Real Time LHD Dispatch Optimisation with Ratio Targets at Newcrest’s Cadia Valley Operations

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Relevant Conference Themes: Innovative mining methods and practices, Revolutionising the traditional mine

ABSTRACT

This paper describes the development and implementation of a real-time LHD dispatch optimisation tool that has been deployed at Panel Cave 1 and Panel Cave 2 at Newcrest’s Cadia Valley Operations. The tool, known as ORB (Optimised Real-time Bogging) is the first known successful implementation of an optimisation-based, autonomous, real-time dispatch tool custom built for underground mining operations that co-ordinates the optimal dispatch of LHD’s in a block cave in order to achieve a range of objectives while adhering to draw compliance and geotechnical constraints. It is an example of short-term interval control using real-time dispatch.

This paper starts by outlining the pre-existing business planning process, detailing the simple logic that produced the daily draw order. Next, the motivations for a real-time dispatch tool are presented, drawing comparison to the limitations in existing planning processes and how these can be overcome through an optimisation-based, autonomous, real-time dispatch tool.

Next, the paper details the Ratio Bogging Draw Strategy, through which tonnes targets are expressed continuously on draw bells or draw points as a ratio of total cumulative cave draw. This means artificial planning boundaries are removed and that draw targets are linked within a cave, such that tonnes are unlocked by bogging other parts of the cave, instead of as a function of time. This creates incentive within the target mechanism for fixing and bogging struggling draw areas whilst allowing uncapped progress if all draw targets are progressing within compliance.

Following this, the optimisation tool developed is outlined, including the data it uses and the objectives it optimises. Finally, detail on the improvements to operations the implementation of this tool has brought and the business process change it has facilitated are presented using Newcrest’s Cadia Valley Operations as a case study.