THEORY TO PRACTICE

LKAB Wassara AB
Mikael Forslund

LKAB Wassara AB
- 50 employees (nine in Research & Development)
- 10 Worldwide Product Patents
- In house Drilling Technology Center
- 100 % owned by LKAB

LKAB
- 100% owned by Swedish State
- 4 200 employees
- World leader in underground mining
- 80% of the EU’s iron ore production
Wassara Water Powered DTH hammer

Two moving parts

Unique water-powered DTH hammer
- > 30 years in various applications
- > 20 million meters drilled only at LKAB

Key Benefits with water powered drilling

- Safer and benign drilling
- Less environmental impact
- Borehole quality and accuracy
- High performance
- Cost
LKAB Wassara - Focus segments

Mining
- Preconditioning/Hydrofracture/Drawbells
- Long blast/investigation/service holes/slot drilling raisings
- Drilling for dewatering/Pre-split
- Mineral exploration

Ground Engineering
- Drilling in sensitive area
- Casing advancing
- Geo energy and geothermal drilling
- Maritime drilling
- Single pass jet-grouting
Sub level caving within LKAB

Before
• 12 m distance between levels
• 28 m bore hole length
• 1 200 tons per blast

After
• 28 m distance between levels
• 56 m bore hole length
• 10 000 tons per blast

Results
• Reduction of sublevels by 70%
• Volume per drilled meter increased by 500%

Scaling up with Wassara
Controlled directional drilling with coiled tubing technology

Top-hammer (28 m)  Wassara DTH-hammer (56 m)  Controlled directional drilling with coiled tubing (56+ m)

"Yesterday"  "Today"  "Future drilling system"

Future drilling system

- Project goal – Develop a fully functioning concept for seamless drilling with positioning and steering in real time.
- Status – Development of Rotational motor is a real challenge and postponed project.
- Have had a good collaboration with the DET CRC and it will continue in MinEx.
LKAB Kiruna mine

Urban transformation

ACCESS TO LAND IS A PREREQUISITE
Urban transformation necessary for continued mining

Totally 5,000 homes will be replaced, which means that 15,000 people on the ore fields will have to move.

100,000 square meters of residential and business premises will be replaced.

Compensations for the relocation and costs of urban transformation.
Investigating for the future – more drilling

- Investigating from a new drift in 1375 m level
- LKAB performs around 38 000 m core drilling and in total around 150 000 m core drilling per year with support from subcontractors. (surface and underground)
- Trend this year: LKAB will double the recourses spent on underground core drilling in Kiruna to secure mining after 2030.

Investigating for the future – new technology

- Pre-drilling with percussive hammer (faster) down to interesting area where core drilling can proceed.
- Will be surveyed with the Wassara gyro system.
- Also interested in other investigation systems such as tandem televiewer and other new technologies developed in the MinEx CRC
Thank you!