

Moving underground at Argyle

The I-Site laser scanner has provided Argyle Diamond Mine with vital survey data for underground design. Located in the East Kimberley region of Western Australia, the Rio Tinto Argyle Diamond Mine is the world's largest supplier of diamonds, historically accounting for approximately one-quarter of the natural diamond production.



Photograph of chamber (left) and scan of crusher chamber (right)

HIGHLIGHTS

- Underground chambers scanned to check excavation against design
- I-Site 4400CR provided the necessary detail
- Results in required time frame without impeding underground work flow
- Quick and easy post-processing
- A method that works!

As the current open pit approaches the end of its life, a new underground mine below the open pit is underway, due for completion in 2013.

To create an economically viable underground mine, Argyle chose the safest and lowest cost underground mining method available. Block caving involves undercutting the orebody and allowing it to break up or 'cave' under its own weight, removing the need for blasting.

Underground project

The Argyle project requires excavation of several large chambers to construct the underground facilities associated with the block cave operation. These include pump station chambers, crusher chambers and transfer chambers.

The chambers must be mined exactly to design, or slightly larger, for construction to be able to proceed within them. Quality control requires no underbreak whatsoever. Therefore, accurate and high detail surveys must be performed in these chambers once mining is finished.

Argyle tried a number of ways to do this including photogrammetry, which proved too time consuming, and CMS. The latter was not detailed enough, and it was hard to filter unwanted data such as rock bolt tails with no post-processing package.

Neil Vucak, Argyle's Surveying Specialist, involved Maptek in the underground project. Luke Holdcroft, Maptek I-Site Consultant, suggested that the I-Site 4400CR could achieve what Argyle required in a much quicker time frame. >

TESTIMONIAL

'I-Site gave us the required results quickly, safely and with no fuss.'

Neil Vucak, Argyle Diamond Mine

I-Site at work

The crusher chamber measures nearly 50m long, 12m wide and about 14m high; survey was required upon completion of mining. Three surveyed, standard resolution scans were performed from the bottom of the chamber, including one in the CWA drive, and an unsurveyed scan from the top of the chamber.

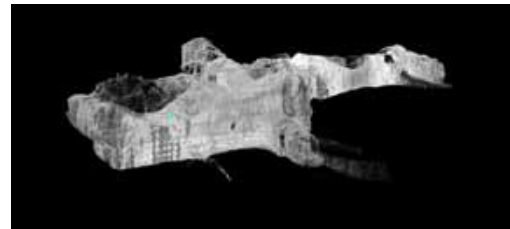
A total scanning time of about 30 to 45 minutes allowed other underground work to be completed, with no time or productivity loss.

Post-processing was quick and easy. A loop model was generated in less than half an hour and brought straight into Vulcan, then put in section view and compared to the design envelope.

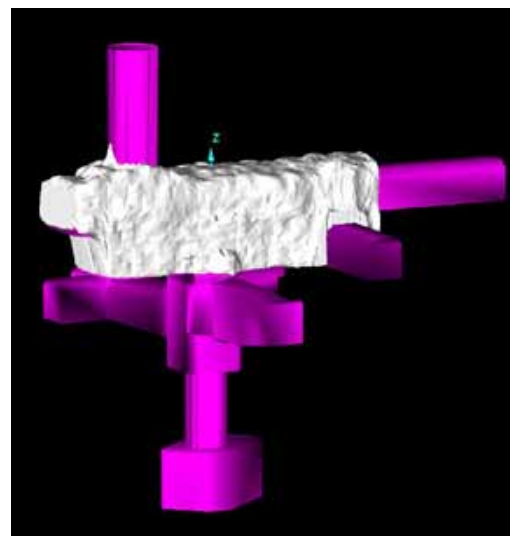
The speed of the system was the greatest benefit to Argyle. An accurate, usable result was generated quickly and without impeding any of the normal work flows.

The result was positive, with Argyle acquiring an accurate model of the crusher chamber that can be compared to the design envelope for determining any problem areas. Total time spent scanning and post-processing was in the range of 1 to 1.5 hours. It is Maptek's opinion that no other method can achieve those results in that time frame.

*Thanks to
Neil Vucak, Surveying Specialist
Argyle Diamond Mine*



Raw I-Site scan of underground chamber



Underground chamber plus design work

Argyle currently uses I-Site Voidworks to process CMS data. As more chambers come on line it is planned that the Maptek method will be chosen to perform these surveys again.