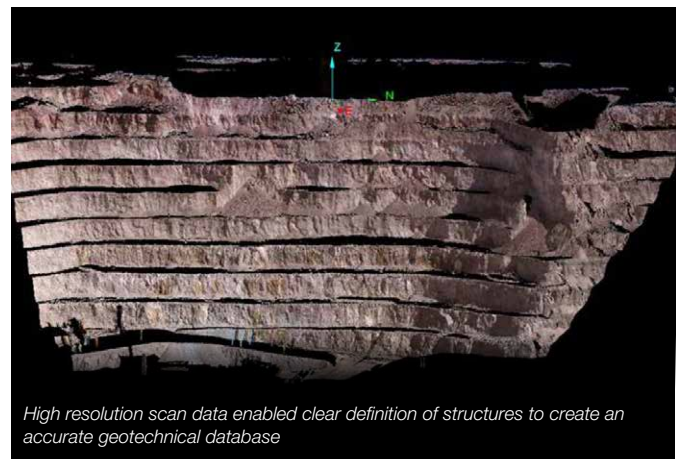
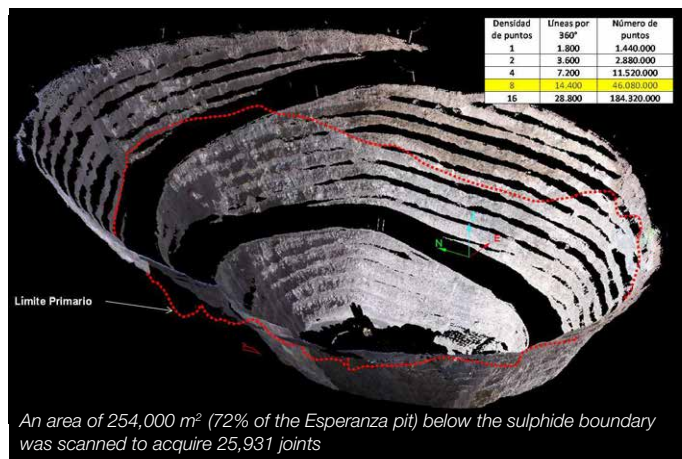


Defining structures at Esperanza

Geotechnical engineers found Maptek™ I-Site™ technology was the ideal solution to define structural domains for the primary mineralisation of the Esperanza mine in Antofagasta.



Esperanza porphyry copper-gold mine is located 100 km south of Calama in the Antofagasta region at 2300 m above sea level. The pit measures 1.5 km long, 1.3-1.4 km wide and 390-400 m deep.

The geology comprises a sequence of Cretaceous volcanoclastic andesite and dacite dipping 20 to 30 degrees west, with a series of minor porphyry intrusions.

The main structural model, generated by geologists for the Esperanza mine in August 2013, clearly defined the boundary between the primary and secondary mineralisation.

The challenge

The geotechnical department was tasked with updating structural domains for the area of primary mineralisation. The biggest challenge was to acquire information in a timely and safe manner from sectors that are inaccessible due to closure of inter-ramp slopes and benches.

The first step was to take the structural model into the field to correlate structures for sectorisation and subsequent definition of the boundaries.

Solution

Different methods for acquiring data were assessed:

- Mapping benches by hand is inexact and presents safety issues
- ATV (Amateur Television) scanning is slow and expensive
- Maptek™ I-Site™ laser scanning was chosen because it is fast and provides detailed data for good quality results

Data capture

Moderate to high resolution scans were captured for the slopes between the top of the primary mineralisation and the pit floor.

The point cloud data was processed and the spherical triangulation feature in Maptek™ I-Site™ Studio was used to select the area of interest from surface scans to identify joint systems.

Discontinuities were saved within a tolerance range of 15 degrees strike-dip and minimum area of 20 cm². The extracted surfaces were then exported with dip and dip direction for analysis.

Validation

Geotechnical engineers reviewed the discontinuity reports for each sector, identified structural differences within these sectors and validated the segmentation of structural domains for the primary mineralisation of the Esperanza pit.

I-Site technology made this validation possible and provided confidence in the data accuracy.

Conclusion

Using I-Site to capture fine structural data has generated a robust and reliable dataset that did not previously exist for the mine. I-Site geotechnical tools enabled detailed structural mapping to update and refine the structural domains for Esperanza.

The accuracy of the data creates a high level of reliability for the structural characterisation generated for domains. Ease of setup and operation with I-Site make it possible to capture information safely and quickly from sectors where operational factors prevent access.