

WALL CONTROL BLASTING AT THE MANASSAS QUARRY

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ABSTRACT

The Manassas Quarry is a large industrial stone quarry in Northern Virginia owned and operated by Vulcan Materials Company. The quarry experienced instability in a portion of the north wall, which included toppling failure in a metasediment and movement on a major fault zone. It was necessary to take remedial measures to stabilize the wall and create good quality final pit walls.

A fundamental requirement was wall control blasting that would achieve good, clean final walls with minimal backbreak. Presplitting was employed at the perimeter using 3-inch diameter holes and 1-inch diameter Splitex as the presplit explosive. The presplit holes were drilled on a 10 degree angle from vertical, achieving an 80 degree face angle.

The final wall blasts included a buffer row next the presplit line, which was essential to success. The buffer row holes were loaded with a reduced amount of powder to reduce gas pressures driven back against the presplit line.

Final blasts were shot across two free faces whenever possible to maximize relief away from the final wall. Substantial delay times were used to further enhance relief. Two or three independently delayed decks were used to minimize vibrations at the wall as well as at nearby housing.

A second phase of the project included creating a slot for a new crusher and ramps for conveyors out of the pit to a new plant facility. All walls had to be presplit. In the immediate area of the crusher installation half depth line holes were spaced between the 3-inch presplit holes to further guide the presplit crack in this critical area.

For the north wall toe drains and artificial support were also used to insure the stability of the wall. Six toe drains were placed on each of two different elevations for a total of twelve. Grouted rebar was employed on the uppermost safety bench to insure the stability of this important bench.

The design methods for control blasting and the field implementation are described in this paper. Good results were achieved, both for the north wall and for the crusher area. Small diameter angle presplit can be used to produce good quality final pit walls, which maintain safety and a high wall angle. This is true even for walls exhibiting unstable conditions. At \$0.75 per sq. ft. of wall prepared the cost for presplitting in this manner is reasonable.