

Achieving Economic and Safety Benefits at the Development Face



Project Summary

EMULSION VERSES ANFO AT THE FACE

Over a 10-day period, Dyno Nobel tested the application of emulsion as a total solution for charging development headings at the *Newmont/Byrne-cut Invicta Mine*.

A total of 38 faces, including nine decline faces, were charged using just under 10 tonnes of Titan® 6000 emulsion. String charging of emulsion was carried out for the majority of the demonstration and achieved perimeter results comparable to conventional decoupled products.

The trial proved that the direct cost of charging development faces at Invicta using emulsion was similar to that of ANFO with a comparable rate of advance, but with a lower overall total cost of advance.

Background

USING EMULSION AS A TOTAL SOLUTION

The purpose of the demonstration was to comprehensively test the application of emulsion as a total solution for charging development headings.

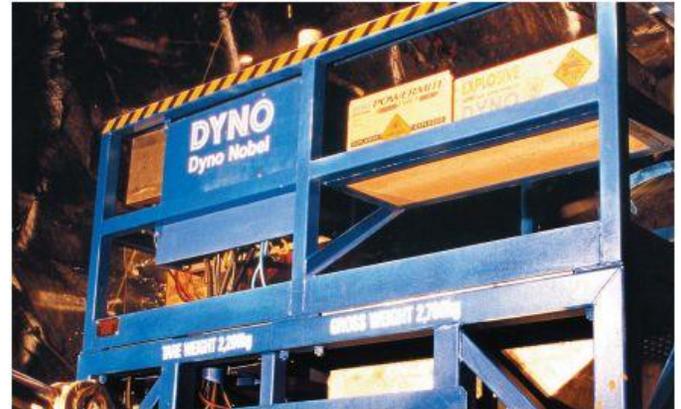
The Byrne-cut Mining contract at the Invicta Mine was chosen because of its suitability for innovation projects.

Project Goals

ACHIEVING COST BENEFITS AT THE FACE

The theoretical benefits of charging with emulsion have been reported in a separate study – ‘DynoMiner Desktop Economic Analysis and Benefits Discussion’.

The purpose of this report was to measure the cost of charging development faces with emulsion compared to conventional products, and discuss transport, storage



and handling of emulsion, as well as economic and occupational health and safety benefits.

Other benefits should include cost savings from:

- Product costs benefits per face should also be complemented through reduced boring time and greater advance per face.
- Faster charging through greater loading rates
- Simplified charging as only one high explosive is required at the face
- Less product storage due to reduced magazine size
- Reduced underground storage through the use of a surface facility

In total, these cost savings amount to a much higher sum than the savings achieved through product usage alone.

The use of emulsion also delivers additional safety benefits over conventional products, including reduced manual handling, less class explosives stored and transported, and a drop in noxious gas emissions.

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Groundbreaking Performance

Achieving Economic and Safety Benefits at the Development Face



Technology Applied

COVERING BLASTHOLE, FACE AND PERIMETER

The technology applied to perform this demonstration was a DynoMiner™, mounted on a work platform. This was used in conjunction with an Integrated Tool Carrier to transport the DynoMiner and for use at the development face.

The DynoMiner is an air operated emulsion system that delivers a gas sensitized emulsion to the blasthole, delivering a fully coupled emulsion charge to the main body of the face and a decoupled emulsion charge to the perimeter blastholes.

The system was designed to allow three separate densities to be used in various parts of the development face operated by the customer.

The unit combines product metering with data logging to capture up to four different parameters and is controlled by remote radio with manual backup.

The DynoMiner system is used in conjunction with a Titan 6000 emulsion, which is sensitive down to very low diameters when gassed.



Similar rates of advance were achieved for a comparable cost.

The DynoMiner delivers both economic and safety benefits by using one product in the entire face and, because this product is an oxidizer, it does not need to be delivered, stored or handled under the same conditions as an explosive.

As it is a bulk product, manual handling is greatly reduced, improving efficiency through quicker handling and charging times. The emulsion produces less nitrates after firing, which reduces the re-entry time to a development face and speeds up mining cycles.

Value Added

TOP AND BOTTOM LINE BENEFITS

Work carried out at Invicta using emulsion achieved similar blast results to ANFO/Powermite/Tube charge, the products currently used at this mine.

The emulsion delivers a string charge accomplishing the same perimeter results as a decoupled tube charge, providing a safer working environment than any fully coupled perimeter explosive.

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