Haulage Simulation of Open-Pit Mines with Ore and Waste IPCC

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In-Pit Crushing and Conveying (IPCC) offers a cost-effective and environmentally friendly alternative to traditional diesel truck haulage in mining operations. However, its adoption remains limited across the industry. This study focuses on the implementation of semi-mobile IPCC system within existing or new mines, specifically analyzing its impact on production schedules over one year. We developed a haulage simulation model to evaluate the production efficiency of various haulage options: pure truck-shovel, ore IPCC, and a hybrid system combining both IPCC and trucks. The model was verified using operational data from an iron ore mine during the eleventh year of its life. Results demonstrate that the hybrid system provides the highest cost savings while closely aligning with optimal production requirements. This research highlights the potential of IPCC technologies to enhance short-term operational efficiency and reduce costs, underscoring the importance of re-evaluating haulage strategies in the mining sector. Our findings advocate for further exploration and implementation of IPCC systems to improve productivity in mining operations.