

## Accurate models aid ground support

Maptek™ I-Site™ Studio generates high resolution models for geological mapping and ground support quality control at a large mine in Utah.

Maptek™ I-Site™ Studio software is used at the mine to generate high resolution models for as-builts, ground support quality control, geological mapping and blast designs.

The project consists of drainage galleries which are present underneath the operating open pit. Six rigs drilling out of 41 bays will produce 700 holes; tunnels advance at around 250 feet per week across the rapidly developing project.

The main geotechnical objective is to obtain high resolution models of drifts before implementing ground support measures. Fast turnaround from data to models is important as delays can affect production.

A laser scanner collects 40 million points, with 3 repeats on each point, in 4 minutes from each setup. Data is captured down drift as well as from the advancing face. The survey process is conducted very quickly so there is no impact on the mining cycle.

Ground quality is variable, with rock mass rating (RMR) values ranging from low teens to 80, so the drift surface is shotcreted after every blast round. Scanning with the short range laser scanner requires survey control of targets in the drift every few setups. The control points are surveyed with a total station and then acquired with the laser scanner as 3D targets.

The I-Site Studio three-point registration tool registers the point cloud into mine grid coordinates. The workflow employed for efficient scanning means that for every 15 setups a surveyed scan is acquired. Each scan in between is registered to the surveyed scans using I-Site global registration. This improves accuracy and repeatability for each traverse.

Laser scan data is modelled in I-Site Studio to assess the spatial juxtaposition of drillholes with drifts.

Underbreak and overbreak is measured after the advancement of each face heading, and a new as-built is created every round.

Scanning before and after shotcreting removes the need to measure shotcrete thickness by drilling. The colour distance by surfaces tool in I-Site Studio allows users to quickly visualise and compare the distance between the original surface and the newly created surface after shotcreting.

Accurate models are quickly produced from the laser scan data. Rib lines are generated, allowing any deviation from plan to be easily identified. Drillhole locations are reported in a 3D PDF.

Using laser scanning for geotechnical quality control underground brings significant safety benefits, including reduced time in the drift, recording shotcrete thickness without coring and avoiding working at heights. More accurate data is acquired and quickly validated.

Analysing the 3D models away from active mining allows users to carefully review the information for mapping and design.

*Thanks to Thomas Moorcroft, Geologist  
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