

## Vulcan 8.1 Stope Optimizer

Chris Alford from Alford Mining Systems was interviewed about the PRIMO project which resulted in the stope optimizer to be released in Vulcan 8.1.

### Features

- Interoperability - move data between software packages
- Automation - generate repeatable stope shapes
- Design - stope geometry takes into account geological and geotechnical constraints
- Visualization - easily define the stope shape framework

### Q. How did the stope optimizer project come about?

**A.** In 1995 I wrote some 'floating stope' software to roughly create stope volumes to guide engineers with manual design of stope shapes. Typically if 5 engineers do a set of stopes you get 5 different results. A software tool was needed to produce those stope shapes automatically in a repeatable and optimal way.

The PRIMO project took a new research prototype developed in 2005 to a commercial product. Maptek was one of three software supplier sponsors to join the project. Each supplier has now got to the point of a commercial product either delivered or about to be delivered.

### Q. What are the specific Vulcan benefits?

**A.** The stope shape is the key. We've been impressed with how rapidly Maptek has been able to develop the Vulcan interface and integrate the tool. This flexibility will facilitate migration to the next iteration of the stope optimizer.

Maptek has added a useful visualization tool at the front end to define the 'stope shape framework'. We've put effort into defining a common data layer to support the output of Vulcan native files.

Another thing that PRIMO achieved was what you might call interoperability - so that you could move data between the different software packages.

### Q. What are some key features that people will be interested to see?

**A.** The key objective was to be able to design the individual stopes to automatically generate stope shapes, taking into account stope geometry as well as geological and geotechnical constraints. The software might do 5,000 - 20,000 iterations to work out the optimal shape that maximizes value, for example.

PRIMO (Planning and Rapid Integrated Mine Optimization) is an AMIRA research project looking at mine design and schedule optimization tools.

AMIRA International Ltd is an independent association of minerals companies facilitating collaborative research on industry issues.

The other key issue in underground selective mining is to identify not just the stope shapes to extract, but also the ones to leave behind.

PRIMO case studies exposed us to a range of stoping methods. Stope optimization for a narrow veined gold project is hugely different to tackling optimization of a vast complex like BHP Billiton's Olympic Dam.

### Q. Will there be more opportunities coming out of the PRIMO project?

**A.** Research showed two different algorithms for stope optimization - both have been extended and modified during the PRIMO project. The currently released stope optimizer product is version 1.

There will be tools to handle different stoping geometries, and more geotechnical constraints. Geological structure will be incorporated in the stope design, so if you're close to the structure the stope shape will snap to the structure wall to mimic overbreak.

There are many other enhancements, different ways of applying cutoffs and various ways of reporting stopes.

Rapid automated generation of stope shapes at different cutoffs is the starting point for underground strategy optimization. Enhancements initially restricted to the PRIMO sponsors deal with stope layout optimization and case management.