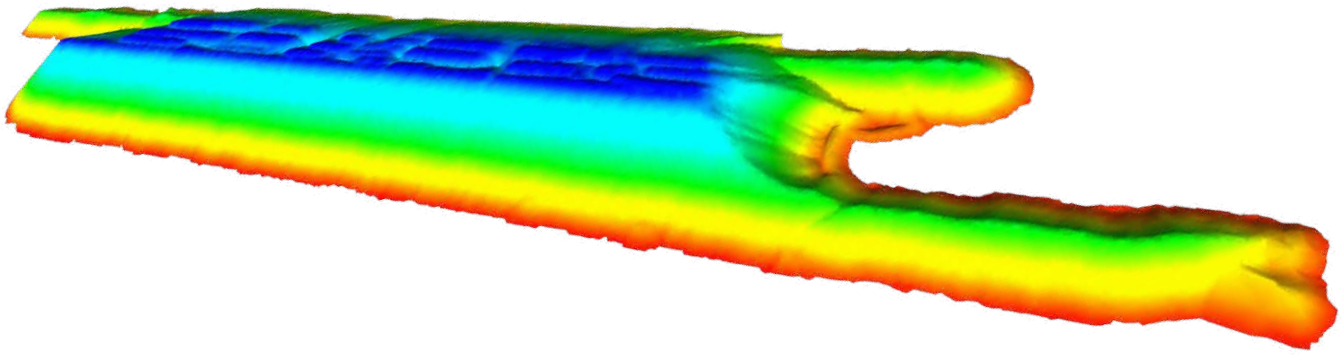
Analysing variability

Cliffs Michigan Operations (CMO) found that using Maptek™ I-Site™ technology for survey significantly decreased variation in volume calculations of bulk material stockpiles.



CMO Tilden and Empire mines regularly measure stockpiles of concentrate, pellets, flux stone and other materials. These surveys provide assessments of production and inventories for accounting; however patterns showed variation - both in excess and deficiency.

'By understanding the sources and magnitude of variation in the process, we can better manage our reconciliation,' said Kurt Peterson, CMO Manager of Training and Development, and project leader.

A repeatability and reproducibility analysis was conducted to define the variability of the current surveying process. Two CMO surveyors performed multiple volume measurements of a single stockpile using GPS, collecting points from the base, middle and top.

The final 3D model of the stockpile contained triangular surfaces that averaged out fine details. Outcomes varied with the number of points taken - more points creates a better model but requires longer cycle times.

In June 2011, CMO brought in Maptek™ I-Site™ which is used at other Cliffs operations, to determine if this laser scanning process would provide a reduced level of uncertainty, and if there was a business case for transitioning to I-Site technology.

Mike Foster, Maptek I-Site Senior Technical Consultant, surveyed the stockpile from a tripod setup at multiple points. He then provided a volume calculation using a common base surface to capture the same volume between two scans of the pile.

> Comparison with CMO manual data showed a 70% improvement in measurement system variability when using I-Site.

'Using the Six Sigma MSA methodology to design the study, and with Maptek help, we accomplished what had never been done before, establishing real life characterisation of the variation associated with such lidar measurement systems,' said Peterson.

CMO determined that the more peaks, valleys, ridges, and crests the stockpile had, the more time it took to walk the piles and make sure the detail was accurate. It also introduced a safety risk for the surveyor. The I-Site process greatly minimised time spent surveying the stockpile and decreased safety risks.

CMO noted additional benefits of the I-Site system, such as a 360° high definition photo of the area, compatibility with Vulcan™ and AutoCAD, the ability to measure from distances of 1500 metres, and vehicle mount capability.

Thanks to Kurt Peterson
Manager of Training and Development
Cliffs Michigan Operations