

# Comment on the paper: 'Financial analysis of the impact of increasing mining rate in underground mining, using simulation and mixed integer programming'

by A. Salama, M. Nehring, and J. Greberg

which was published in the April 2017 issue of the *Journal*

It should come as no surprise that a model can show increased profitability with increasing mining rate. However, models are based on assumptions, and sometimes those assumptions are hidden or even overlooked.

This may have happened in the present paper. There is an implicit assumption that grade control was maintained at all rates of mining. I know of several cases in which this was not true.

In one classic mining experiment on the Witwatersrand, the rate of face advance was increased from 3 m to 25 m per month at very little direct cost. However, a fault was encountered.

Because of the interest in the experiment, all available geological resources were brought to bear on the problem. Finally it was agreed that this was a downthrust. A small development revealed what looked like a continuation of the reef lower down, the plane of mining was lowered and we continued at 25 m/month face advance.

Slowly the news broke that grade control had been lost over the whole mine. Slowly the

sampling results for our rapid-mining section came in. Slowly we discovered we were mining waste - very efficiently, but at huge cost, because we were undercutting pay-grade material and effectively immobilising it. After two months our experiment was forcefully halted.

So this is a plea to all who use simulation and modelling in an attempt to improve their mining methods. Check the implicit assumptions. It is all too easy to overlook them. When you try to implement the improvement, it fails because of an assumption you made without even realizing you had done so.

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