

Dyno Nobel on mining's explosive innovations

Drill and blast has undergone a rapid evolution in recent years as trends such as automation, electrification and ESG impact on the sector

Mining Magazine caught up with Izak Mey, GM Product Management EIS and Commercialization at Dyno Nobel, to find out more about how the company's new innovations are tackling those trends.

Q Can you tell us the design considerations and benefits of your EZshot LP hybrid electronic initiation system?

EZshot is the newest addition to the Dyno Nobel electronic detonator product line. This product is unique because it can activate the electronic detonator by sensing a shock tube signal instead of communicating through a wire. This means the hook-up and firing of EZshot is essentially the same as NONEL detonators providing a familiar set up reducing or eliminating training time. EZshot

detonators are factory programmed just like other shock tube detonators with the precision and accuracy of an electronic detonator eliminating the complexities of firing boxes and electronic training. This practical innovation takes the durability of a shock tube and integrates it with electronic accuracy providing a product that will revolutionize the blasting industry. EZshot's key benefits are ease of use which reduces training time, robust and durable shock tube for tough blast hole conditions, precision and accurate timing, and improved perimeter control.

Q Can you tell us about your Hybrid Electronic Initiation Technology Overbreak trials?

Dyno Nobel has completed several overbreak trials in North America and Europe

with some very positive results. The concept of using EZshot in conjunction with standard NONEL's as a perimeter application is to simply take advantage of the superior timing accuracy between holes, causing them to function as a post-split giving it a very good sheer between holes.

The result in most cases is a significant reduction in over break (quite often producing rounds with full half barrels in the perimeters) which has a positive impact on the resulting mining process. Fines for trials have been conducted have reported reductions in scaling requirements and the ability to modify bolting patterns and or reductions in the use of shotcrete. We are very excited to continue these trials, building on the validation we have already seen in improving perimeter conditions.

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Q Can you tell us about the project to add Dyno Nobel's Differential GPS (DGPS) technology to the DigiShot Plus.4G electronic initiation system?

Customers across the mining industry experience common problems when tagging/logging detonators. Common challenges our customers are facing is incorrect delay assignment due to incorrectly marked blast holes, incorrect tagging of a hole or delay, lack of a blast plan. Blast delays are also encountered due to difficulty identifying the correct hole location or finding a problematic hole when fault finding and trouble-shooting on the bench. These challenges affect the blast outcomes and negatively influence the customers blast results in terms of fragmentation, loading efficiency, and overall productivity.

A critical value for Dyno Nobel is "Think customer, everyone, everyday" – with this in mind Dyno Nobel has developed the first-ever sub-meter (3.28 ft) Tagging and Hole Identification system using Differential Global Position System (DGPS) technology. The use of DGPS technology is changing the world of blasting making it simpler, safer, and smarter. Our current customers using the DGPS system are seeing additional production, shovel material, and improved fragmentation, vibration & airblast due to the control of the DGPS ensuring the blast plan is executed as designed.

Q Have there been any implementations of your DIFFERENTIAL ENERGY system that you can tell us about?

Our DIFFERENTIAL ENERGY (ΔE) System has been implemented at many of our customer sites. The system is utilized in several large metal mining operations and many quarry sites of various sizes. The ability to target energy in different boreholes and even within the borehole has improved mining operations while lowering overall costs to our customers. These benefits come through fragmentation improvements, faster loading times for equipment, better mill throughput, and even improved life on loading equipment wear surfaces. Customers have realized savings through reduced equipment needs as well. The ΔE system has also reduced



DIFFERENTIAL ENERGY is a proprietary method for controlling the explosive energy profile in a borehole

the need for AN prill storage, dewatering equipment, and other infrastructure at mine sites reducing regulatory burden and improving efficiency as one piece of equipment can vary explosives energy as it loads borehole.

The ΔE2 system builds on the ΔE system by utilizing any available geologic information about the rock mass to further target energy profiles in the borehole. The ΔE2 system has reduced costs by using high explosives energy only where needed. This has reduced overall explosives usage for many of our customers using the system.

Q How is Dyno Nobel working to address ESG trends in mining?

Dyno Nobel and Parent Company IPL has accelerated our decarbonization strategy with our first absolute reduction target of 5% in operational emissions by 2026. The reduction is approximately 200,000 tCO₂e, or the equivalent of more than 43,000 passenger vehicles driven in a year. We recognize that reducing greenhouse gases (GHG) in line with the Paris Agreement will require much deeper emissions reductions. We are committed to investigating new and emerging decarbonization pathways in our hard-to-abate sector.

A key element of our decarbonization strategy is to support our customers in reducing their GHG emissions. As part of our ongoing commitment to transparency, we have initiated reporting of our value chain (Scope 3) GHG emissions this year. The use of our premium technologies is helping our customers reduce their emissions.

For example, both our enhanced efficiency fertilizers and our Delta E proprietary explosives method reduce our fertilizer and explosives customers' GHG emissions during their use. These technologies are straightforward for our customers to adopt and drive meaningful improvements in crop yields, mine and quarry productivity, safety, and other environmental impacts.

Within the explosives space, Dyno Nobel can partner with our customers to build blending facilities directly on their mining sites, minimizing transportation and the associated carbon. We favour and invest in rail for all high-use applications, minimizing carbon generated from long-distance over-the-road trucking. Our high-density TITAN and DIFFERENTIAL ENERGY emulsions significantly reduce or eliminate NO_x generation as well as groundwater contamination.

Outside the explosives space, in 2020 Incitec Pivot Limited (IPL) completed a \$2.7m Solar Hydrogen Feasibility study, supported by the Australian Renewable Energy Agency. The study assessed the potential to use renewable hydrogen as a substitute for natural gas. Rather than being made from natural gas, renewable hydrogen can presently be made at small plants using solar energy to split water into hydrogen and oxygen. In this case, the goal was to produce ammonia without the GHG associated with natural gas. The study evaluated the feasibility of renewable hydrogen generation at an industrial scale and a commercially competitive price. This hydrogen could generate electricity, power equipment and support various mining processes without creating carbon at mining locations. ♥

“Benefits include ease of use which reduces training time”