
- Cutter wear monitoring systems
- Advance radar system for ground monitoring to detect obstructions
- Special designs for rapid assembly, disassembly and movement inside the bored tunnel
- Grout/probe drills for pre-excavation and ground consolidation



Main Beam TBM during shop assembly





SPECIFICATIONS: ROBBINS MAIN BEAM TBM

MAIN BEAM – OPEN GRIPPER DESIGN SERIES

2.5 m	то	3.8 m	SERIES 1
3.2 m	то	4.5 m	SERIES 2
4.3 m	то	6.0 m	SERIES 3
5.3 m	то	7.1 m	SERIES 4
6.5 m	то	9.5 m	SERIES 5
8.8 m	то	14.1 m	SERIES 6
11.5 m	то	+17 m	SERIES 7

PROVEN IN THE FIELD

- Since the use of Robbins Main Beam TBMs began, they have excavated more than 2,800 km of tunnel around the world.
- Robbins developed its unique floating gripper system in the 1960s, and to this day all Main Beam machines utilize the system for its continuous steering capability.
- Robbins cutterheads are designed from actual field data: Our cutterheads have gotten 30% heavier over the last 25 years, and they are also 30% heavier on average than other manufacturers' heads, making them the most long-lasting design on the market.
- Robbins introduced large diameter 19-inch and 20-inch cutters to the TBM market in order to excavate hard rock more efficiently with improved cutter life.
- Robbins High Performance (HP) Main Beam TBMs come equipped with highly efficient, electric variable frequency drives (VFDs).
- Robbins Main Beam TBMs are designed with the largest main bearing to tunnel diameter ratio in the industry—a robust design for high thrust in hard rock conditions.



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