As Appeared In December 2008

NAQN
NORTH AMERICAN QUARRY NEWS

INDUSTRIES SERVED—
▶ QUARRIES ▶ HOT MIX ASPHALT
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Published by Lee Publications
6113 State Highway 5, Palatine Bridge, NY 13428
TEL: (518) 673-3237

Features

Considering the potential of digital technologies: from laser profiling to EIS

Maine Drilling & Blasting's quarry division has long been on the leading edge of available digital technologies to insure the highest level of safety and quality in their blasting operations. The most notable of these technologies is the Bore-Track/Laser profile system. The company uses it routinely to determine the quality of their drilling and the condition of the faces they are loading. It is a proven technology and recognized as being instrumental in the prevention of flyrock incidents and the improvement of the quality of our shots.

Maine Drilling & Blasting is now advancing their position as an industry leader in the application of digital technologies by embracing yet another … electronic initiation systems, which have great potential for quarry applications. MD&B has been evaluating major electronic systems over the past 18 months. In some cases, the system is mandated by regulation or permit. There are, however, other sites into which MD&B is introducing the system with great success.

Electronic initiation systems

We all hear marketing claims everyday for products used in our daily lives. Some may be true; some are made simply to entice a purchase. Electronic initiation systems have their own marketing claims and, like any other claim, the perennial question is, does it deliver? Based on what MD&B is learning from every electronic shot they've detonated, the system does indeed deliver. To date, they have employed the system in extremely challenging conditions that include weather, heavy use of blasting mats, proximity to structures, complex blast designs and multiple decking applications.

According to Todd Harrington, MD&B's blasting technical manager, "As this article is written, there is an extremely high confidence level in the ability for this

Blaster in charge Todd Larain, center, giving instructions to the crew.

Bulk truck and electronic equipment at sunrise start to load the shot.

type of technology to perform. Given what the system has been put through in the last couple of years, we are now at a point where we are learning about a potentially valuable benefit not only to us, the user, but to our customers as well." The benefit and value is known as production efficiency.

"We have had more than one customer tell us (unsolicited) they are seeing improved productivity from electronic shots that includes loader cycle times and through the plant crushing productivity," according to Harrington. "Apparently the level of efficiency is such that it is offsetting the higher cost to deploy the electronic system. This concept is one of the primary marketing claims made by the electronic detonator manufacturers."

While MD&B certainly doesn't advocate the use of electronic detonators across the board to all their quarry customers, they are keeping eyes peeled for opportunities. Before any implementation, potential candidates are considered carefully to ensure total success and benefit to the customer, and supervisory and management approvals happen before approaching a quarry with the idea. In today's economic climate, Maine Drilling & Blasting feels it is important to consider the significant potential for the application of this technology to impact their customers' production efficiency, so the use of an electronic initiation system is then well thought out and planned by a company.

Considering 12

Considering from 11

A case in point

One success story was a blast performed this summer by Maine Drilling & Blasting's central quarry region at the Brox Industries Dracut, MA, quarry. The planning that went into this particular blast started about two years ago when it became apparent that quarry reserves that were available from an overburden removal standpoint, were running low, and MD&B would need to shoot at least 600,000 tons right next to the new $15 million crusher complex.

As Todd Larain, blasting supervisor on the project, said, "At the previous shot, we were about 85 foot from the main jaw, and could look down on the approach ramp from the face. Not a very pleasant situation to be in. To further complicate the blast plan, there is an asphalt plant 225 foot directly behind the shot, with a 20,000 gallon fuel oil storage tank. In a 225 foot radius, there are $20 million in structures that could not be moved. Due to the proximity of the road, benching the 90 foot face was not an option."

Electronic detonator blasting machine.

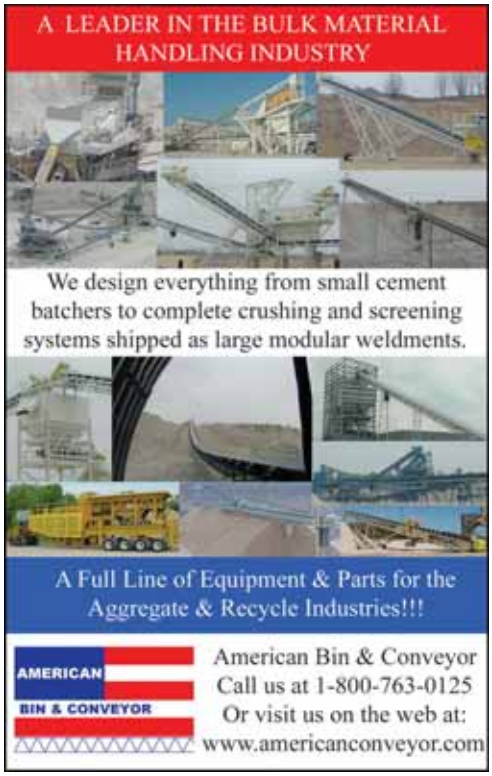
After consulting with the quarry superintendent Bob Norkiewicz, it was determined that MD&B should remove as much rock at once as possible, due to ongoing construction of a new asphalt plant directly in front of the existing face. By taking a shot of this size, Maine Drilling would put the quarry's construction timetable ahead by a full month. The shot was laid out as proposed, and reviewed by Todd Harrington. Both nonelectric and electronic timing plans were drawn up, and although they could have shot the eight rows deep this shot required with nonel, MD&B decided to demonstrate the effectiveness of the electronic system.

The electronic system is a programmable electronic detonator that delivers precise timing; selected by Maine Drilling & Blasting to provide advanced control over muck pile displacement, as well as for control over vibration and air blast due to the size of the blast. While these detonators are expensive, MD&B was able, in partnership with their customer, to receive a premium for the deployment of this system.

The 101, 88-foot deep holes required 70,000 pounds of bulk powder. MD&B drill operator John Dion was selected to drill this shot. He produced excellent holes in very tricky rock that had seen some serious deviation in prior shots. Every hole was bore tracked, a procedure that took several days, and both free faces were laser profiled. After a thorough

Pre blast photo of the shot next to the crusher.

safety meeting involving all participants, loading began at 4:30 a.m. The shot was loaded by 11:45 a.m. and Todd Harrington double checked the electronic programming in the caps. Everything was checked and rechecked. Seismographs were positioned all around the quarry at residences that previously had concerns about vibration. This was more of a "peace of mind" set up for many of these folks, but also covered Maine Drilling & Blasting from a regulatory standpoint.

A blast site security plan was established and implemented. This involved securing all access points not only to the blast zone, but the quarry, itself. Each sector was verified clear prior to the shot being fired. The security outside the main gate was so strict that the guard would not admit to enter MD&B quarry division manager, Joe Taber! Once the dust had settled, there was just less than 130,000 tons on the ground, just about 100 percent crushable. Most importantly, there was no flyrock damage to the crusher or vibration damage to the asphalt plant. All of the seismographs were well within limits, and there were no complaints from area residents.

The quarry management could not have been more pleased with the whole process and most importantly, the end result.