**Section 220.130 Explosives and Blasting**

a) Explosives and blasting.

1) Explosives, blasting agents, detonators, or any other related blasting device or material shall be stored, transported, carried, handled, charged, fired, destroyed, or otherwise used, employed or disposed of by any person at a coal mine in accordance with all applicable provisions of existing federal and state statutes and rules, and as prescribed in the following Sections:

2) The term "explosives" as used in this Part includes blasting agents. The standard in this Part in which the term "explosives" appears are applicable to blasting agents unless blasting agents are expressly excluded.

b) Magazines; location.

In addition to the magazine location provisions contained in existing federal and state statutes and rules, the magazine shall be located outside the blasting area.

c) Magazine; storage.

In addition to storage requirements contained in existing federal and state statutes and rules, the following shall apply:

1) Ammonium nitrate-fuel oil blasting agents shall be separated from explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the explosives, safety fuse, or detonating cord;

2) Blasting agents may be stored in van-type trailers, provided that they are kept clean, and free of extraneous material that could create a fire hazard;

3) The magazines shall be detached structures located at least fifty (50) feet away from that point or area directly beneath the powerlines;

4) Areas surrounding magazines shall be kept free of rubbish and other combustibles for a distance of not less than twenty-five (25) feet in all directions;

5) The magazine area shall be posted with suitable danger signs which are so located that a bullet passing in the direction of the sign will not strike the magazine;

6) The magazines shall be unheated unless heating can be provided in a manner that does not create a fire or explosion hazard;

7) Cases or boxes containing explosives shall not be stacked more than six (6) feet high; and

8) Cases of explosives shall be stored in such a manner to assure the use of the oldest stock first.

d) Persons authorized to use explosives.

1) Each blasting operation shall be under the direct control person trained and experienced in the handling of explosives.

2) Any person who uses or handles explosives shall be experienced in the handling of explosives; inexperienced persons shall work under the direction of and in the immediate presence of an experienced person.

e) Transport of explosives.

1) Vehicles used to transport explosives, other than blasting agents, shall have substantially constructed bodies, no sparking metal exposed in the cargo space, and shall be equipped with suitable sides and tail gates; explosives shall not be piled higher than the side or end.

2) Vehicles containing explosives shall be maintained in good condition and shall be operated at a safe speed and in accordance with safe operating practices.

3) Vehicles containing explosives shall be posted with appropriate warning signs.

4) Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, except for properly secured nonsparking equipment used expressly in the handling of such explosives, detonating cord, or detonators.

5) Explosives and detonators shall be transported in separate vehicles unless separated by four (4) inches of substantially fastened hardwood or an equivalent partition.

6) Explosives shall be transported promptly without undue delays in transit.

7) Explosives shall be transported at times and over routes that expose a minimum number of persons.

8) Only the attendants necessary for safe transport shall ride in vehicles containing explosives.

9) Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in the immediate area where loading or charging is in progress.

10) When vehicles containing explosives are parked, the brakes shall be set, the motive power shut off except when in use to discharge the contents of the vehicle, and if parked on a grade the vehicle shall be chocked securely against rolling.

11) Vehicles containing explosives shall not be taken to a repair garage or shop for any purpose.

12) Vehicles used to transport blasting agents to the blasting site shall have substantially constructed bodies with no zinc or copper exposed in the cargo space; where applicable, the vehicle shall be equipped with suitable sides and tailgates and the blasting agent shall not be piled higher than the sides or end enclosures. If an end screw is used to discharge the blasting agents from the vehicle, the conveyor shall be constructed to prevent development of excessive internal pressure and frictional heat in the blasting agent.

13) Caution shall be exercised in the movement of vehicles in the blasting area to avoid driving the vehicle over or dragging hoses over firing lines, detonator wires, explosive materials, or loaded holes.

f) Priming and stemming of explosives.

1) A primer containing an electric detonator or fused cap shall only be made up at the time of charging and as close to the blasting area as conditions allow.

2) A primer containing a detonator shall be prepared to insure the detonator is securely and completely within the explosive column.

3) Detonating cord shall be securely attached to the explosive forming the primer.

4) Adequate priming shall be employed to minimize misfires, toxic fumes, and poor performance.

5) Only nonsparking implements shall be used to punch holes in an explosive cartridge.

6) Tamping poles shall be blunt and squared at one end, and made of wood, nonsparking material, or of acceptable plastic. However, where electric detonators are in use, the tamping pole shall be made of wood. All couplers shall be made on nonsparking material on both tamping machines and poles.

7) No tamping shall be done directly on a primer.

g) Firing of explosive charges.

1) Multiple blasts shall be fired only with instruments designed specifically for initiating electrical detonators, and having adequate capacity for the number of electrical detonators, the resistance of the blasting circuit and the type of blasting circuit used. Dry cell batteries of adequate capacity may be used for the firing of single electrical detonators, if such use has been previously approved by an authorized representative of the Department.

2) The control of the electrical firing device shall be entrusted only to the person authorized to fire the shots or his immediate supervisor.

3) Electric detonators of different manufacturers shall not be used in the same circuit.

4) Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks or within fifty (50) feet of energized trailing cables or other sources of electrical contact. Twenty-five (25) feet shall be applied as a minimum distance for coal shooting.

5) Electrically powered equipment and trailing cables shall be deenergized if within fifty (50) feet of boreholes containing electrical detonators or blasting circuits, and the power circuits shall not be reenergized until the shots are fired. Twenty-five (25) feet shall be applied as a minimum distance for coal shooting.

6) When instantaneous blasting is performed, trunklines, in multiple-row blasts, shall make one (1) or more complete loops, with crossties between loops at intervals of not over two hundred (200) feet.

7) Except when being tested with a blasting galvanometer:

A) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting circuit;

B) Wired rounds shall be kept shunted until they are being connected to the blasting line; and

C) Blasting lines shall be kept shunted until immediately before blasting.

8) Completely wired rounds shall be tested with a blasting galvanometer before connections are made to the blasting line, and prior connection to power source.

9) Blasting lines shall be properly insulated and kept in good repair.

10) Charging of boreholes shall be suspended and men withdrawn from the blasting area to a safe location upon the approach and progress of an electrical storm.

h) Detonating cord.

1) Delay connectors shall be treated and handled with the same safety precautions as detonators.

2) Detonating cord shall not be used if it has been kinked, bent or otherwise handled in such a manner that the train of detonation may be interrupted.

3) The line of detonating cord extending out of a borehole shall be cut from the supply spool after the primer is correctly positioned and the line secured.

4) All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunk lines.

5) Blasting caps shall be crimped to fuses only with implements designed to that specific purpose.

6) When firing from one (1) to fifteen (15) blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

A)

|  |  |  |
| --- | --- | --- |
| Number of holes in a round |  | Minimum burning time, minutes |
| 1 |  | 2 |
| 2-5 |  | 2⅔ |
| 6-10 |  | 3⅓ |
| 11-15 |  | 5 |

B) In no case shall any forty (40) second-per-foot safety fuse less than thirty-six (36) inches long or any thirty (30) second-per-foot safety fuse less than forty-eight (48) inches long be used.

7) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all men concerned with blasting.

8) Fuse shall not be used if it has been kinked, bent sharply, or handled roughly in such a manner that the train of deflagration may be interrupted.

i) Blasting area.

1) Substantial, non-conductive closed containers shall be used to carry explosives other than blasting agents. All detonators shall be kept in suitable, enclosed (non-conductive) containers prior to the use of such detonators in the work area.

2) Explosives shall be kept separated from detonators until charging is started.

3) Smoking articles, matches, lighters and open flame shall not be used within fifty (50) feet of explosives.

4) During the period when final preparations are being made for firing a blast, only the work activities associated with that operation shall be permitted in the blasting area.

5) Unused explosives, detonators, and related materials shall be moved to a safe location as soon as charging operations are completed.

6) Boreholes shall be stemmed immediately after loading. Whenever possible, shots shall be fired immediately after the borehole is stemmed. If shots are not fired immediately thereafter, the boreholes shall be guarded or otherwise protected as is provided in Section 220.130(i)(7) of this Part.

A) All boreholes drilled for the purpose of blasting overburden shall be identified by number and location and logged daily in a report book kept by a certified person exclusively for these purposes. Daily notations shall be made by the certified person responsible for the report book when shots are fired. In the event a loaded hole is not fired within twenty-one (21) days after its borehole is stemmed, such holes shall be platted on a map retained by the certified person responsible for the daily report book, which map shall be retained until all such shots are fired.

B) Where there exists a loaded hole or holes which have not been fired, prior to the beginning of each working shift and examination of such holes shall be conducted and a report made, and such report shall be countersigned by the certified person responsible for the overall supervision of the mine.

7) In blast areas where final preparations are being made and holes are awaiting firing, the areas shall be guarded or barricaded and posted, or flagged against unauthorized entry.

8) Ample warning shall be given before blasts are fired. All persons shall be removed from the blast area.

9) Overburden blasting shall be conducted during daylight hours unless special permission is obtained from an authorized representative of the Department. Extra precautions shall be taken when shooting after dark. This requirement does not apply to shaft and slope sinking operations, or coal shooting.

10) The blasting area shall not be reentered after firing of the charges until the concentrations of smoke, dust, or fumes have reached safe limits.

11) For the protection of underground workers, special precautions shall be taken when blasting in close proximity to underground operations, and no blasting shall be done that would be hazardous to persons working underground.

j) Misfires and damaged explosives.

1) Damaged or deteriorated explosives shall be destroyed in a safe manner under the supervision or instructions of the explosives manufacturer.

2) Misfires shall be reported to the supervisor in direct control of the blasting operations (See Section 220.130(d)(1) above), and shall be disposed of safely before any other work is performed in the blasting area.

3) No person shall return to a misfired hole for at least fifteen (15) minutes.

4) If explosives are suspected of burning in a hole, all persons in the blast area shall move to a safe location and no one shall return to the hole for at least one (1) hour until the danger has passed.

5) Blasted areas shall be examined for undetonated explosives after each blast and undetonated explosives found shall be destroyed and disposed of in accordance with this Part.

6) Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

7) Electric blasting shall be prohibited in the vicinity of operating radio frequency (rf) transmitters except within clearances as published in the Institute of Makers of Explosives, Publication No. 20, March 1971, "Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Electric Blasting Caps".

8) Radio transmission shall be prohibited within fifty (50) feet of charged holes when blasting electrically and appropriate warning signs shall be posted.

9) Blast holes in "hot-hole" areas and holes that have been sprung shall not be charged before tests have been made to insure that the heat has been dissipated to a safe level.

10) Fuse and igniters shall be stored in a cool, dry place away from oils or grease.

11) Fuse shall be ignited with hot-wire lighters, lead spitters, igniter cord, or other such devices designed for this purpose.

12) Fuse shall not be ignited before the primer and the entire charge is securely in place.

k) Blasting agents; special provisions.

1) Ammonium nitrate and the components used for the sensitizing thereof shall be stored and used in accordance with the recommendations contained in the Bureau of Mine Information Circular 8179, "Safety Recommendation for Sensitized Ammonium Nitrate Blasting Agents-1963".

2) Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be taken to eliminate the hazard of static electricity before blasting agent use is commenced.

3) Pneumatic loading equipment shall not be grounded to waterlines, airlines, rails, or the permanent electrical grounding systems.

4) Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wirecountered hose shall not be used.