CANMET
MINING AND
MINERAL
SCIENCES
LABORATORIES

GROUND CONTROL

THE CHALLENGE

Underground and open pit mining involve a number of complex issues for the mining industry ranging from ensuring the safety of miners and the public, to maximizing recovery of ore reserves. Particular challenges are presented by mining under conditions of highly stressed or weak rock masses, mining at greater depth, and mining under permafrost and frontier conditions.

NRCAN CAN HELP

CANMET-MMSL has established a team of specialists in geomechanics, numerical modelling and induced seismicity. We work with the mining industry to increase productivity and extend mine lives, as well as to improve the safety of miners. Our leading-edge science and interdisciplinary approach to ground control ensure that the best knowledge and expertise are applied to the complex ground control challenges facing the industry.

OUR EXPERTISE

CANMET-MMSL has developed a range of expertise through R&D activities:

- **Seismicity**
  - Analysis of mine-induced seismicity
  - Microseismic monitoring for underground and open pit mines
  - Microseismic monitoring for deep-well petroleum extraction
  - Regional and local networks
- **Assessment of mine structure integrity**
  - Stress-control strategies for mining in burst-prone ground
  - Design/research for mining in weak rock mass
- **Instrumentation**
  - In-situ stress measurement
  - Tailings dam stability monitoring
  - Time domain reflectometry
- **Backfill systems for underground mines**
  - Paste backfill support systems
  - Waste rock liner (rockfill composite) systems
- **Tools for improved long-term mine planning**
  - Numerical modelling
  - Mechanical rock property testing

Analyzing mine-induced seismic waveforms.

SUCCESSFUL PARTNERSHIPS

Examples of successful partnerships are:

- Following CANMET-MMSL recommendations, a mining company in Quebec was able to increase ore recovery while maintaining its structural integrity. CANMET-MMSL assistance enabled the company to safely recover ore from post pillars, based on field characterization, laboratory tests and 3-D finite element analysis.

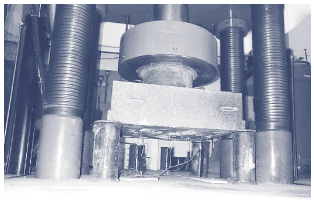
Tailings investigation.

- CANMET-MMSL collaborated with a mining company in the high Arctic on geomechanics projects that resulted in a one-year extension of the mine's life. A team comprising four specialty areas assimilated data through rock characterization studies using TV-probe systems and borehole surveys, in-situ stress measurements using biaxial, triaxial overcoring and borehole dilatometer equipment, laboratory rock property tests, in-situ ground movement monitoring and numerical modelling.

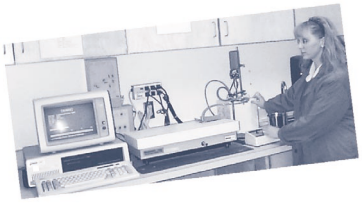
- In cooperation with a mining company in Sudbury, CANMET-MMSL has developed an internationally recognized testing protocol for evaluating the support potential of thin spray-on membrane liner materials, which are being studied as an alternative method of ground support in underground mine openings. This has led to several client-based projects with producers of membrane liner products.

Monitoring slope stability with seismic methods

- CANMET-MMSL played a supporting role in the Mine Automation Program (MAP™) led by industry, providing resources for numerical modelling, correlating induced seismicity and mining activities, observing the underground process, and coordinating specific tasks.



Material compression testing facility



Fine particle size laser analyzers, capable of providing particle size distributions from 1 millimeter to 2 microns

CONTACT US

CANMET-MMSL's goal is to help find sound, science-based solutions to operational challenges.

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