Signature Hole Analysis for Vibration Control

Project Summary

VIBRATION IS A CONCERN AS THE PIT APPROACHES AN OIL WELL

Cast blasting is used in all dragline pits at this large western surface coal mine. High effective cast to final has been the primary driver in all areas until recently.

One pit was approaching an oil well, so vibration became a concern. The modified scaled distance factor of 15.6 is used when determining how many pounds per 8ms can be shot and delay timing options have been decreased because of the scaled distance factor.

A competitor's detonators are generally used and the delay timing is chosen by that company. Seismographs had not been used to determine the PPV at the well.

The challenge for this mine is coming up with delay timing that gives optimum performance without exceeding the limit of 5 inches per second PPV at the well.

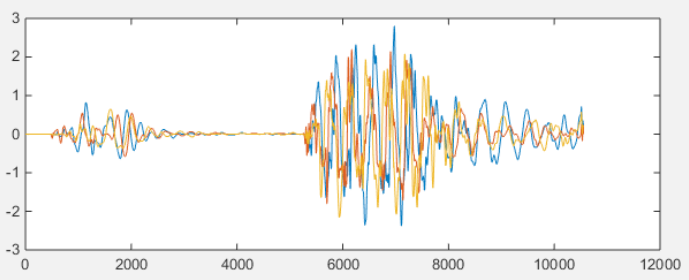
Technology Applied

DYNO 42™ VIBRATION CONTROL SOFTWARE USED TO DETERMINE OPTIMUM DELAY SEQUENCES

A signature hole was shot along with a cast blast. The signature hole was actually the first hole in the cast and was timed at zero ms. The rest of the shot was delayed 5 seconds to enable the signature hole wave form to be isolated from the rest of the shot. DYNO 42 software was used to determine the best delay timing for the next cast in that area.

Results

REDUCED VIBRATION ADDS VALUE, SAFETY TO CUSTOMER CAST BLAST PROGRAM



The PPV from the cast that was shot with the signature hole was 1.24 IPS at the well. The distance from the well was 2,000 feet. The delay timing sequence was chosen by DynoConsult.

The next cast was 3,300 feet from the well and the competitor's progressing timing was used. The PPV now was 2.3 IPS at the well.

The next cut in that area used timing determined by the DYNO 42 software. The distance was 2,000 feet from the well. Vibration at the well was 1.02 IPS and cast performance was not reduced.

Value Added

CONTINUED USE OF DYNO 42 WILL ENSURE OPTIMUM VIBRATION PROFILE AT NEARBY OIL WELLS WITHOUT IMPACTING THE RANGE OF POSSIBLE DELAYS AVAILABLE TO ENSURE OPTIMUM CAST PERFORMANCE

Signature holes will continue to be shot when near the well. DYNO 42 software will be used to determine the best delay timing options rather than the timing being chosen by our competitor. Seismographs will be used at the well to document PPV, rather than using the scaled distance factor.

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