



Determination of the Optimum Cutoff Grade Considering Environmental Cost

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Abstract: Mining production planning is a very important subject of mine design process. One of the most important issues in mine production planning is the cutoff grade which is simply a grade used to distinguish between ore and waste. Waste materials may either be left in place or sent to waste dump. Ore is sent to the mill for further processing. Lower cutoff grade causes higher amounts of ore to be processed and subsequently lower amounts of waste materials to be dumped resulted in fluctuations in the cash flow of a mining project. Dumping waste is accompanied with the rehabilitation cost which will affect the overall cost of final production and also the optimum cutoff grade. Rehabilitation cost is the cost per tone of rehabilitating material of a particular type of rock after it has been dumped as waste. One of the most popular algorithms for determination of the optimum cutoff grade is Lane's method. Lane formulated the cutoff grade optimization, but he did not consider rehabilitation cost during optimization process. This cost item should be evaluated first, and then considered during cutoff grade optimization process. In this paper rehabilitation cost is inserted directly into cutoff grade optimization process using Lane's theory. The cutoff grades obtained using suggested method will be more realistic rather than ones by using the original form of the Lane's formulations.

Keywords: Rehabilitation cost, Cutoff grade, Optimization, Production planning.