Construction and Evaluation of Mine Cover Systems with Upgraded Soil

Experience gained from Laboratory and Pilot Tests

Project leader
Christian Maurice, Luleå tekniska universitet

Partners
Ltu , Boliden Mineral , Mitta , Ecoloop , NGI

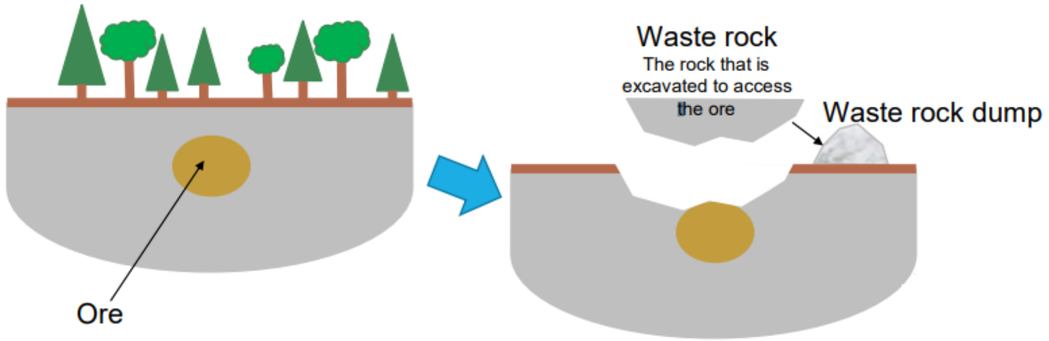
Project duration
2024 - 2025

Presented by: Abdalla Saafan
PhD student, Ltu
abdalla.saafan@ltu.se

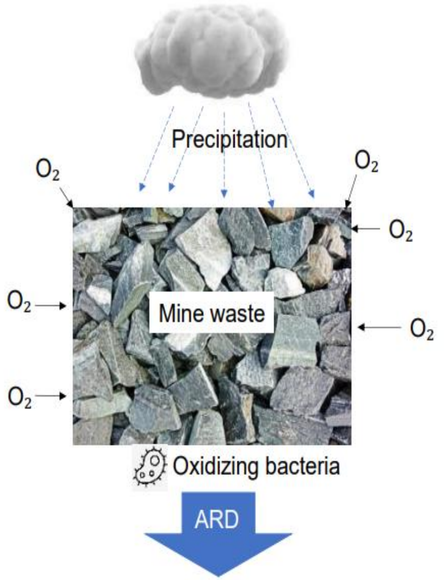
SWEDISH MINING INNOVATION

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program

Description of the problem



- **70% of the mine waste in Sweden contains sulfide minerals**
  (SGU and Swedish EPA 2017)



Substrate for enhancing vegetation establishment

Protects the sealing layer from erosion, frost and root penetration

Low hydraulic conductivity, high water retention capacity and compacted to a high density to prevent oxygen diffusion to the mine waste

Potential to produce Acid Rock Drainage (ARD)

Med stöd från VINNOVA Sveriges innovationsmyndighet, Energimyndigheten, FORMAS, Strategiska innovationsprogram

Objectives of the project

- Validate a stepwise (**time and cost-efficient**) method to the design and evaluate mine covers
- Scientific evaluation of laboratory experiments and field tests, complemented by numerical simulations
- Facilitate the design of mine reclamation measures (guidance)
- Promote the use of alternative sealing materials to reduce the environmental footprint

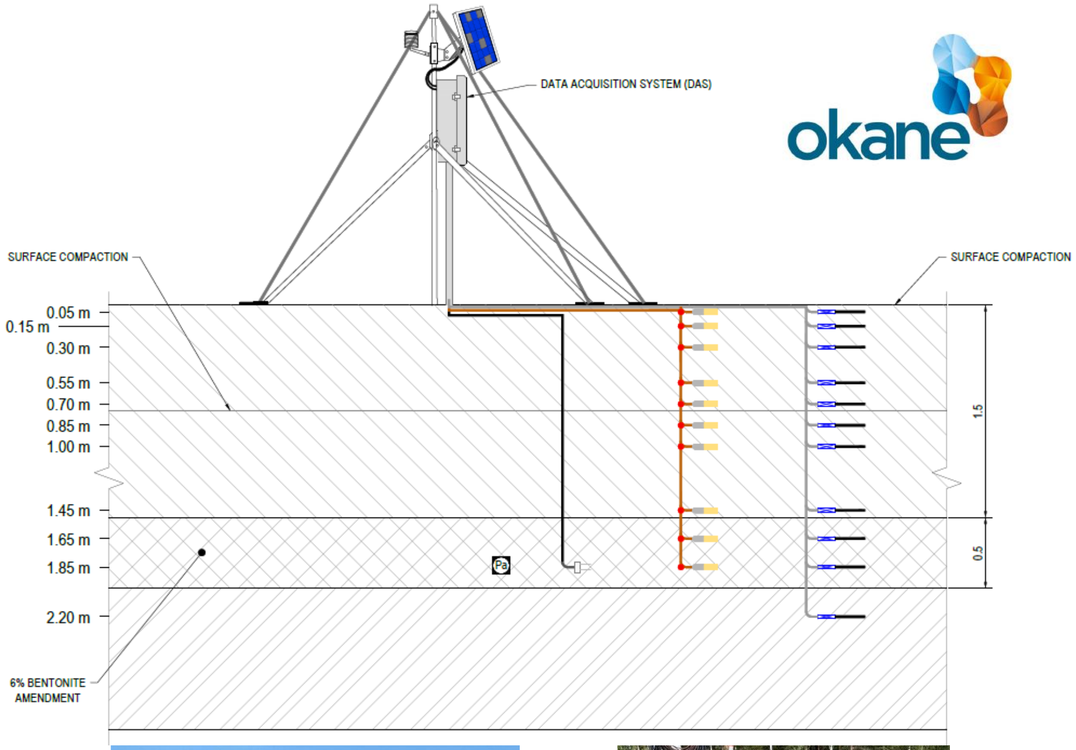
What are the optimal cover geometries and properties?

- Each site is unique and needs a site-specific solution!

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program

Results so far

- Construction of two instrumented field trials (400 m2 each) by Boliden at Garpenberg mine
  Sensors installed by Okane company
- Interview with contractor during the field work
- Construction of three columns with the materials from the field trials



Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program

Coming activities

- Monitoring of the laboratory columns
- Monitoring of the field tests
- Numerical modelling

Scientific publication

- Evaluation of the construction at Garpenberg
- Experience from the field trials
- Compilation of experience from previous test, guidance/reports

Guidance

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program

Mining innovation for a sustainable future

Thank You

SWEDISH MINING INNOVATION

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program