
The use of discrete event simulation for underground haulage mining equipment selection

Abubakary Salama*, Jenny Greberg
and Håkan Schunnesson

Division of Mining and Geotechnical Engineering,
Department of Civil, Mining and Environmental Engineering,
Luleå University of Technology,
SE-971 87, Luleå, Sweden
E-mail: abubakary.salama@ltu.se
E-mail: Jenny.greberg@ltu.se
E-mail: hakan.schunnesson@ltu.se

*Corresponding author

Abstract: The selection of equipment for haulage in underground mines is a challenge due to its impact on both production rates and costs. The selected equipment should create an optimal match for the complete system and the point when equipment is to be added or replaced needs to be identified before the change is made. The use of discrete event simulation to compare two different haulage units of different size with the aim of improving production is presented. The feasibility of the production targets was also analysed. The result shows that, the smaller unit improves the average production from 52% to 75% while the bigger unit improves to 83% of the planned production target. This shows that the production will rise by 8% when smaller units are replaced by bigger units. This may need to be justified financially as the costs associated with changing the truck size might be recuperated by extra production gained. Furthermore, the study showed that current production targets were not feasible under the given circumstances.

Keywords: haulage system; equipment selection; discrete event simulation.

Reference to this paper should be made as follows: Salama, A., Greberg, J. and Schunnesson, H. (2014) 'The use of discrete event simulation for underground haulage mining equipment selection', *Int. J. Mining and Mineral Engineering*, Vol. 5, No. 3, pp.256–271.

Biographical notes: Abubakary Salama holds a Master's degree in Mining Engineering from Paris School of Mines in France. His mining experience is in Sub level stopping mine operations. Currently, he is pursuing a PhD in mine production at Luleå University of Technology. His research interest is production simulation and optimisation with respect to mining at great depth.

Jenny Greberg holds a PhD from Lund University of Technology in Sweden. Before joining Luleå University of Technology, she worked in the Aerospace industry and as mining consultant. Currently, she is an Assistant Professor and also a Deputy Director for Centre of advanced mining and metallurgy at the division of Mining and Geotechnical Engineering at the Luleå University. Her current research focuses on production and simulation of mining operations and tunnelling.