



Technical Article

## Truck Dispatching by Computer Simulation

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This paper describes the results of a digital computer simulation study in which the impact of the proposed truck dispatching on the overall mine productivity was investigated for an operating open pit mine. In the study the existing operation was first simulated for a one-month period using both the actual time study data and the computed cycle times. By adjusting certain input parameters to the simulation program the actual one month production was duplicated through simulation. Afterwards the operation was again simulated in the dispatch mode. Comparison of the simulation results under the dispatch mode with the initial base case simulation results showed a definite improvement in overall productivity with dispatching that is approximately 10% gain for the operation. As expected the results also showed that the extent of possible improvement did vary with the particular pit configuration being investigated.

### Introduction

Truck haulage is the most widely used means of transportation in an open pit mining operation, but is often the single most expensive process in a truck-shovel mining system. According to Michaelson (1974), truck-fleet productivity in open pit copper mines has the lowest improvement rate among the three major unit operations drilling, loading and hauling. In addition, trucks require much labor, high maintenance and relatively frequent replacement making them sensitive to inflation. Most operating shovels experience either some insufficient or excessive

truck capacity or a combination of both in truck-shovel mining system. To meet required production with increasing depth of pit or changing ore-waste stripping ratios, additional equipment is required each year. As a result management is faced with the problem of buying additional trucks or shovels if there is an improper balance of equipment in the mining operation. This problem usually results from inadequate use of haulage resources. Recent increases of the energy cost together with projected future increases will further increase truck-fleet capital and operating costs in the future. Therefore, it seems appropriate to test any strategy for optimizing truck-fleet performance...