



MINING SOFTWARE

Dr. Tony Diering



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Dr Tony Diering has been involved in the development of mining applications for more than 30 years and is the pioneer behind Dassault Systèmes' innovative block-caving GEOVIA PCBC and sub-level caving GEOVIA PCSLC software applications, which are used by the majority of the world's mines employing these specialized mining methods.

Diering graduated with a Bachelors in Applied Mathematics

and Geophysics and has a Masters in Mining Engineering from the University of the Witwatersrand. He earned his Doctorate degree in Mining Rock Mechanics from the University of Pretoria.

He began his career at SRK in Johannesburg, where he developed a number of stress analysis systems including two and three dimensional boundary and finite element analysis systems. At SRK, he was largely responsible for the development and initial marketing of DMIPS, a computerised mine planning system. Throughout his long-standing tenure with Gemcom Software International (acquired by Dassault Systèmes in 2012), Diering held several positions including Chief Technology Officer and Vice President of Advanced Technologies. As the former Vice President, Block Caving for Dassault Systèmes' GEOVIA brand, Diering played a central role in setting up Dassault Systèmes' GEOVIA operations in South Africa in addition to overseeing the global development, marketing, training and

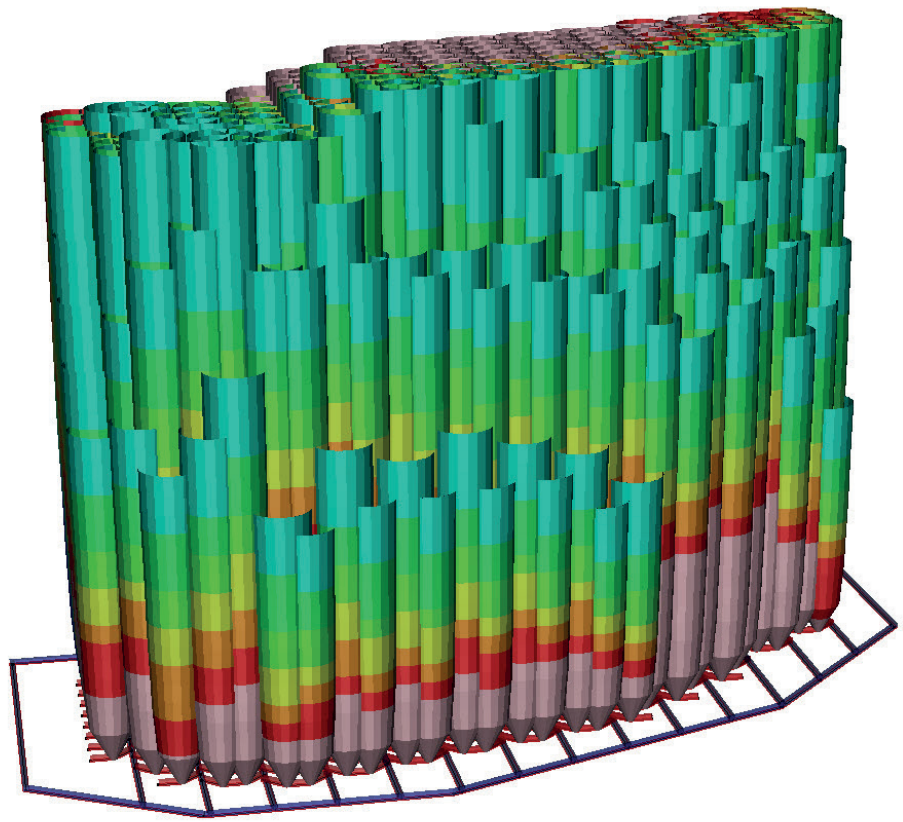
consulting for both PCBC and PCSLC.

In 1987, in conjunction with Dr Dennis Laubscher, he developed the world renowned PCBC software while working for a premier diamond mine in South Africa. In 1994, Diering, once again with Laubscher, performed the first major implementation of PCBC for the Northparkes mine in Australia, prior to the opening of that company's first block cave mine, which resulted in a proven product and very useful design tool for use in both operating mines and producing feasibility studies.

To complement the PCBC software, Diering successfully developed the following applications for use with PCBC:

- Foot Print Finder enables a quick study of different footprints at different elevations, before a more detailed footprint with explicit draw points is set up in PCBC
- Cave Management System (CMS) is a daily draw order production system that monitors daily actual tonnages and status per draw point, and uses this to produce daily draw orders that can be fed to an LHD dispatch system
- LSQ is a least squares draw point sample analysis tool, which enables calibration of draw columns against actual measured sample grades.
- PCSLC is similar to PCBC, and is used by planning engineers for feasibility studies as well as for operating mines that use sublevel caving.

In 2005, Diering was appointed Adjunct Professor by the University of British Columbia's Mining Engineering Department, one of the top mining schools in North America, and is responsible for researching block caving design and providing expertise to support the Masters and PhD programs. He continues to showcase his extensive knowledge on Block Caving by authoring



numerous White Papers. Highlights include:

- Massmin 2000 – PC-BC: A Block Cave Design and Draw Control System
- Massmin 2004 – Computational considerations for production scheduling of block cave mines
- Massmin 2004 – Combining long term scheduling and daily draw control for block cave mines
- Massmin 2004 – Implementation of cave management system (CMS) tools at the Freeport DOZ Mine
- Apcom 2007 – Template Mixing : A depletion engine for block cave scheduling
- Massmin 2008 – Block cave scheduling with a piece of paper
- Massmin 2008 – Simulating irregular cave propagation using PCBC
- SME 2010 – Block Cave Scheduling using PCBC
- International Caving Symposium 2010 – A new mine planning tool for sub level caving mines
- Massmin 2012 – Quadratic Programming applications to block cave scheduling and cave management

Throughout his career, Diering has made enormous technical contributions to the world of block caving, specifically in the area of software development. His contributions are prevalent, in many different forms, at most of the major caving operations across the globe. A truly international figure, he is well recognised as a great technology innovator.

