

BEST PRACTICE

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TITLE  On Video

Signature blasts to reduce and control ground vibration

ARTICLE

DESCRIPTION

The use of electronic detonators to reduce and control the levels of ground vibration from blasting is becoming more popular. However, switching detonation systems is no guarantee of achieving the desired result. The major asset of any electronic detonator system is its flexibility in allowing the user to select bespoke delay timings with finite precision and accuracy, but exactly what timing should the shot firer select?

EPC-UK has developed a methodological approach to derive the optimised delay timings for any given site. This approach requires the firing of a signature blast. This is a single shot hole, loaded with the normal amount of explosive and having a burden equal to that normally used at the quarry. This blast is simultaneously monitored at all properties, buildings and structures which have been identified as being sensitive receivers.

The resulting vibration traces capture the seismic characteristics of the geology and the individual response of the monitoring location, hence it is termed a 'signature blast'TM. This data is then used to seed a linear superposition mode - a mathematical algorithm that calculates the optimum inter-hole delay time. This is used as the seed data for a second linear superposition model that derives the optimised inter-row delay time. The final outputs are the values that the shot firer can use to design the blast to minimise the levels of vibration.

BENEFITS

This protocol has been successfully used to reduce and control the levels of ground vibration at eight quarries across the United Kingdom. This has resulted in:

- Leaving safer faces through controlled blasting
- Leaving safer rockpile profiles for appropriate digging and loading
- Minimising the environmental impact of blasting
- Reducing blasting complaints
- Improving the relationships between operator and neighbour
- Releasing reserves that would otherwise be sterilised

ARTICLE IMAGES

