

Digital Twins for Stockyard Reclamation Optimisation

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ABSTRACT

ROM stockpiles are commonly used as buffers and quality control units between the mine and the processing plant. Its quality control function is achieved by stacking ores of varying quality selectively into either a new stockpile or onto an existing stockpile. The decision on where to stack the ore follows a rule of thumb, each stockpile contains ore of a similar quality, and the incoming material should not significantly change the overall quality of the stockpile. Reclamation operations blend stacked materials, further reducing quality variation. Thereby, a stockpile is considered to have a uniform quality distribution, and its quality is saved as weighted percentages of the elements of interest in most of current stockpile management systems. This paper identifies the reason why the efficiency and effectiveness of such systems are lower than expected and proposes a new management strategy, named proactive reclaiming. The key idea behind this strategy is to use 3D stockpile models for quality calculations, store the results at corresponding 3D locations, and then utilise such quality embedded models to optimise the reclaiming sequence for multiple loaders. The objective of the optimisation is to achieve the required quantity and quality combinations with smaller margins, while also reducing the reclaiming time.