

3860
60000270

LONGHOLE LOADING AND BLASTING PROCEDURES

USED BY

SUNSHINE MINING COMPANY, 16-TO-1 MINE

SILVER PEAK, NEVADA

PREPARED BY

JOHN R. TAULE, MINE SUPERINTENDENT

11/85

Sunshine, at the Sixteen-to-One Mine uses a modified VCR method for stope blasting. Each stope is divided into panels which average 125 feet in length. An average panel will have three holes per row (more holes where the vein widens) in fourteen rows, for a total of 42 holes, all of which are shot with one VCR blast. Drill holes are approximately 115 feet in depth. The term modified VCR is used because first a slot raise approximately 10 feet x 10 feet is brought up to within twenty-five feet of the sill.

One VCR shot will break on an average of fifteen vertical feet. Five to six VCR shots are made, eventually bringing the bottoms of the holes to around thirty feet of sill elevation. The remainder of the holes are then loaded to sill elevation. When the slot raise is holed through, these rows are then shot, completing the panel.

LOADING PROCEDURE:

Enclosed is a copy of a VCR sheet which the loader completes while loading a typical shot. This procedure involves the following steps:

- 1). The distance to the muck pile in the stope is measured by dropping a tape down each hanging wall hole and recording the measurements.
- 2). The bottom of each hole is measured and recorded.
- 3). Wooden hole plugs are set approximately two feet off the bottom of each hole.
- 4). One lift of powder is put down each hole. One lift consists of either a 4 inch x 20lb. x 3 feet in length or 5 inch x 30 lb. x 3 feet in length cartridge of powder.
- 5). A booster is put down the hole on prima cord to charge the first lift of powder.
- 6). Three feet of intermediate sand stemming is put down the hole on top of the powder.
- 7). Another lift (cartridge) of powder is put down as in step number 4.
- 8). A second booster is put down on the prima cord to charge this lift of powder.

LONGHOLE LOADING AND BLASTING PROCEDURES

- 9). Three feet of top stem, which is a washed gravel 1 inch to 1½ inch in size, is then put down on top of the last lift of powder.
- 10). A third booster is put down on the prima cord.
- 11). Another 3 feet of gravel is put down for a total of 6 feet top stem.
- 12). All holes in a row are tied together with a cross tie piece of prima cord. This is repeated for each individual row.
- 13). Each cross tie is then attached to two electric blasting caps, with one cap on each end of the cross tie, which gives each row a double prime with the electric caps.
- 14). The electric caps are then wired together, checked with a blasting galvanometer, wired into the main blasting line, checked again with the blasting galvanometer then hooked again into the blasting box (VME 450) and shot.

Powder products used are:

	<u>Manufacturer</u>
4 in. x 20 lb. Power AN	Atlas
5 in. x 30 lb. Power AN	Atlas
4 in. x 10 lb. Apex 320	Atlas
5 in. x 15 lb. Powermax 840	Atlas
Deck Master Boosters	Atlas
RX Primaline (used down the hole)	Ensign Bickford
25 gr. Det. cord (used for cross ties)	Ensign Bickford
Electric blasting caps-Rockmaster	Atlas
Electric blasting caps-Superdet	Hercules
Blasting Box-VME 450	

After the blast:

Each hole is checked to see whether it is open or plugged. This is determined by taping to the "new hole bottom" elevation which is at the depth where the top of the powder was loaded (see number 7, Loading Procedure). Any plugged holes are recorded, including the depth to the top of the plug. Most plugged holes are due to the top stemming not falling out after the hole is blasted.

LONGHOLE LOADING AND BLASTING PROCEDURES

Plugged holes are handled in the following manner:

- 1). Hole is examined to make sure prima cord was initiated. Holes are never reamed if prima cord is not initiated.
- 2). Water is run down the hole which sometimes washes the hole clean.
- 3). A booster is then lowered to the plugged elevation to try and blast the hole clean.
- 4). If steps number two and three fail, the down-the-hole drill is used to ream the hole clean.

Many types of top stem material have been tried in the past including water, water bags, sand, pea gravel, drill cuttings, loose rock from the sill, minus one-inch rock and one-inch to 1½ inch rock. It was found that by using the one-inch to 1½-inch washed rock with a booster, the best results were obtained.

In reaming plugged holes, a tricone bit has been tried with good results. The advantage of using this bit is that it eliminates the down-the-hole hammer from the drill string, thus no hammering takes place while reaming a hole. This method of hole reaming will be used as much as possible in the future. Future mine plans call for sub levels to be 60 feet or less apart vertically. By doing this, less reaming of holes will occur.

When reaming plugged holes, the shortest length of any hole requiring reaming is 30 feet. In this instance, there would be at least five drill rods in the hole. Each rod is 5 inches in diameter, 6 feet long, and weighs 125 pounds. The tricone bit weighs approximately 25 pounds. With the tricone reaming method you would have 650 pounds of steel and bit, plus the draw-down pressure of the drill while reaming. When using the down-the-hole hammer for reaming, you would have 885 pound (5 rods, 625 pounds - 1 hammer, 200 pounds - 1 bit, 60 pounds) plus the draw down pressure of the drill down the hole while reaming. When reaming deeper holes, there would be that additional weight of of extra drill rods involved.

While reaming holes, the operator is standing behind a remote control panel approximately 15 feet from the collar of the hole being reamed. The drill helper also stands a safe distance from the hole collar.

LONGHOLE LOADING AND BLASTING PROCEDURES

It must be emphasized that it is Sunshine's policy to avoid the reaming of plugged holes if at all possible.

Concerning the miss holes (i.e., holes in which it is clearly determined that undetonated powder is present):

Any employee coming upon a miss fired hole will first contact his supervisor. Then, under the direction of his supervisor, he will take the following steps:

Absolutely no drilling will take place in or around a miss fired hole. If the missed hole cannot be reshot, the holes around the miss are loaded and shot with the next VCR lift with the hope that the ground will continue to pull around the missed hole. If these procedures fail, a new slot raise will be drilled at a safe distance from the missed fired hole. The slot raise will be brought up above the level of the powder loaded in the miss fired hole. VCR blasting will then continue.

SHOT NO

VCR BLASTING

AREA
BLASTED

7140 F-I Block

[illegible]

