

Jaguar Raisebore design using LiDAR for back analysis

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ABSTRACT

Bentley located 60km north of Leonora in Western Australia is a VMS Zinc Copper mine forming part of the Teutonic Bore, Jaguar and Bentley cluster of deposits. The mining method uses variations of Avoca mining method using cemented rock fill, waste fill and open stopes with pillars. The mine is currently to a depth of 750 m with up to six sub-parallel ore lenses being mined. With the discovery of a new high-grade lens – Bentayga – there is need to expand and improve capital infrastructure. This paper looks at the design of the Bentayga Raisebore with subsequent back analysis using LiDAR. LiDAR has not commonly been used in raisebore assessment. The paper examines the empirical design and RS2 modelling assessment with the bored condition. The high resolution of the LiDAR enabled mapping of weak structures that were located on the geotechnical investigation hole whose orientations could not be determined. In addition, the scan showed where water ingress was occurring, potential stress overbreak and structural controls on stability. The LiDAR results were able to confirm no additional work such as a shotcrete liner was necessary. The LiDAR results have been analysed in one metre increments as volume of overbreak against the empirical stability criteria (Stacey & McCracken 1989). The future use of LiDAR mapping over a range of rock mass conditions will provide quantification of the established empirical assessment improving its reliability. It is also a useful and accurate tool to monitor long term stability of a raisebore due to stress change or ore pass due to wear.