# DynoConsult Assists in Permit Change

## Project Summary

### BLASTING REGULATIONS: CHANGING BLASTING PERMIT CRITERIA FOR NORTH-EAST LIMESTONE QUARRY

This northeast US limestone operation was facing production constraints due to limitations in blast size imposed by the original state mining permit. The operator was seeking to petition the state to remove the limitations based on size due to the ability to provide minimum community impact while dramatically increasing shot size to meet production demands with the use of technical blasting applications.

## Background

### CHANGES WERE NEEDED TO MEET DEMAND

When the quarry was opened in the early 1990's a state issued permit set limits of no more than 200 lbs per 8 ms delay and no more than 5,000 lbs of explosives in one blast. In early days of the quarry these limits were acceptable. However, as the customer base grew and demands for stone increased, it proved difficult for quarry to stay in compliance while supplying their customer base.

## Project Goals

### TRIPLE CURRENT ALLOWABLE POUNDS PER BLAST

The goal of the project was to petition the state for a permit change which would allow unlimited lbs / delay and up to 15,000lb in single blast. Prior to seeking this change, the operator understood the need to convince local government and regulators that such changes could be accomplished without increasing the perception of blasting operations to the surrounding property owners. Dyno Nobel was tasked with developing a program to highlight technological advances in blasting applications with the goal of educating the local community and seeking their approval before going to the state regulatory authorities.

## Technology Applied

### DIGISHOT® ELECTRONIC DETONATORS, SIGNATURE HOLE ANALYSIS PROVIDES MEANS TO ACHIEVE GOAL OF ZERO INCRESED IMPACT TO COMMUNITY REGARDLESS OF SHOT SIZE

As expected, resistance was encountered in the request made of state officials. Many presentations were made to state reps and commissioners pleading the case where the use of electronic detonators used in conjunction with wave cancellation had proved effective in larger blasts-with same or less impact on neighbors.

At the state's request, the mine performed a 7,500 lb. blast with representatives and quarry neighbors present. Using timing selected by wave cancellation signature hole analysis, the mine was able to show that 500 lbs per delay and increased shot size had no greater impact on neighbors.

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## QUARRY PERMIT

### PREVIOUS PERMIT LIMITS FOR BLASTING

- Explosives per blast 5,000 lbs
- Explosives per delay 200 lbs
- Blasts per day 1
- Days and times M-F 10-4
- Blasts per year 104
- Ground vibration limit Flat 0.50 ips
- Airblast and overpressure 133 dB
- Blast notification offered for interested neighbors

## DYNOCONSULT PROPOSAL

### USE PROGRAMABLE, PRECISE AND SAFER DIGITAL DETONATORS AND SIGNATURE WAVEFORM ANALYSIS

- Explosives per blast 15,000 lbs
- Explosives per delay No limit
- Blasts per day 1
- Days and times M-F 10-4
- Blasts per year 104
- Ground vibration limit Flat 0.50 ips
- Airblast and overpressure 133 dB
- Blast notification offered for interested neighbors

## Value Added

### LARGER BLASTS, LESS FREQUENT BLASTS AND OVERALL COST REDUCTION

The permit changes were granted, allowing the quarry to increase shot size in increments of 2,500 lbs with no lbs /delay requirements. The permit states that wave cancellation timing will be used in all future blasts.

Signature hole analysis (SHA) was used in conjunction with DigiShot® precision and programmable electronic detonators to design production blasts exceeding the limitations imposed by the existing permit. Predicted modeling of larger production blasts provided the needed confidence to convince regulatory authorities to allow a series of test blasts with increasing shot size. Subsequent shots were designed using timing sequences developed by SHA on a shot specific basis. DigiShot detonators were used to insure precise hole timing to achieve the delay sequence developed by SHA.

These test shots proved the ability with shot specific timing to increase shot size with no increase in off-site impact to the community. With the approval of the local community, the state regulators agreed to amend the mining permit to allow larger shots based on SHA instead of Scaled Distance.

The permit change has allowed the quarry to be more productive by doing larger shots. This translates to less shots and less down time. The added benefit is the neighbors are subjected to less frequent blast events with equal or less effects than previous smaller blasts.

Larger blasts also provide an advantage to the local Dyno Nobel distributor, reducing costs by increasing the amount of product used per visit to this operation. This reduces the number of trips annually, freeing manpower and equipment to service other accounts.