

MINING MATTERS

Research news

Stochastic mine planning at McGill

Mining is fraught with uncertainty, but with the Sept. 8 launch of McGill University's COSMO (stochastic mine planning) laboratory, uncertainty will be less of a liability. In fact, it should become more of a positive factor, to be combined with all the variables used to determine a mine's value and its schedule of production.

The advisory board consists of representatives from BHP Billiton, AngloGold Ashanti, Barrick Gold, CVRD, De Beers, Inco, Newmont Mining and Rio Tinto. Each company has made a five-year financial commitment, and participates in the formulation of problems and the on-site evaluations of the new technologies that COSMO generates.

The director of COSMO, Prof. Roussos Dimitrakopoulos, is a leader in the field of stochastics—the science of uncertainty and risk—as applied to mining. Inspired by work on managing strategic investment in an uncertain world, 10 years ago Dimitrakopoulos began developing new modeling methods that quantify uncertainty for mining, particularly in orebodies.

Tests conducted with BHP Billiton and others suggest 5-25% improvements in the value of mining operations compared with conventional methods, and risk is reduced. Dimitrakopoulos believes that the existing modeling and mine planning technologies are near the end of their life cycle:

"The conventional models used can't include uncertainty, they simply ignore it, and we understand now that this does us no favours."

COSMO is staffed by eight graduate students and three research associates. There are collaborating professors from a variety of disciplines including computer science, electrical and computer engineering, management and finance from McGill University as well as Stanford, École des mines de Paris, and Colorado School of Mines.

Dr. Malcolm Thurston, vice-president, mineral resource management for De Beers Canada, notes that "one of the major problems we face is to optimize exploitation of the orebody. This implies an understanding of what run-of-mine material must be removed in space and time to get the best return possible for the project. This must be balanced against the risk imposed with respect to people, mining equipment and the natural resource itself. The laboratory at McGill is making a contribution in this area, and early results have been implemented with success at a specific De Beers operation in South Africa."

The interdisciplinary research to be conducted at this facility will continue to change how we assess orebodies, plan and design mines, forecast production, manage waste and plan mine rehabilitation.



Left to right: Dr. Wynand J. Kleingeld, Group Manager, Mineral Resources, De Beers Consolidated Mines, Wells, UK. Prof. Christophe Pierre, Dean, Faculty of Engineering, McGill University. Prof. Roussos Dimitrakopoulos, Canada Research Chair in Sustainable Mineral Resource, Development and Optimization Under Uncertainty, Department of Mining, Metals and Materials Engineering, McGill University. Dr. Malcolm Thurston, VP, Mineral Resource Management, De Beers Canada. Prof. Denis Therien, VP Research, McGill University.