

IM4DC

Action Research Report

SUMMARY

Researcher:
Mohammed Abdalla

School/Centre:
School of Mining Engineering

University/Institutions:
University of New South Wales

Key themes:
Operational effectiveness

Key countries:
Sudan

Completion:
January 2014

Research aims:
This PhD research sought to address the following:

- Identify the environmental effects resulting from the blasting processes at a mine
- Test out the technique of airdecking compared to the current blasting process
- Assess the outcomes and provide recommendations

For further information on this action research:
Contact person: Ros Taplin
r.taplin@unsw.edu.au

Final report available on request from:
admin@im4dc.org

The Environmental Impacts of Air-deck Blasting

This PhD research was conducted with the Ariab Mining Company Ltd (AMC) in Sudan in order to test the efficiency of air-deck blasting in reducing the environmental impacts associated with mine blasting. Based on the blasting history in Ariab, there was evidence of negative impacts of blasting at the site, such as deformation of mine walls and nearby infrastructure that resulted from ground vibration, and concern about the unpredictability of rock throw (flyrock) hazards had been raised due to the geological nature of the blasted materials (hard green schist and quartzite rock) and the frequent use of secondary blasting. Also, it had been noticed that there is a high accumulation of explosive fumes due to the use of ANFO (Ammonium nitrate/fuel oil explosive) in shallow blast holes with a low amount of stemming material.

The air-decking technique was first developed in the 1980s and introduces volumes of air into part of the explosive column resulting in reduced ground vibration, air pressure, flyrock and fume risk.

Seven blast trials were conducted at the mine: five air decked and two conventional blasts. There was a considerable reduction in ground vibration when using air-decks within the explosives column charges especially with lower air-decks. Decreased ranges of flyrock were recorded due to the reduction in explosives used with air-decking. Lower levels of fumes (CO and NOx) were noted due to applying air-decking with the optimum amount of stemming and less explosives used.