Case Study
Improving Crusher Throughput from Improved Fragmentation
Mawsons Lake Cooper Quarry, Australia

Site Profile
Orica Quarry Services provides a Rock on Ground service to Mawsons Lake Cooper Quarry in northern Victoria. This service includes design and mark out of the blast, supply of initiating systems, mixing and loading of bulk products, tying up and firing the shot.

Quarry management identified that the site was experiencing oversize in the blasted Dolerite muck-pile, which was affecting production rates and increasing their cost for secondary breakage.

The Situation
As Dolerite is one of the hardest rock mass to blast, the site was experiencing excessive amounts of oversize. The following are some of the problems that the Lake Cooper Quarry were experiencing due to oversize:

- High cost of secondary breakage
- Reduced loading efficiency
- Increased maintenance cost (loader, crusher, excavator)
- Reduced primary crusher efficiency
- Reduced Production rate

The Lake Cooper Quarry Manager (Adrian Bull) agreed to a blast improvement program that could assist in addressing some challenges faced by this hard-rock quarry site.

Technical Solutions
Orica proposed that an electronic initiation system, combined with the use of accelerated initiation timing and Centra™ Gold GT bulk product, be trialed to improve blast fragmentation and the quarry’s productivity.

An initial 45,000 tonne trial blast was divided into two sections, the first being initiated by Uni tronic™ electronic detonators using advanced accelerated timing and the second half being initiated by a conventional non-electric initiation system.

Both sections of the blast had crusher throughput data recorded for detailed analysis of the outcomes of each initiation system. Visual post blast differences between each of the two sections of the blast were also recorded for analysis.

The excavation process of each of the two blast sections was completed separately in order to record individual production data for each initiation method. This enabled analysis of primary crusher throughput for both the Uni tronic™ and non electric sections of the blast.

The Result
Notable improved rock fragmentation was achieved as a result of accelerated initiation timing using Uni tronic™ detonators. Analysis showed that primary crusher throughput of the Uni tronic™ section was 18.5% higher when compared to the standard non-electric section. Analysis also showed that crusher blockages were reduced by 32.5% in the Uni tronic™ section. Both the Quarry Manager and Supervisor stated that this trial had delivered notable and measureable gains when compared to standard non-electric blasting at Lake Cooper Quarry.
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Additional benefits delivered aside from increased crusher throughput included:

1. Production loading efficiency in the electronic blast section was improved as the requirement for a second dump truck to haul only oversize material was eliminated. Savings in fuel and operating costs were seen.

2. Reduced expenditure in ground engaging tools, wear parts and crusher maintenance has resulted.

3. Improved floor control during excavation of the blasted rock pile.

Acknowledgements

During the Lake Cooper trial blast, there was a outstanding cooperation between Orica’s blasting team (Reza Ghaemi - Technical Service Engineer & Frank Santoro - ABM VIC) and Mawsons Lake Cooper Quarry manager_ Adrian Bull. The cooperation and teamwork during this project led us to achieve our desired outcome and outstanding ongoing results.