

STAND DOWN FOR SAFETY

PREVENTING FIRES & EXPLOSIONS

During the winter months, cold air entering the mine dries out mine surface, increasing the risk of fires and explosions. Miners should know about the various explosive substances in coal mines and potentially explosive combinations of these substances, including:

- Explosion of methane alone
- Explosion of coal dust alone
- Coal dust explosion started by a methane ignition
- Methane explosion started by a coal dust ignition (unlikely but possible)
- Explosion of other flammable gases alone (acetylene, hydrogen, etc.)
- Coal dust explosion started by an ignition of flammable gases

There are additional combinations and sequences of events which could occur that involve methane, other flammable gases, and coal dust.

Explosions involving coal dust are usually the most violent and destructive. However, major explosions have occurred which are believed to have resulted primarily from large methane accumulations.

Fuel, oxygen, and heat must be present at the same time for a fire or explosion to occur.



In an underground coal mine, the fuel for a fire or an explosion can be an explosive mixture of flammable gas, a sufficient concentration of coal dust, or a combination of both. The heat to ignite the combustible mixture can come from sparks, electrical arcs, detonation of explosives, etc. Oxygen sufficient to support combustion is generally present throughout unsealed areas.

Fires and explosions can be prevented by eliminating any one element of the fire triangle.

Most preventive measures concentrate on the fuel or heat sides of the fire triangle. Some ways to eliminate or minimize the fuel side of the fire triangle include:

- Maintaining adequate ventilation
- Frequent testing for methane
- Maintaining bleeder systems
- Maintaining seals
- Maintaining water sprays and dust collectors (if used)
- Using extra precautions when mining near or into inaccessible areas
- Keeping mine surfaces wet (especially in areas less than 40 feet from the face)
- Cleaning up loose coal, coal dust, and other combustible material and
- Applying liberal amounts of rock dust

Maintain Adequate Ventilation

Ample ventilation in all unsealed areas of a mine is the first line of defense against an explosion. All open parts of a mine must be ventilated by a current of air that will dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dust, smoke, and fumes. Sometimes there are sudden outbursts of unusually high quantities of gas in active mining areas. Under such circumstances, additional quantities of air must be supplied to maintain a margin of safety against unexpectedly high methane liberation rates.

Proper maintenance of the mine's ventilation system is important at all times but especially so during the winter alert period. Some ventilation factors requiring attention include:

- Proper installation of ventilation controls
- Prompt repair of damaged ventilation controls
- Proper authorization when making changes in regulators and doors
- Prompt cleanup of roof falls
- Removal of obstructions to ventilation
- Keeping line brattice or tubing close to the face
- Maintaining required air quantities
- Frequent and thorough monitoring of air quantities flowing through the mine

Testing for Methane

During the winter months, gas tests should be made more frequently than required by law, especially in gassier mines, on retreat mining sections, and in places near abandoned areas.

Thorough methane testing is particularly important in areas where miners may only occasionally be required to work, such as in idle sections.

Maintaining Effective Bleeder Systems and Seals

Because of the barometric pressure drops that accompany storm fronts, the condition of systems used to ventilate or seal abandoned areas are especially critical during the winter months. Tests for proper airflow, methane, and oxygen deficiency, in and around such areas can often detect malfunctioning bleeders or seals and warn of dangerous accumulations of explosive or noxious gases.

Maintaining Water Sprays and Dust Collectors

Water sprays and dust collectors reduce the fuel available for a potential fire or explosion by:

- Removing some of the dust cloud from the air near the point where the dust is generated.
- Reducing the amount of float coal dust deposited some distance away from where the dust is generated.

Water sprays also add moisture to mine surfaces, which reduces the risk of the dust found on these surfaces being dispersed into the air. Water sprays and dust collections must be properly maintained in order to be effective.

Use Special Precautions When Mining Near or Into Inaccessible Areas

Mining near or into inaccessible areas can give rise to several dangerous situations. Chief among these include methane, oxygen deficient air, and possible inundations of water. Take special precautions if mining near potentially hazardous inaccessible areas. It is especially important to drill test holes to prevent accidental mining into these areas.

Clean Up Loose Coal, Coal Dust and Other Combustible Material

Fuel is an element of the fire triangle. The possibility of a fire or explosion can be diminished by reducing the fuel supply. Loose coal and coal dust should be frequently cleaned up. Paper, rock dust bags, scrap wood, and oily waste should be removed.

Loose coal, coal dust, and other combustible materials must not be permitted to accumulate either on mine surfaces or on electrical equipment.

Apply Liberal Quantities of Rock Dust

Generous applications of rock dust can prevent the propagation of coal dust explosions. The law requires that all areas of a coal mine that can be safely traveled must be kept adequately rock dusted to within 40 feet of all working faces. ***These are minimum requirements.***

REMEMBER

The chance of propagation and risk of widespread explosion disasters in bituminous coal mines can be nearly eliminated when rock dust is applied liberally and maintained properly. However, unless rock dusting is appropriately and properly maintained, it will almost surely fail in an emergency.

