

Measure While Drilling: A Case Study at Daunia Coal Mine

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ABSTRACT

Reducing coal loss and dilution in mining is crucial in maximising resource value and coal mining efficiency. Blast damage to the top of coal is a significant cause of coal loss and dilution in coal mines globally. When a Geologist is modelling a coal roof surface, touch coal records from production drillers are typically used to support existing exploration data. This is not ideal as it relies on human factors (e.g. alertness and experience of drillers) to determine when roof of coal has been reached. Often a drill rig can either stop short of coal roof or continue drilling until coal has been observed in the drill cuttings; these eventualities compromise the accuracy of the data.

To minimise blast damage we implemented a novel technique: Measure While Drilling (MWD). MWD makes use of data obtained via production rig sensors which record rate of penetration (ROP) data. Using this data Geologists can produce short-term coal models with increased resolution. When compared with survey coal roof data acquired after overburden removal, these short-term models are proven to be highly accurate. Accordingly, the implementation of MWD at Daunia Mine has significantly reduced surface blast damage across the site. It has also enabled the Daunia Mine Geology team to identify accurately complex geological structures, such as large-scale reverse faulting. Modelling the precise strike, dip and dip direction gives much greater confidence in the safety and stability of the open cut highwalls.

In a further advance, MWD technology has also been shown to improve the speed of uncovering coal by better fragmentation of the overburden material. This was evidenced in a pilot study at Daunia whereby the production dig rate efficiency of releasing coal for mining increased by 10%. More work needs to be completed to repeat this trial across other coal operations.

Keywords. Measure While Drilling; Coal; Blast Damage; Loss and Dilution; Structure