

Increasing Efficiency through Improved Shaft Cycle Times



Project Summary

COLLABORATION DELIVERS OUTCOME

Dyno Nobel and *Burnecut-RUC-Thyssen* (Telfer) Joint Venture worked together to excavate, support and line a 7.05m diameter vertical shaft to a depth of 1,100m at the Newcrest Mining Limited Telfer Project.

The shaft includes five level plats as well as loading and crusher access points. The work involved the implementation of Dyno Nobel's Dynominer™ shaft version to the Telfer shaft, and training of BRT JV employees by Dyno Nobel to operate the unit.

Background

DOUBLE CHARGING THE SHAFT

Excavating and lining vertical tunnels is a difficult task. Traditionally, shaft charging has relied on either cartridge or solid sensitized emulsions.

Together Dyno Nobel and BRT have developed a gas-sensitized emulsion using a purpose built charge unit for the Telfer shaft sink.

The Dynoiner concept was used with two product pumps to form a compact unit, allowing two people to charge the Telfer Shaft at the same time.

To further support the project, Dyno Nobel designed and implemented a world-class training and maintenance program.

Project Goals

MIGRATING TO EMULSION CHARGING

The Telfer shaft began using airleg development before the shaft jumbo was commissioned. During early development and the initial jumbo commissioning, all production blast holes were loaded with cartridge emulsion.



All production holes were charged with bulk emulsion using a cartridge primer.

The goal of the project was to migrate from traditional explosives to Dynominer allowing the full benefits of the system to be realized. As part of a comprehensive logistics program, an emulsion depot was built at Telfer for the surface mining operation, along with a separate emulsion and gassing chemical storage yard for use by BRT.

With a minimum of training, BRT personnel load raw materials directly into the Dynominer. Emulsion is pumped in, with gassing chemicals gravity fed into the unit.

The BRT team then transported the unit to the shaft working face and directly pumped emulsion into blast holes. The BRT team worked to a rigid quality control program and procedures, developed by Dyno Nobel.

DYNO
Dyno Nobel

Groundbreaking Performance

Increasing Efficiency through Improved Shaft Cycle Times



Technology Applied

TAILORED TO SPECIFIC PROCESSES

After a global review of emulsion charging systems, the Dynominer was selected from Dyno Nobel North America and then adapted to the Australian underground mining environment for use in a development mining application.

The Dynominer system is:

- Capable of charging all blast holes fully coupled
- Operated by trained mine operators
- Purpose built for specific applications, including the Telfer shaft sink

The Dynominer shaft version was applied to the Telfer shaft sink. The system comprises the following key components and features.

Key Components

- Emulsion container (550L capacity)
- Two product pumps for dual charging
- Process system, including gassing chemical, water containers and injection
- Twin control panels

Key Features

- Unit runs off standard mine compressed air
- Pump rate = 50 kg/min
- Consistent gassing into blast hole with gassed emulsion product
- Simple reload of emulsion, gassing chemicals and water

Value Added

EFFICIENT BREAKING OF BLAST HOLES

A positive impact on the round advance, mucking time and drilling time has been achieved through efficient breakage of the blast holes using a fully coupled emulsion.



Compared to traditional explosives, the Dynominer system has delivered a number of other important benefits to BTR, including:

- Greatly reduced charge times (approximately one hour per round)
- Reduced cost of explosive product in the face
- Optimal breakage is ensured, reducing mucking times.
- Connects to standard mine services
- Can be operated after a short training period
- Lower magazine storage for high explosives
- Less manual handling injuries

Although the charge time equals a small percentage of the total shaft cycle time, the impact of an effective charge system dramatically increases the overall efficiency of the shaft operation

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