

Real Time LHD Dispatch Optimisation at Newcrest's Cadia Valley Operations

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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 Boggging) 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. It provides detailed analysis of the limitations of this process, and the suboptimal operations that can arise under this planning regime using actual historical operations data.

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. This includes discussion on the move from daily to continuous planning, the constraints on the problem, and where there is dimensionality for optimisation. The paper then describes the iterative process through which the real-time LHD dispatch optimisation tool was developed, in order to minimise time to value.

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.