

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

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## ABSTRACT

A real-time load-haul-dump (LHD) dispatch optimisation tool has been deployed at Panel Cave 1 and Panel Cave 2 at Newcrest's Cadia Valley Operations. The tool, known as ORB, is the first known successful implementation of an optimisation-based, autonomous, real-time dispatch tool, custom-built for underground mining operations. ORB can co-ordinate the optimal dispatch of LHD's in a block cave to achieve a range of objectives while adhering to draw compliance and geotechnical constraints. It is an example of highly automated short-term interval control.

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.

Subsequently, 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.

Furthermore, 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.