THE AUSTIN ADVANTAGE

QUARRY FRAGMENTATION IMPROVES BY 15% WHILE SECONDARY BREAKAGE IS REDUCED BY 67%

GENERAL INFORMATION

Location: Slovakia

Project Type: Surface Quarry

Products Used:

- E*STAR
- Emulex
- Austinite
- Paradigm Software

Project Lead: Miroslav Valkovic

Author: Ondrej Cermak

THE HISTORY

This limestone and dolomite quarry has an annual production around 350,000 tons which is consumed mainly by the construction industry. The typical blast parameters are 89 mm hole diameter, 19.5 m hole length with 1 m subdrill and pattern 3 m x 3.2 m. The usual blast size is around 15,000 – 17,000 tons of rock blasted by 1.9 tons of explosives in approximately 30 holes. Austin Powder Slovakia provides full rock-on-the-ground service for this quarry.

THE CHALLENGES

Geology variation throughout the quarry made it difficult to keep consistent fragmentation. Most of the time the muckpile contained boulders that required intense secondary breaking by a hydraulic hammer. Subsequently, the blasts were creating uneven faces that were influencing safety on bench; making it harder for blast planning to keep the patterns uniform as needed for the desired final fragmentation.

THE GOAL

1. Provide blasted rock in the specific, requested fragmentation.

Figure 1 - Result of nonelectric blast

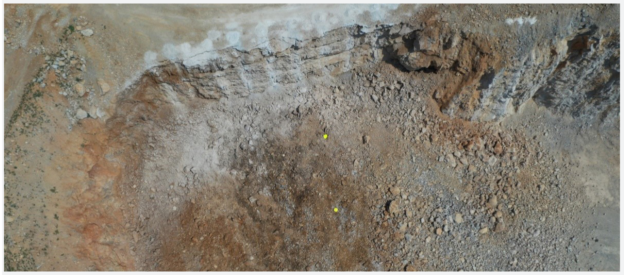

Figure 2 - Result of optimized E*STAR blast

THE **AUSTIN** SOLUTION

Thorough analysis of the geological conditions as well as the blasts fragmentation together with Paradigm geological modeling provided calculations of the optimum timing for the best fragmentation results.

Specific timing suitable only for the implementation by the use of the E*STAR detonators was gradually improved using drone photogrammetry, fragmentation evaluation and tweaking the geological model.

The precise electronic timing brought straightening of the faces after the blast.

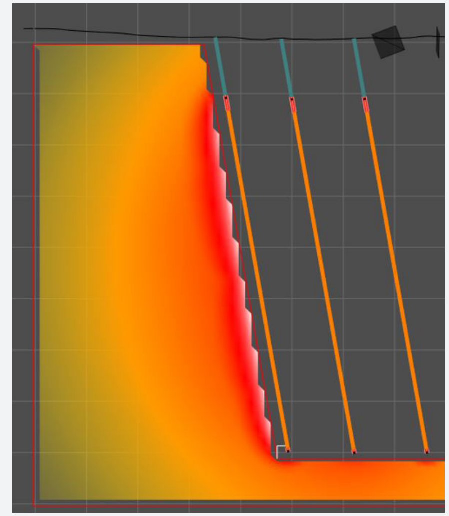

Figure 3 - Theoretical damage model for nonelectic timing - influence of delay scatter

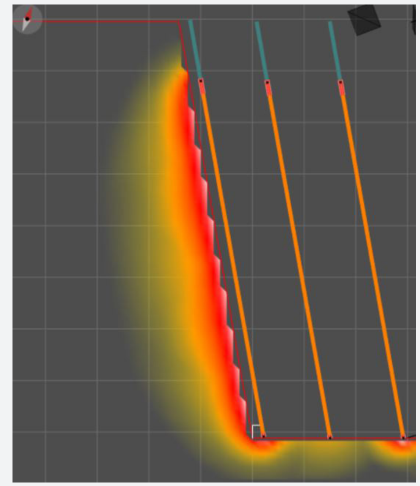

Figure 4 -Theoretical damage model for E*STAR timing - minimizing delay scatter

THE **OUTCOME**

Gradual improvement of the model during the seven-blast test period resulted in 67% reduction of secondary breaking. Muckpile percentage below the crusher critical size (1,000 mm) was increased by 10% and the optimum size (600 mm) by 15%.

Figure 5 - Paradigm timing optimization for best fragmentation

AUSTIN POWDER