An Orica Mobile Manufacturing Unit and operations team load Centra Gold at a site.

EMULSION-BASED PRODUCT PROMISES INCREASED STRENGTH

Bulk explosives have long been a feature of the quarrying industry, evolving from the basic ammonium nitrate/fuel oil (ANFO) form to emulsion-based products. David Miller outlines how a primary emulsion-based explosive can reduce a quarry's total cost of ownership.

Orica's latest generation emulsion-based bulk explosives offering for the Australian quarry industry is the Centra Gold product range.

The primary products in this range are Centra Gold, Centra Gold GT and Centra Gold ES, which have been formulated for high fragmentation in hard rock, improved dig rates and environmental control.

This range provides quarry operations with the flexibility to customise energy needs to achieve the desired blast outcome.

Committed as it is to continuous improvement, Orica has optimised the emulsion formulation for the Centra Gold product range. It offers a higher strength base emulsion, with an increased density range and a higher maximum in-hole density. Producers can now load products with a density between 1.15 grams per cubic centimetre (g/cc) and 1.25g/cc with Centra Gold and Centra Gold GT products, or 1.10g/cc with Centra Gold ES.

The higher strength emulsion and increased density range delivers a relative bulk strength increase between five per cent and 13 per cent from what has been traditionally available, and provides greater flexibility at lower densities for sites with environmental restrictions.

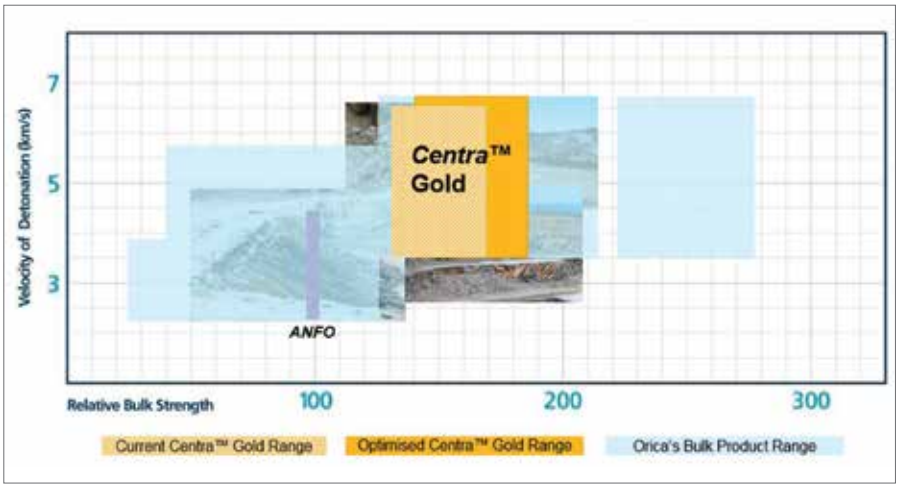

Figure 1: Orica's bulk product EnergyMap with the optimised Centra Gold product system.

These changes have been reflected in the EnergyMap in Figure 1, which compares the previous and optimised Centra Gold product range.

A comparison between the optimised Centra Gold product range at an average in-hole density of 1.25g/cc versus a traditional watergel bulk explosive at an average in-hole density of 1.32g/cc, along with the amount of

explosives charge required per blast hole to deliver the same energy output, is shown in Figure 2.

This shows the Centra Gold products with a lower average in-hole density can deliver an equivalent or better energy output than traditional watergels at a higher density. Centra Gold products deliver the same or better blast outcome with less explosives per blast hole, which has a direct impact on the bottom line of the quarry's operating cost.

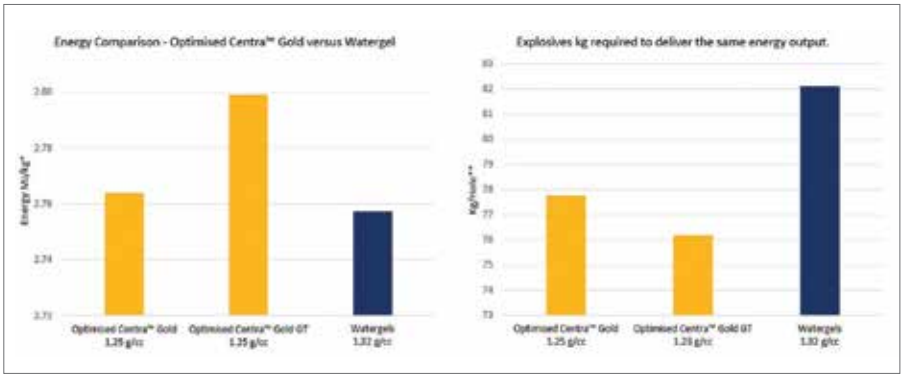

Figure 2: Energy comparison optimised Centra Gold vs watergel.
* Energy values are calculated using Orica's proprietary IDeX computer code. Energy values are based on standard ANFO with a density of 0.8g/cc and a cut-off pressure of 100Mpa. Other computer codes may give different values. ** Based on an 89mm diameter blast hole with 10m of product charge.

OPTIMISED BLAST OUTCOME

The optimised product formulation and capability of Centra Gold promises improved results for extractive producers.

Quarry operations can access a higher energy, emulsion-based product, enabling them to use lower quantities of bulk explosives in each blast hole. The increased energy can be used to reduce the total operating cost in a quarry through increased dig rates and throughput due to improved fragmentation or reduced drilling and blasting cost through pattern expansion. Furthermore, the wider density range allows better control for those operations with stricter environmental controls.

Achieving the optimum final blast outcome is dependent on the bulk explosives used, plus many other factors including the initiation system used, pattern dimensions, loading design, initiation sequence, on-bench quality assurance/quality control (QA/QC) and loading accuracy.

Orica's technical services team will review all these aspects as it transitions new and existing operations to the optimised Centra Gold product range. This process will be enabled by Orica's BlastIQ platform,

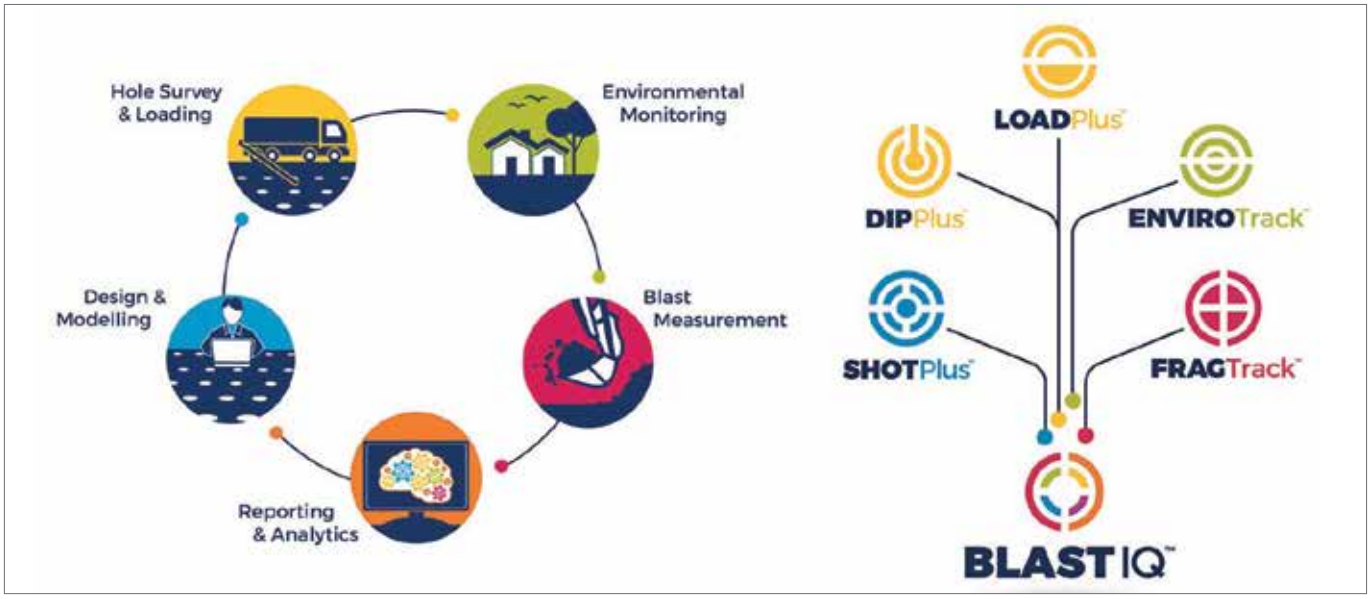

Figure 3: Orica's continuous improvement approach to blasting, enabled by BlastIQ.

which includes the SHOTPlus blast design package, the DIPPlus in-field data capture tablet for drill hole QA/QC data, ENVIROTrack tools for vibration monitoring and prediction, and FRAGTrack fragmentation measurement systems.

Using the continuous improvement approach to blasting outlined in Figure 3, and enabled by BlastIQ, Orica's technical services team in conjunction with the quarry's technical team will assess how their quarry can lower their operating cost through implementation of the optimised Centra Gold product range.

The performance data of the previous Centra Gold can be compared to the optimised Centra Gold, starting from the design and modelling process through to the blast measurement process when it is integrated onto the BlastIQ web portal. This will enable faster data-driven decision-making for drill and blast improvements during the reporting and analytics stage, ultimately resulting in consistent quality blast outcomes and blasting within the site's environmental limits.

The staged rollout of the optimised Centra Gold product begins this month. It is expected that Orica's quarry customers in Australia will be realising the benefits of the improved product range by the end of July. •

David Miller is Orica's Marketing Manager - Explosives for Australia, the Pacific and Asia.