Application of Tunnel Boring Machines for Rapid Underground Mine Development with Civil Contractor Early Involvement

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# ABSTRACT

As ore deposits become deeper, environmental regulations evolve and improved quality and safety outcomes are demanded in the mining industry, tunnel boring machines (TBM’s) have become an increasingly viable alternative to drill and blast (D&B) for rapid access development. The key to successful project delivery which is often overlooked is applying lessons learned from other industries and the early involvement of key stakeholders.

This paper will discuss recent experience for projects requiring deep orebody access and conveyor drives, highlighting the benefits of adopting TBM’s. These key findings include increased productivity rates and improved safety through elimination of blast fumes and reduced exposure to geological hazards and water inflows. A smoother profile is achieved, reducing overbreak and providing a higher quality, durable lining that requires significantly less long-term operational and maintenance costs over the mine life. Versatility is provided with the contractors’ experience guiding the correct TBM type selection allowing greater certainty through complex geological conditions, applying technology adopted from the civil industry. Recent experience has also shown that TBM and D&B methods can supplement each other to maximise benefits.

Engagement with an experienced contractor early in the procurement phase allows collaboration between key stakeholders from the start, achieving an accelerated development of a robust design, specification and procurement of not only the TBM but also the associated plant and infrastructure. The contractor can assist with feasibility studies and provide recommendations for a targeted geotechnical investigation campaign to inform the design, with knowledge transferred from the civil industry to achieve 100 year design life. Early procurement of the TBM and key plant can commence, expediting access to first ore production. Innovation in TBM design continues to evolve with a range of profiles, automation and proven technology to predict ground conditions ahead of the face now available for improved mining development.