



Australian Centre for Geomechanics
CSIRO Curtin University University of WA
Joint Venture

On-Site Geomechanics Training: Practical Rock Engineering Skills Development

- **Ground Control Systems Training Course**
- **Rock Mass Characterisation Training Course**
- **Geomechanical Stope and Pillar Design Training Course**

This new series of training courses developed by the ACG seeks to raise the standard of geomechanics outcomes at mine sites, through practical rock engineering skills development of site personnel. Geomechanics practitioners at the early stages of their career are often ill equipped to face the challenges of implementing a sound ground control management plan at a mine site. Many practical aspects of rock engineering can hardly be taught in a university setting. Most geomechanics practitioners enter the industry with a broad and non-specialised background such as geology and mining engineering degrees.

Currently, less experienced “Rock Doctors” are at the front line, dealing with the daily and sometimes higher risk issues. They develop their rock engineering skills slowly and gradually through occasional contact with consultants, and often by ‘trial and error’ and self-learning experiences. Very few have the luxury of relying on a company senior geomechanical engineers with sufficient time to act as a mentor for developing their skills.



Photo courtesy Newmont Mining

ACG’s **Practical Rock Engineering Skills Development courses** are designed to fast-track the learning experience of good ground control practices for personnel dealing with those issues at mine sites. The training can only be delivered to very small groups (max. three) due to the intense trainer-trainee interaction required.

Course format:

- Initial session of two to three days on site where theory and practice on a specific topic is covered.
- Subsequently, trainees complete a comprehensive assignment designed to not only add value to their operation but also to cement their newly developed skills.
- Follow-up visit by the trainer with a review of the assignment and a practical evaluation of the skills acquired.



Photo courtesy Newmont Mining



Practical Rock Engineering (PRE-01)

Ground Control Systems Training Course

Objective: To develop the basic skills required for the implementation of a sound ground control program at a mine site.

Description: The course will begin with a review of the requirements for ground control systems at the mine site. The review will be performed in collaboration with the trainer and trainees. The critical analysis of the requirements for ground control systems (and the skills required to perform this analysis) is the first course outcome.

Existing systems already in place will be individually analysed in terms of their strengths, weaknesses and potential alternative ways of achieving intended outcomes.

Potential implementation of new systems (if relevant) will also be analysed in terms of what they may achieve, the potential value they may add, the resource requirements and the potential problems in implementing these systems.

Some of the ground control systems considered in this course will include:

- Data gathering for geomechanics design
- Daily inspections
- Geomechanics audits
- Ground support (evaluation and QA)
- Geomechanics record keeping
- Workforce training
- Communication with management and workforce
- Instrumentation and monitoring etc.

**Instructor for all 3 courses: Yves Potvin - PhD (1988), MSc Mining (1985), BSc Mining (1982)
Director, Australian Centre for Geomechanics (ACG)**

Yves commenced his position as Research Coordinator with the ACG in August 1998. In March 2000 he was appointed Director of the ACG. From 1995 to July 1998 he was the Mining Research Manager with Mount Isa Mines, managing the mine's technical services in rock mechanics, blasting research, fill research, mine geophysics, mine automation and mine survey. He is also an Adjunct Professor at the WA School of Mines and Laval University. From 1988 to 1995 he was Manager Rock Mechanics and Mine Design with the Noranda Technology Centre; and from 1981 to 1982 he was Mine Planning Engineer with Noranda Mines, Gaspé Division.

Course Duration: 3 days on-site (each course), plus one day follow-up site visit after the assignment is completed.

Cost: Please contact Christine Neskudla at the ACG for a quotation: christin@acg.uwa.edu.au

NB: Undertaking this training course may be a valid activity towards relevant professional development and education.

Rock Mass Characterisation Training Course

Objective: To develop the skills and knowledge required to achieve a sound understanding of rock mass characteristics at a mine site.

Description: Rock mass characterisation is the first step of the design process. It is also the main input of data into various mine design methods. A good design can only be achieved with a high quality data set. This course will teach recognised techniques commonly used by specialists to characterise the rock mass. The trainees will develop the skills to routinely and confidently apply these techniques and develop (or up-date as required) a comprehensive geomechanical model of the mine.

The course will cover the following topics and will be tailored to the level of knowledge and interest of the trainees and mine site requirements:

- Definition of geomechanical domains
- Understanding the pre-mining stress field
- Major structures
- Rock mass characterisation from geotechnical mapping
- Rock mass characterisation from core logging
- Rock mass characterisation from laboratory testing
- Rock mass classification



Photo courtesy of Newmont Mining



Photo courtesy of Auriongold's Kundana Gold Mine



Geomechanical Stope and Pillar Design Training Course

Objective: To develop the skills and knowledge required to design and back-analyse stope and pillar performance for the purpose of optimising their dimensions.

Description: Often performed by consultants, the design techniques for stopes and pillars must nevertheless be well understood by the on-site rock mechanics engineers. Site engineers play an important role in the implementation of the design, the evaluation of the design performance and ultimately in adjusting and optimising stope and pillar design through systematic back analysis exercises.

In the initial part of the course an in-depth study of the empirical stope and pillar design techniques will enable the trainees to understand the relevance of applying different methods in different situations, their benefits and limitations. Interpreting the output from these methods remains one of the critical skills for the trainees to acquire. This will be achieved through a series of back analyses performed as part of the course at the mine site and via further analyses as part of an assignment that is of particular interest to the mine.

The course will cover the following topics and will be tailored to the level of knowledge and interest of the trainees and mine site requirements:

- Empirical stope design
- Empirical pillar design
- Numerical modelling approach
- Other approaches
- Measuring stope performance

Please send me more information about

- Ground Control Systems Course (PRE-01) Geomechanics Stope and Pillar Design (PRE-03)
- Rock Mass Characterisation Course (PRE-02) Other on-site training suggestions
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Name:

Position and Title:

Company:

Address:

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Phone: **Fax:**