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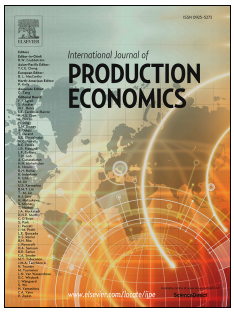

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Decision Support for Fleet Allocation and Contract Renegotiation in Contracted Open-Pit Mine Blasting Operations

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Abstract

In the current copper mining scenario, where prices are decreasing and pits are larger, there is a pressing need for increasing operational productivity. This is particularly important for mining contractors, who are constantly facing the additional pressure of obsolescence if they are not able to provide cost-savings for mine owners. In this paper, we deal with operational efficiency for blasting operations in open-pit mine sites, and propose a framework for minimizing truck allocation costs with hazardous materials based on mathematical programming. Apart from reducing operational costs, the proposed research allows contractors to re-negotiate contracts with mine owners. An integrated model for blasting operation is proposed, taking into account multiple owners with various open pits, each one of them having multiple blasting grids. The main methodological contribution is the inclusion of specially tailored constraints for modelling the blending requirements for the on-delivery production of the explosives, an important aspect given the hazardous nature of the chemical compounds that are transported. The proposed framework was implemented by a Chilean contractor, leading to savings up to 15% of the total operational costs and allowing better tactical decisions, as contract renegotiation or fleet design.

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