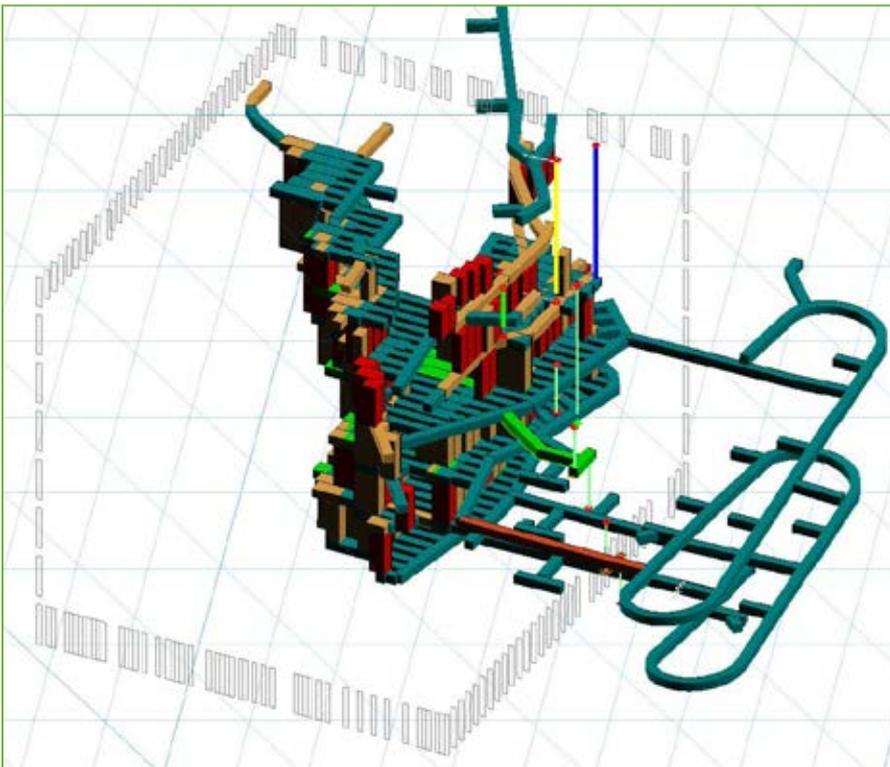




## SHORTCUTS IN MINE DESIGN

Hongliang Wang, Mining Optimization Engineer of Newmont Mining Corporation, initiated a shortcut for evaluating alternate underground designs.



Wang was tasked with developing a full-scale mine design for an underground project at Nevada's Carlin Gold Trend.

'Underground precious metal mining is difficult,' said Wang. 'Manual stope design is time consuming and error prone.'

Underground mine design automation and optimisation is a complex task. Generating 3 to 6 scenarios for a proper comparison and sensitivity analysis at different metal prices and cut-off grades can take months.

Traditional methods required more than 3 weeks to complete 1 mine-wide detailed design. When management requested another 16 options for evaluation, new methods had to be

explored in order to meet the schedule for bringing the site into production.

After thousands of stope designs were made, point by point, line by line, and ring by ring, Wang discovered an incremental-analysis-based stope design and cutoff grade calculation method (3D-IASD).

'The traditional methods did not allow for a logical or spatial relationship between rings,' he said. 'I realised proper naming could save a significant amount of time.'

Mining shapes, such as cut-and-fill drifts and stopes, are typically manually drawn by engineers, based on the block model and cut-off grade. The new method can replace manual checking and provide a final stope shape with maximum values.

THE 3D-IASD METHOD SIGNIFICANTLY REDUCED ERRORS AND PROVIDED ACCURATE CUT-OFF GRADE CALCULATIONS, SAVING TIME.

The five step process involves

- 3D grid setup
- filtering out rings that do not contain grades
- running the stope rings reserve report
- building mineable stope shapes with various cut-off grades
- designing mine-wide stopes and development.

According to Wang, Maptek Vulcan™ allowed Newmont to be creative when doing design work.

'Vulcan definitely made the process a lot easier. Simple but key tools such as 'multiple transfer' and 'auto naming' facilitated 3D setup; 'triangulation by polygon' and 'carry naming attributes' streamlined modelling; and the 'advanced reserve editor' gave us the results we needed,' he concluded.

*Thanks to Hongliang Wang  
Mining Optimization Engineer/Scientist  
Newmont Mining Corporation  
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