

An Approach for Drilling Pattern Simulation

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ABSTRACT

Drilling is one of the most relevant expenditure in the mining industry. This cost depends on the location, geology features and complexity of the operation, but in general it starts at 150 USD/meter and may be higher than 300 USD/meter.

This paper presents an approach to assess the geological and financial risks related to different drilling patterns with the use of conditional simulations.

The methodology has been successfully applied in different operating mines and mineral exploration projects located in different geological contexts and for commodities such as iron, bauxite, niobium, zinc, copper and gold.

The first step consists in performing a set of conditional simulations using the real dataset available. From the total realizations some are selected, based on a cluster analysis, as the simulated realities that will form the basis of the study. The selected realizations are resampled in different patterns (at least five) and these virtual drilling patterns are then used as the input for additional conditional simulations.

The result of the conditional simulations with the virtual drilling patterns are then rescaled to production increments, based on the actual production of the operating site or the production forecast of mineral exploration projects. The increments used are consistent with monthly or quarterly and annual production, and the risk assessment is performed within a confidence interval of 90% of the simulated results according to the methodology proposed by Harry Parker.

From this study, the degree of accuracy related to each drilling pattern is assessed and used as a guide for additional drilling campaigns, based on the risk that the company is willing to take and budgetary forecast.

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