CASE STUDY
Improving Trim Blasting Efficiency using Advanced Vibration Analysis
KCGM Fimistone Pit Mine, Australia

The Situation
Orica has world leading expertise in blast vibration assessment and control. KCGM operate an open cut gold mine approximately 800km east of Perth in Western Australia. KCGM wanted to reduce clean up time and idle shovel time following blasts.

Mining Issues
One of the unwanted by-products of any blasting operation is the vibration that results from the sudden release of explosive energy on the surrounding ground. This vibration places unwanted stress and strain on pit walls which must be maintained at low levels to minimise its effect. Current practice achieved this through trim blasting, leaving a couple of rows of unblasted material and 'trimming' them off when the blasted material in front had been removed.

Blast vibrations have for a long time been thought to be reduced if the face of the shot is cleared of broken ground as the previously broken ground placed a restriction on the movement of the material being blasted. This practice however results in inefficiencies and a loss of production time due to:

- throwing the trimmed material across the pit floor
- toe clean-up for the trim blast
- scheduling equipment losses

The challenge was to determine if these inefficiencies could be eliminated through using advanced blast modelling to leave broken ground in front of the trim blast without causing any increase in vibration load on the pit walls.

Technical Solutions
A trim blast at KCGM was prepared for firing. One half of the face of the pattern was cleared of broken rock and the other half had approximately 20 metres of broken rock left in front of the face. The blast parameters for this section were redesigned using Orica's advanced blast modelling tools. The trim shot was loaded and fired as per the recommended design. Vibration monitors were deployed in such a fashion as to form an array of monitoring points. The vibration records obtained at each of these locations were then compared and cumulative records calculated to indicate the vibration levels that were experienced at both the choked section of the blast and the free face section of this blast.

The Result
The results showed that Orica could modify pattern design to achieve:

- Lower cost of mining
- Vibration from the choke section, no higher than for the free face section.
- Confirmation of Orica's advanced modelling system prediction of the effect of burden on blast vibration

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