



TELEMACH ROBOTIC SOLUTION

Tele-Operated Robotic System for TBM Cutterhead Maintenance

TELEMACH is a tele-operated and fully automated robotic solution dedicated to **TBM cutterhead maintenance**, specifically designed for disc-cutter replacement in harsh underground environments. By removing personnel from the cutterhead chamber, **TELEMACH** significantly improves **safety, operational efficiency, and maintenance repeatability**, while reducing reliance on diver-based operations.



Key benefits

- ± Major **safety improvement** by removing personnel from hazardous areas
- ± Reduced dependence on divers and manual operations
- ± High precision and repeatability
- ± Faster and more predictable maintenance operations
- ± Proven, mature, and scalable robotic solutions for large TBM projects

INNOVATIVE SOLUTIONS FOR TUNNEL CONSTRUCTION



Robotic System Description

TELEMACH is based on a heavy-duty KUKA KR 600 FORTEC F industrial robot, specifically adapted for TBM applications.

Key technical characteristics

- › Payload: 600 kg
- › Reach: 5.5 m
- › Robot weight: ~2 tons
- › Position repeatability: 0.08 mm
- › 6 robot axes + 1 linear axis
- › Fully automatic and tele-operated
- › Designed to operate in humid, dusty, and hot environments

The robot is equipped with dedicated **grippers, vision tools, and automatic trajectory software**, enabling fully automated disc-cutter replacement.



TBM Integration Concept

- › Installed in a dedicated chamber inside the TBM shield
- › Optimised installation position at 12 o'clock
- › Access to 3-4 m cutterhead radius, covering approximately 70% of disc-cutters
- › Integration performed in coordination with the TBM supplier

Automation & Vision

- › Automatic trajectory generation with collision-free paths
- › No blind spots within the operating range
- › Reduced commissioning time
- › High accuracy 2D/3D vision with ± 1 mm localisation

Performance

- › Fully automated disc-cutter replacement sequence
- › Typical cycle time: ~1 hour per disc-cutter within the robot operating range
- › No human presence required in the cutterhead chamber during operation



Adresse
Contact

www.tunnelbytp.com