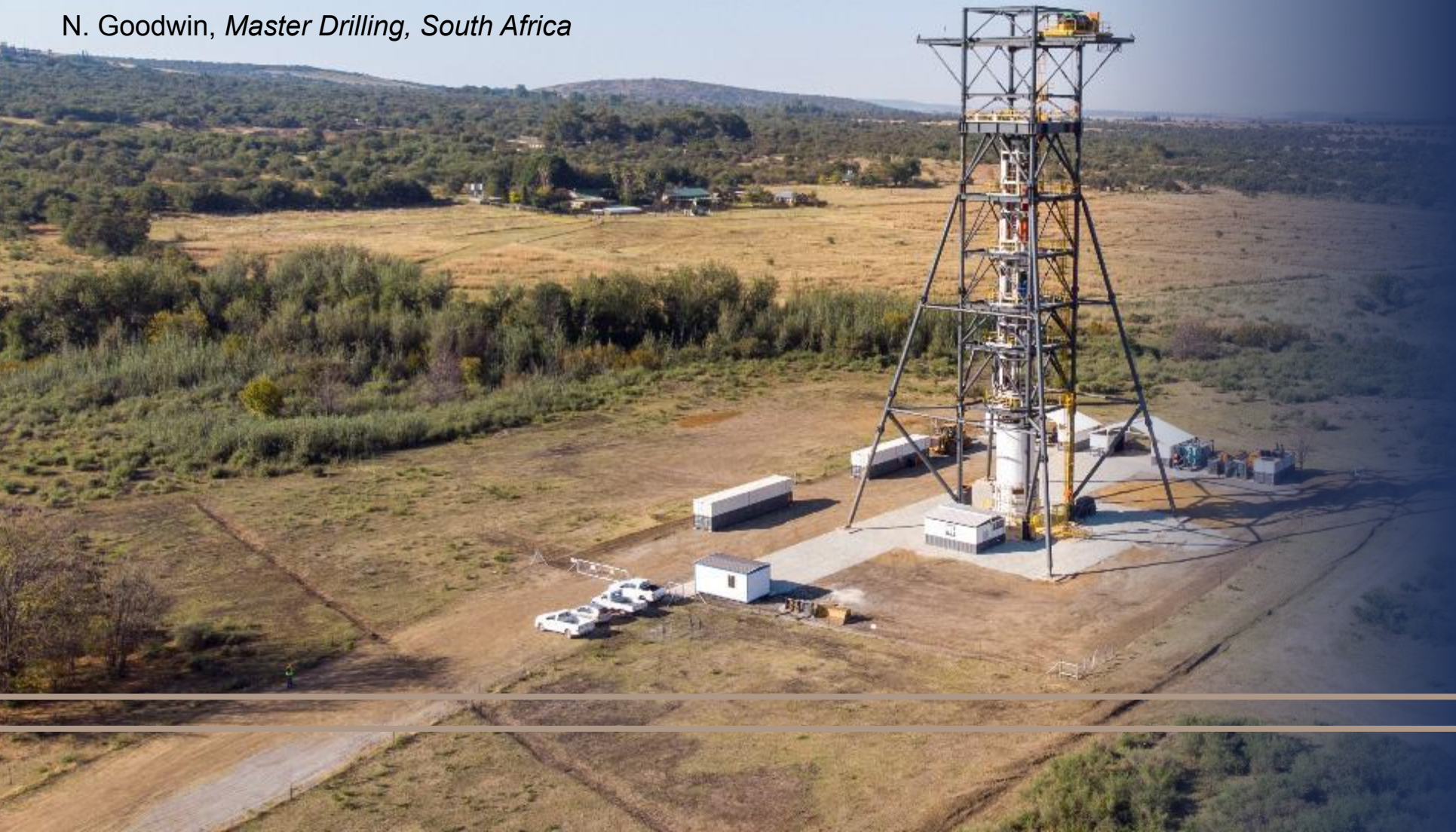


PROGRESS IN DEVELOPING A SHAFT BORING SYSTEM AS AN ALTERNATIVE TO CONVENTIONAL SHIFT SINKING FOR DEEP AND HARD ROCK APPLICATIONS

N. Goodwin, *Master Drilling, South Africa*



South African National
Committee on Tunnelling

MAKING A DIFFERENCE
IN THE MINING INDUSTRY

AGENDA



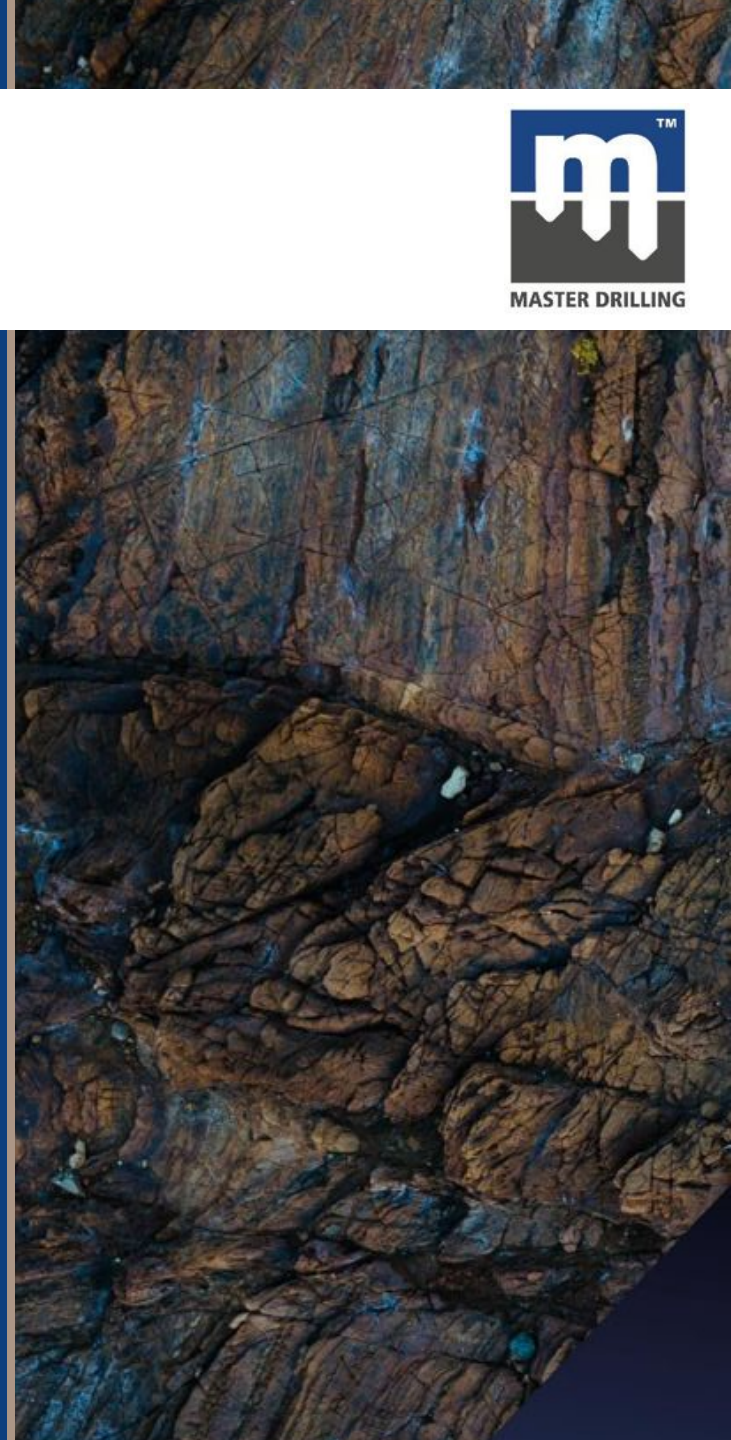
1) Introduction

- A. The status Quo
- B. Why are we challenging the Status Quo

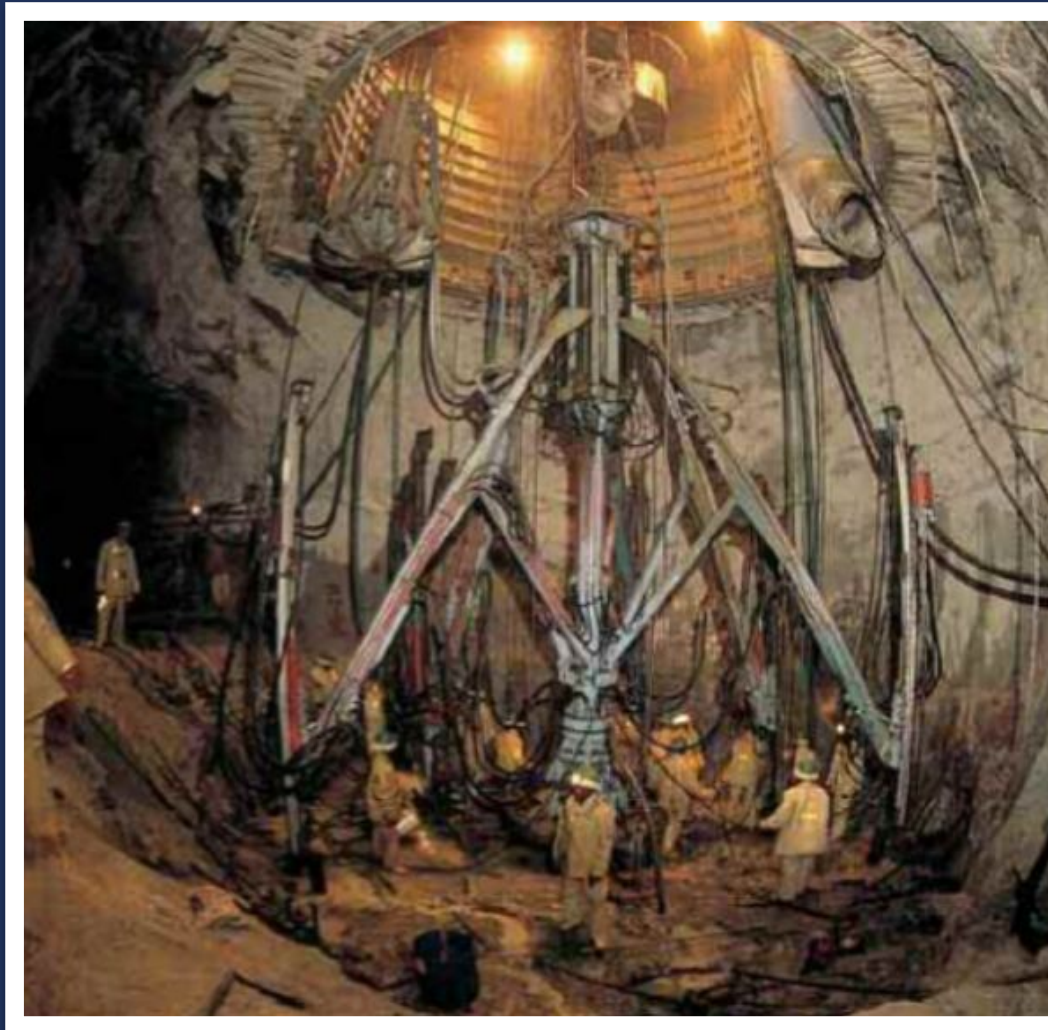
2) Key developing milestones

3) How does the SBS work

4) Current Progress & Future Roadmap



THE STATUS QUO



Reference: Evolution of shaft sinking systems Vern Evans and Charles Graham

WHY CHALLENGE THE STATUS QUO

- **Safety**
- **Advance rates**
- **Project feasibility**
- **Costs**
- **Continuous Excavations and Operational efficiency**
- **Structural integrity** of the side wall
- **Reduced support** requirements
- **Automation Integration**



KEY TECHNICAL MILESTONES

- **Phased approach**

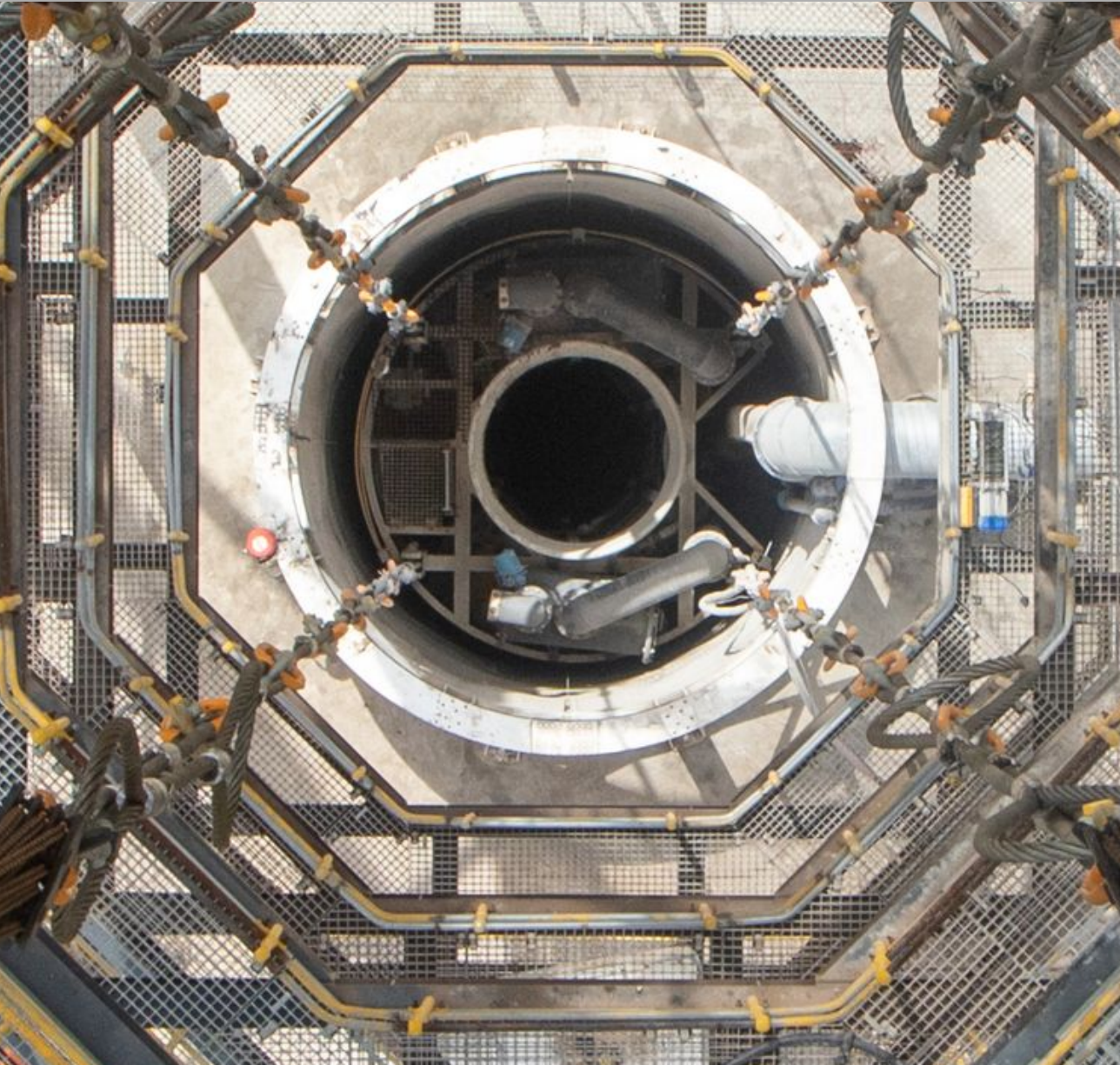


Image: 2019, Concept validation testing 320 MPa rock.



Image: 2024, MRK1 Concept validation testing, 50m deep.

KEY PERFORMANCE INDICATORS ACHIEVED



- SAFETY
- TARGET DEPTH
- HARD ROCK
- REMOTE OPERATIONS
- INSTANTANEOUS PENETRATION
- CONTINUES PRODUCTION
- EXCAVATION FROM SURFACE
- ACCURACY
- TRL 7 ACHIEVED

HOW DOES THE SBS WORK?

- **Cutterhead**
- **Thrust and Gripper**
- **Material Handling**
- **Auxiliary equipment**
- **Side wall support**
- **Safety systems**

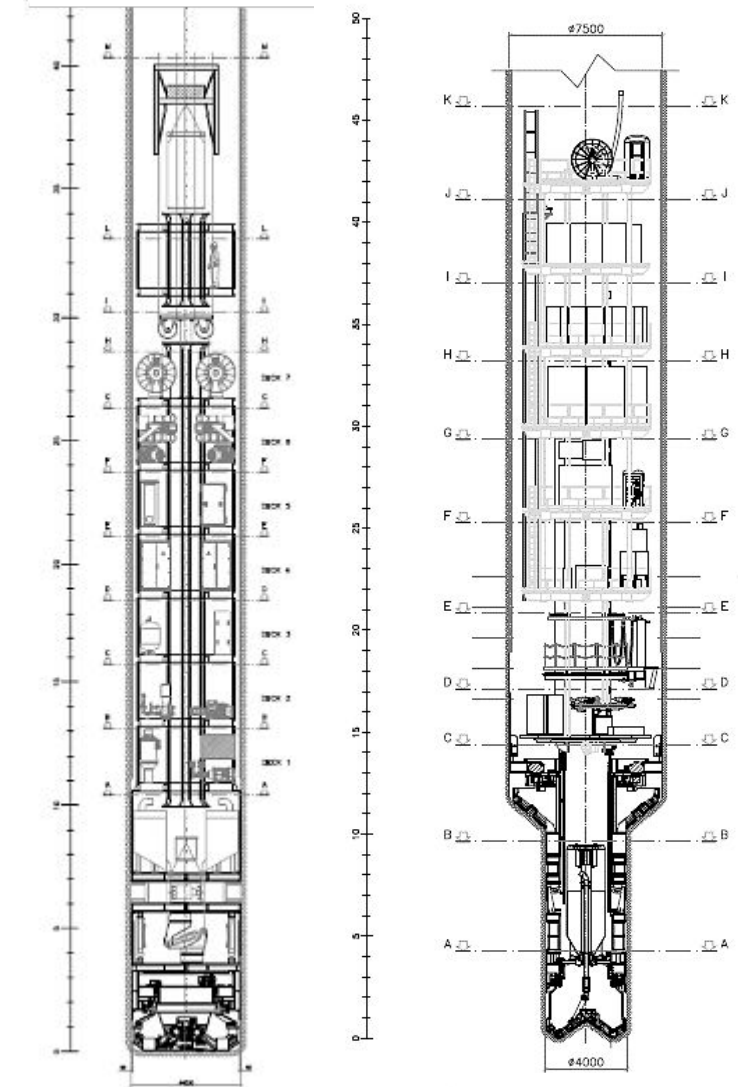


Image: 4-8m diameter concept. Image: 7-11m diameter concept.

HOW DOES IT WORK?



Image: 2019, Concept validation testing 320 MPa rock.



Image: Back loading disc cutters.



Image: Realtime thermal disk cutter condition monitoring.

The patented W-Cutterhead.

Continued:



HOW DOES IT WORK?



Image: The top of the SBS during testing.

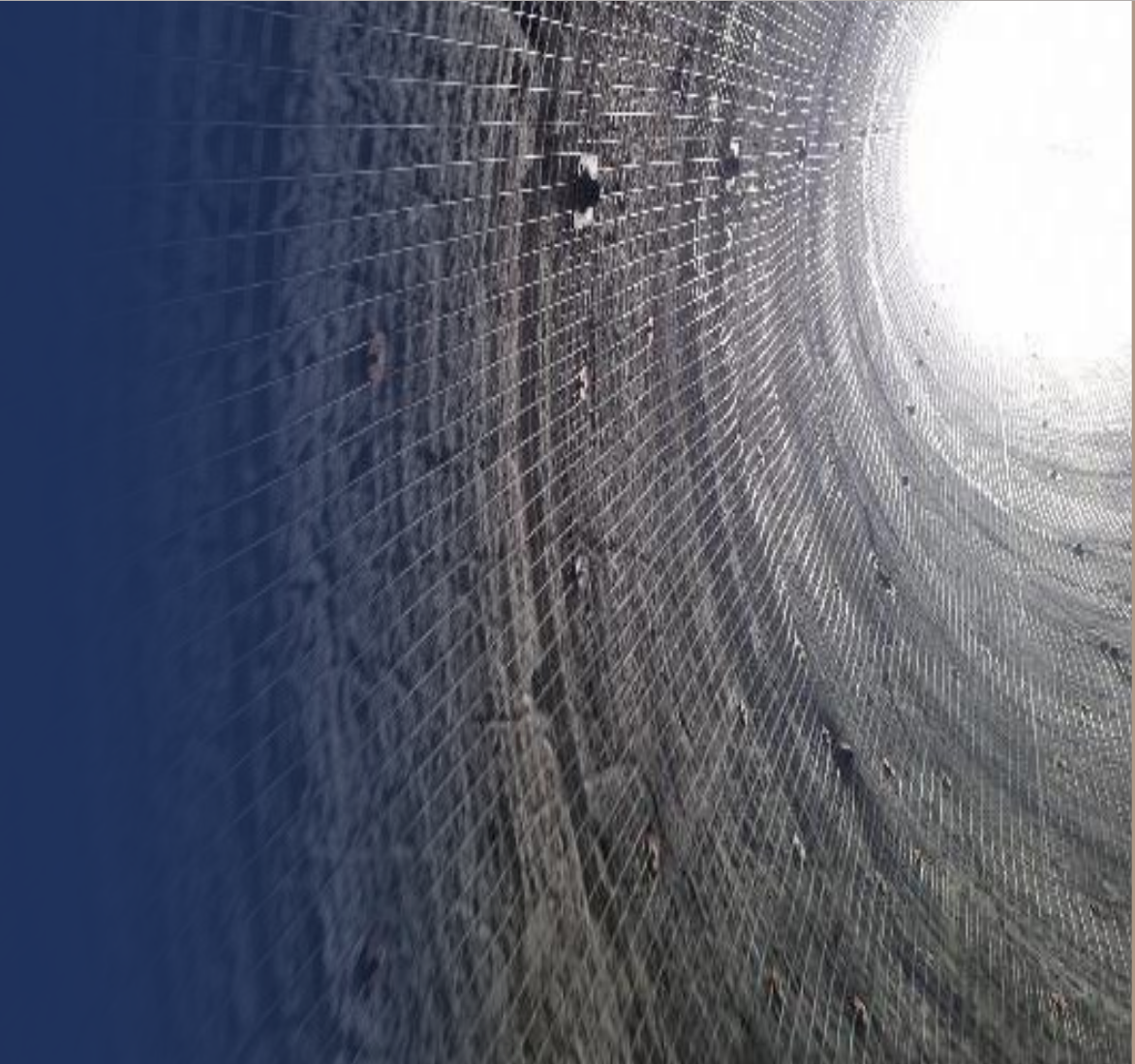


Image: Remote operation and monitoring of operations.



Image: Mesh and bolting of sidewall.

CURRENT PROGRESS & FUTURE ROADMAP

- 
- A large, dark, and textured image of a tunnel under construction, showing the interior walls and a bright light source at the far end.
- MRK2 SBS Rebuild underway
 - Improvements, learnings and opportunities applied.
 - Do engineering on larger diameter machine
 - Further testing on revised KPI's
 - Planned 2026 start first commercial project

Current Progress & Future Roadmap

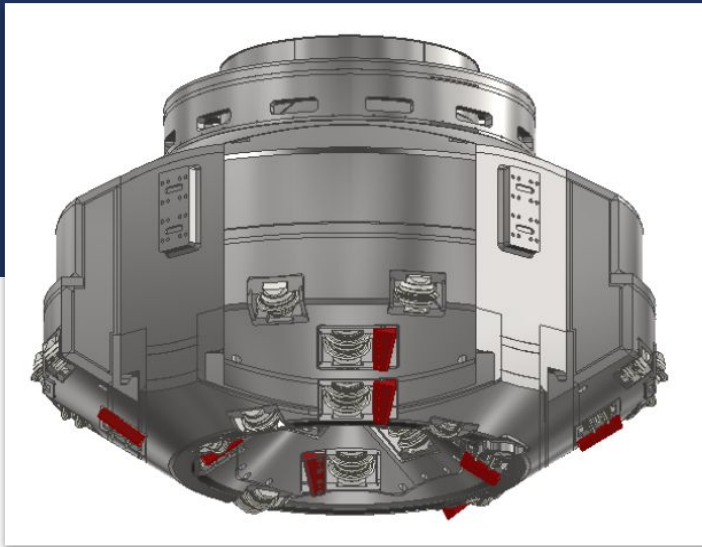


Image: Increased shaft diameter



Image: Upgrades to components

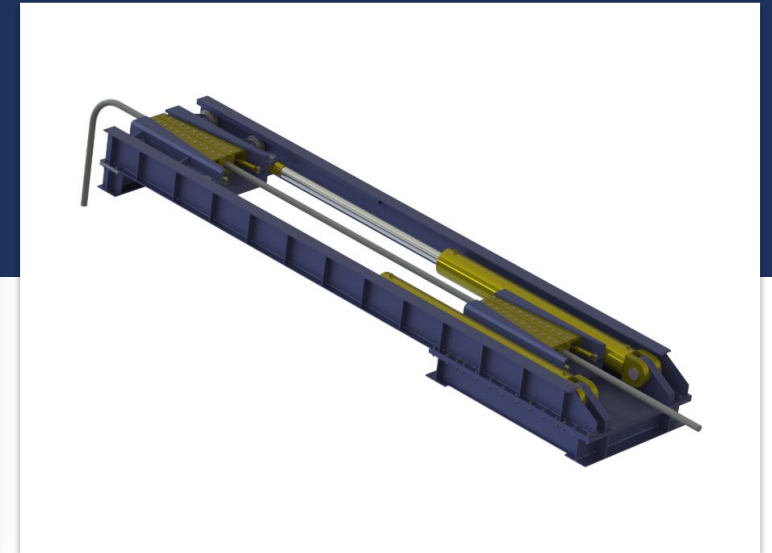


Image: New hoisting plant

THANK
YOU.



MAKING A DIFFERENCE
IN THE MINING INDUSTRY