

# Mechanical Excavation and Drilling and Blasting – A Comparison Using Discrete Event Simulation

Bartłomiej Skawina, Jenny Greberg, Abubakary Salama, Håkan Schunnesson

## **Abstract**

Mine development is often a bottleneck in mining operations and is strongly influenced by the choice of excavation method. In this paper, the two well-recognized methods, conventional drill and blast and mechanical excavation, are compared and discussed. The former method is the continuation of a long tradition in mining, while the latter method started to be used in 1960s, when mechanical excavators such as roadheaders, continuous miners or tunnel boring machines were developed. The rate at which the tunnel advances is one of the most important factors for mine development. By evaluating and selecting the right technique, the speed and effectiveness of the development could be improved. This paper aims to estimate and compare the advancement rate between the mechanical excavator and drill and blast method using simulation with AutoMod. This study has been done for one of Boliden Mineral AB's mines in Sweden. For the drill and blast method, the study shows increased performance for two simultaneously drilled tunnels when compared with a single one. Furthermore, the simulation runs have estimated the total tunnel development times for the specified development lengths. The study is concluded by sketching an interesting picture of mine development using the mechanical excavator.

## **Keywords**

Advancement rate drill and blast mechanical excavation AutoMod and discrete event simulation