Short-term grade uncertainty and its impact on operational dig-limit definitions

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# ABSTRACT

Short-term mine planning has the critical task of defining the destination of all the material extracted from the mine to fulfill long-term goals and meet the expected production targets. Commonly, the amount of information available for constructing the short-term plan is greater than in other planning horizons, but, at the same time, the operation faces the real variability of the deposit daily. The variability on grade, rock type, geometallurgical performance might impact the fulfillment of production targets, and decrease the expected revenue of the operation. In this work, we explore the impact of grade uncertainty in one of the steps in the grade control workflow: the dig-limit definition. In this step, the operational constraints related to the shovel selectivity are introduced on the plan to obtain a feasible short-term destination definition. While manual procedures are common for this task, several optimization approaches have been proposed. Using an optimization model, we show that grade uncertainty can impact the expected profit up to 10% depending on the scenario and metal production in a real case study. We also explore the use of uncertainty-based models to tackle this variability.