

The use of in-pit crushing and conveying method to significantly reduce haulage costs

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ABSTRACT

Choosing the optimized and proper haulage system in mines is the important factor and affecting the technical and economic respects. The pit limit becomes larger and deeper by continuation of the open pit operation. This increase of the pit limit causes that the transportation distance to be increased. Therefore, revising and finding a new route for decreasing the distance and applying the substitution methods for the ore and waste haulage is necessary. Both the economic force and increase the energy value are the most important factors and verifying the application of in-pit crushing and conveying system to decrease the mining operations. The obtained results show the operations cost of the waste and ore transportation by trucks is about 3.5 times more than the in-pit crushing and conveying system costs in Sarcheshmeh copper mine. In addition, the studies show that the truck system can be only used until the sixth year of the development planning of the Sarcheshmeh copper mine. After that, by choosing the policy of increase of mine production, also increase of the transportation distance, the usage of the trucks system alone is not eligible. In this condition application both trucks and conveyers system together will be essential. In addition, the studies show that in Sarcheshmeh copper mine by applying the trucks and conveyers together as in-pit crushing, the number of required trucks and the operations cost will be reduced about forty two percentages and the confidence level of production continuity will be increased.

Key words: Sarcheshmeh Copper Mine, In-pit Crushing and Conveying, Haulage System

Introduction

Using the continuous and discontinuous methods for transporting and haulage the mined materials in mines is based upon the technical and economic considerations. The long transportation routes in open pit mines is the major factor for increasing the mining costs. Choosing the proper transportation equipment and the optimized routes for transporting mined materials cause to save and reduce the mining costs as considerably. Applying the continuous methods needs to a little space for transportation of the mined materials and their capacity and power is too much. The discontinuous methods flexibility relation to change place and time is affiliated to the nature of the mined materials properties. In addition, the discontinuous transportation consumes much personnel costs and it needs the exceeding space.

The distinguished characteristics of the materials transportation by belt conveyor method is the continuity for the materials transportation from loading to dump places. In addition, the strength and power of belt conveyor for the materials transportation relation to the occupied space is considerably high. In many cases, the only economic method for crushed materials transportation from a place to another one is the usage of belt conveyor. The belt conveyor is widely used to transfer the materials in local situation or in long distance if it is necessary. Therefore, there are several reasons such as high capacity and reliability, good efficiency in energy consuming for moving the huge volumes of materials that the belt conveyor usage to make suitable for a long time.

Mined materials include the ore and waste blocks are usually loaded into the trucks in the open pit mines. The mined minerals are transported to the primary crusher. The crushed

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