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Quantification of the impacts of rock mass quality on stope width control and pillar stability in a hard rock narrow reef mine

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2018
https://hdl.handle.net/10539/26770

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ABSTRACT

In bord and pillar mining, pillar stability is a key element of the mining process. This is usually underpinned by successful adherence to planned mining stope width. Stope width control is the backbone to the grade control process in platinum mines on the great Dyke of Zimbabwe. Poor rock mass has always been used to explain the failures by mining personnel to meet the requisite stoping width. A quantification process for this risk in monetary terms is tested and proves that geotechnical risk at times does less damage to the business value stream than malpractices. A review process followed in this research shows the vital path to value preservation and reduction of unnecessary dilution of the ore.

A robust pillar support system is critical in a bord and pillar setup in shallow mines. These pillars are designed not to yield nor crush. Despite meeting design criteria, however, pillars are still found to fail. A tool to quantify this risk in monetary terms is an unparalleled advantage. A classical case is presented in this research illustrating the critical steps that can be followed to scientifically provide management with the financial information on which to base decisions.

Poor rock mass conditions will always require to be adequately supported for sustainability of the mining business. This normally requires the installation of longer tendons, a time-consuming process. A slightly more expensive support product (the Flexibolt) was tested in this research to optimise the support process resulting in great value addition to the business. A case study is presented in this research report. Proposals for inclusion of a geotechnical risk quantification process to assist management to make value-based mining layout and operational decisions are also presented in this report.