Controlling Drilling and Blasting Costs
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The recent increase in diesel oil and ammonium nitrate prices have caused many operations to re-examine their drilling and blasting methods to find ways of reducing costs. We work with many drilling and blasting companies to optimize their blasting and costs through a blasting optimization review. We are faced with many of the same types of questions that we will discuss below.

Many operations are only looking for less costly explosives which they feel would do the job. What can be done to reduce costs if we are only looking for less expensive methods for firing the same blasting pattern. Let's examine the blasting pattern and supplies used and consider the following questions and how they relate to your specification.

Do you really know what your exact drilling and blasting cost actually should be? Countless times when we work with operations we find that their actual costs are much higher than their calculated ideal cost. Some times the reason for this is as simple as, for example, they are assuming a 14 by 14 foot drill pattern while in actual fact the drill pattern on average is 13 by 13.5 feet. This small difference in average pattern dimensions would already increase cost per ton by over 11%. There is Blasting Cost software available, which will accurately determine calculated ideal costs.

What types of initiators are you using in the blast? Are you using a redundant path system for a shock tube initiation system? Is the redundant path really needed or are you paying double for the cost of the initiators to protect the manufacturer for product defects? Are you paying double for initiators to cover mistakes made by the blasting crew? A single path shock tube system is used by many operations worldwide. Why would it not work in your operation?

One of the lowest cost methods to produce better fragmentation is to use the proper delay times in the blastholes. How do you know if the delay times used produce the best fragmentation, back wall control, and lowest vibration in your particular operation. Selection of proper delay times are site specific and depend on the local geology. Do your blasters know how to select the proper delay times? Using the wrong delay times can greatly increase your production costs.

How many cast primers are used routinely in each blasthole? Is more then one really needed in all holes? What size cast primer are you using: 2.0 pound, 1.0 pound, .75 pound, 0.5 pound? What size and how many primers are really needed from a technical standpoint?

What explosive are you using as the main explosive charge? Many operations are using more expensive, more energetic explosives than needed with the same drill pattern they would use for Anfo. All that results is additional throw of the broken for the additional cost.

Are you using cartridged explosives rather than bulk explosives? The additional explosive that you can place into the blasthole because you are filling the annular space that you would not fill with cartridged explosives will allow you to reduce the drilling cost by expanding the drill pattern.

What do you do with the used motor oil that you generate from your equipment? Some companies use the old motor oil as part of the fuel for their Anfo or in the manufacture of their emulsions rather than paying to have the used oil taken away. Research has shown that used oil diluted with diesel oil produces as much or more energy than pure diesel oil in Anfo.

Deck loading is used in many operations to reduce the pounds of explosives per delay in order to reduce vibration. Deck loading increases the time it takes to load a blast, increases the number of initiators and primers needed, and often produces less efficient fragmentation than when using a full column of explosives. In my experience most blasts are not efficient when it comes to minimizing vibration. If the blast efficiency is improved then deck loading may not be necessary. By considering these factors and others, many operations have saved as much as 40% of their explosive costs without effecting their blast performance.

A bigger picture must be considered if we are truly concerned about reducing production costs. Blasting is only the first step in the production process for mines and quarries and the costs of this first step is normally only 8% to 12% of the total costs. The total product costs are composed of: drilling, blasting, secondary breakage of oversize, digging, haulage, crushing. Blasting affects every step in the production cycle. What is important is to reduce total costs. If you try to reduce explosive costs alone you may raise drilling cost per ton, secondary breakage costs, digging costs, hauling costs, and crushing costs. If explosives cost would increase but produce better breakage and cost reductions could made in the other production costs then total production cost may radically decrease.

If savings on drilling and blasting costs are desired it is important to determine the actual costs of the production process. What are the drilling and blasting costs per ton? What percent of the blast is oversized and what does it cost to break up the oversized boulders? What is the average cost per ton to dig and load out the blast? What does it cost to haul the material to the crusher? How many trucks dump at the crusher per hour? With good blasting you may be able to greatly increase the truck count per hour. What are the average crushing costs. How many tons per hour go through the primary crusher? Most operations either have the raw data needed or can easily get this data to be able to determine a total production cost.

The major problem we find is that many operations do not have a good understanding and easily obtainable data on of the costs associated with secondary breakage, digging and haulage costs and how this would be affected by better drilling and blasting procedures. It is much easier to look at explosive costs. To totally optimize costs and to make informed decisions, all production costs must be considered when selecting drilling and blasting methods.

Drilling and blasting is only the first phase of the production cycle but influences all costs for all the other activities.