

# FLYROCK HAZARD ALERT

“Flyrock” means any uncontrolled material (usually rock) that is thrown by a blast and is hazardous to persons, or to property not owned or controlled by the mine operator. Flyrock can travel 3,000 feet or more, reach speeds of 400 miles per hour, and can penetrate buildings, smash vehicles, and cause great bodily harm.

From December 2003 through August 2006, 5 serious flyrock incidents have occurred from blasting at surface mineral mines/quarries in Virginia. All of these incidents had the potential for very serious or fatal results. Fortunately, no one was injured, though significant damage to property (vehicles and structures) did occur in each of these incidents.

## CAUSES OF FLYROCK

Investigations have found that flyrock is often the result of:

- Blast holes with insufficient stemming
- Blast holes with excessive burden
- Blast holes with insufficient burden
- Secondary blasting with insufficient burden (toe holes, boulders)
- Weaknesses in the rock structure (mud seams, faults, cavities, fractures, etc.)
- Excessive energy due to high powder factors
- Insufficient energy due to low powder factors



## BEST PRACTICES

Blasters can minimize the risk of flyrock by careful planning and by utilizing the following practices:

- Adjusting the drill pattern and/or hole depths for geology, face geometry, and shot surface topography
- Examining the drill log and blast site geology, and making appropriate adjustments when loading
- Accurately measuring burden on the free face and succeeding rows
- Adjusting the explosive charge in the blast hole for the actual burden
- Adjusting the stemming depth and/or decking to maintain adequate burden on all sections of the blast hole
- Adjusting timing to ensure adequate time for rock movement
- Using extraordinary caution when shooting boulders or toe holes with small burdens



Blasters now have a wide variety of initiation devices and explosive products that allow for safe, effective blasting. The certified blaster has the responsibility to use those products safely. He must carefully evaluate the conditions, design the shot, supervise the loading, and ensure the safety of miners and the public during detonation.

**PREVENT FLYROCK – THINK BEFORE YOU LOAD**