

4123:1-3-15 Explosives and blasting.

(A) Reserved.

(B) Definitions.

- (1) "Approved storage facility" means a facility for the storage of explosive materials covered by a license or permit issued under authority of the appropriate federal agency.
- (2) "Blast area" means the area in which explosives loading and blasting operations are being conducted.
- (3) "Blaster" means the person having a comprehensive knowledge of the installation and use of appliances associated with the type of blasting operations being performed, designated by the employer to perform and direct the functions of placing and fixing explosives, firing, approaching misfires, thawing explosives and all other duties in connection with the blasting operation.
- (4) "Blasting agent" means any material or mixture consisting of a fuel and oxidizer used for blasting, but not classified an explosive and, in which none of the ingredients is classified as an explosive provided the furnished (mixed) product cannot be detonated with a no. 8 test blasting cap.
- (5) "Blasting cap" means a metallic tube closed at one end, containing a charge of one or more detonating compounds, and designed for and capable of detonation from the sparks or flame from a safety fuse inserted and crimped into the open end.
- (6) "Bus wire" means an insulated expendable wire used between connecting wires and leading wires.
- (7) "Connecting wire" means an insulated expendable wire used between electric blasting caps and the bus wires or leading wires.
- (8) "Detonating cord" means a flexible cord containing a center core of high explosives which when detonated, will have sufficient strength to detonate other cap-sensitive explosives with which it is in contact.
- (9) "Detonator" means igniters, blasting caps, electric blasting caps, or similar devices used to explode explosives.
- (10) "Explosive" means any chemical compound or mixture that is intended for the purpose of producing an explosion; that contains any oxidizing and combustible units, or other ingredients in such proportions, quantities, or packing that an

ignition by fire, by friction, by concussion, by percussion, or by a detonator, of any part of the compound mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects, or of destroying life or limb.

- (11) "Fuse lighters" means special devices for the purpose of igniting safety fuse.
- (12) "Leading wire" means an insulated wire used between the electric power source and the electric blasting cap circuit.
- (13) "Magazine" means any building or other structure used for the storage of explosives.
- (14) "Primed cartridge" means a cartridge of explosives to which a detonator has been attached as a means of firing, and intended to be placed in the bore hole or other explosive chamber for the purpose of exploding the remainder of the charge.
- (15) "Safety fuse" means the slow-burning commercially used blasting fuse, usually consisting of a core of powder overspun with yarns and tapes, and which may be treated with a waterproofing compound, and intended to convey fire to the blasting caps or explosive mass while minimizing the danger to the employee lighting it.

(C) Specific requirements for all blasting operations.

- (1) The employer shall designate one employee qualified as a blaster, to be in charge of blasting at each location where blasting operations are being performed.
- (2) The use of black powder is prohibited.
- (3) No explosives or blasting agents shall be abandoned.
- (4) Smoking, firearms, matches, open flame lamps, and other fire, flame, heat or spark-producing devices are prohibited in or near explosive magazines or while explosives are being handled, transported or used.
- (5) When blasting is done employees shall be removed from the area or the blast shall be covered, before firing, with a mat or mats so constructed as to control the throw of fragments.
- (6) The blaster shall be responsible for using every reasonable precaution such as visual and audible warning signals, flags, and barricades, to ensure employee safety.

- (7) Blasting operations in the proximity of overhead power lines, communication lines, utility services, or other services and structures shall not be carried on until the operators or owners have been notified and measures have been taken to ensure the safety of the employer's employees.
- (8) Due precautions shall be taken to prevent accidental discharge of electric blasting caps by current induced by radar, radio transmitters, lightning, adjacent power lines, dust storms, or other sources of extraneous electricity. These precautions shall include:
 - (a) The suspension of all blasting operations and removal of employees from the blasting area during the approach and progress of an electrical storm.
 - (b) The posting of signs warning against the use of mobile radio transmitters on all roads within one thousand feet of the blasting operations.
- (9) Empty boxes, paper and fiber packing materials which have previously contained high explosives shall not be used again for any purpose, but shall be destroyed by burning at a location approved by the blaster, and no employee shall be permitted closer than one hundred feet after the burning has started.
- (10) Containers of explosive materials shall not be opened within fifty feet of any magazine. In opening cases, nonsparking tools shall be used, except that metal slitters may be used for opening fiberboard boxes.
- (11) Explosive materials that are obviously deteriorated or damaged shall not be used and shall be destroyed by or under the direction of the blaster.
- (12) Flagmen posted on highways to stop traffic during blasting operations shall be stationed far enough away from the blasting for their own safety.

(D) Transportation of explosives.

(1) Surface transportation of explosives.

Any vehicle used to transport explosives on the job site shall have a nonsparking floor and side members and shall contain a suitable fire extinguisher. Explosives and blasting caps shall not be transported in the same vehicle.

(2) Underground transportation of explosives.

- (a) No employee shall ride in any shaft conveyance transporting explosives and blasting agents.
- (b) Detonators and other explosives shall not be transported at the same time in any shaft conveyance.

- (c) Explosives or blasting agents, not in original containers, shall be placed in a suitable container when transported manually.
- (d) Detonators, primers, and other explosives shall be carried in separate containers when transported manually.
- (e) When detonators or explosives are brought into an air lock, no employee except the blaster, lock tender and the employees necessary for carrying, shall be permitted to enter the air lock. No other material, supplies, or equipment shall be locked through with the explosives.
- (f) Detonators and explosives shall be taken separately into pressure working chambers.
- (g) The blaster shall be responsible for the receipt, unloading, storage, and on-site transportation of explosives and detonators.

(E) Storage of explosives and blasting agents.

- (1) Blasting caps, electric blasting caps, or other detonating devices shall not be stored in the same magazine with other explosives or blasting agents.
- (2) Primed cartridges shall not be stored.
- (3) All explosives stored on the job site shall be stored in approved storage facilities. All brush and combustible materials shall be kept clear of the magazine to a distance of twenty-five feet.
- (4) Detonators and explosives shall not be stored or kept in tunnels, shafts, or caissons. Detonators and explosives for each round shall be taken directly from the magazines to the blasting zone and immediately loaded. Detonators and explosives left over after loading a round shall be removed from the working chamber before the connecting wires are connected.

(F) Loading of explosives or blasting agents.

- (1) All drill holes shall be sufficiently large to admit freely the insertion of the packages of explosive materials.
- (2) Tamping shall be done only with nonsparking tools without exposed metal parts, except that nonsparking metal connectors may be used for jointed poles. Violent tamping is prohibited. Primed cartridges shall not be tamped.
- (3) No holes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives shall be immediately returned to the

magazine or removed from the area to a distance of no less than one hundred feet.

- (4) Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be disposed of before work proceeds.
- (5) No person shall be allowed to deepen drill holes which have contained explosives or blasting agents.
- (6) No loaded holes shall be left unattended or unprotected.
- (7) The explosives used in wet holes or holes that may become wet shall be water-resistant.

(G) Initiation of explosive charges.

(1) General.

- (a) When safety fuse is used, the blasting cap shall be securely attached to it with a standard ring type cap crimper. All primers shall be assembled no less than fifty feet from any magazine.
- (b) Primers for use in blasting shall be made up only as required for each round of blasting.
- (c) No blasting cap shall be inserted in the explosive materials without first making a hole in the cartridge for the cap with a nonsparking punch.
- (d) If there are any misfires while using cap and fuse, all employees shall be required to remain away from the charge for at least an hour. If electric blasting caps are used and a misfire occurs, this waiting period may be reduced to thirty minutes.

(2) Electric blasting caps.

- (a) Bus wires, connecting wires and lead wires shall be insulated single solid wires of sufficient current-carrying capacity.
- (b) Blasters, when testing circuits to charged holes, shall use only blasting galvanometers or other instruments that are specifically designed for the purpose.
- (c) Only the employee making the final check on the wire connections shall fire the shot. All connections shall be made from bore hole back to the source of firing current, and the leading wires shall remain shorted and not be

connected to the blasting machine or other source of current until the charge is to be fired.

- (d) In any single blast using electric blasting caps, all caps shall be of the same style or function, and of the same manufacture.
 - (e) Electric blasting shall be carried out by using blasting circuits or power circuits in accordance with the electric blasting cap manufacturer's recommendations, or an approved contractor or his designated representative.
 - (f) When firing a circuit of electric blasting caps, every reasonable precaution shall be exercised to ensure that an adequate quantity of delivered current is available, in accordance with the manufacturer's recommendations.
- (3) Use of safety fuse.
- (a) No one shall be permitted to carry detonators or primers of any kind on the person.
 - (b) The minimum length of safety fuse to be used in blasting shall be as required by applicable state law, but shall be no less than thirty inches.
 - (c) At least two employees shall be present when multiple cap and fuse blasting is done by hand lighting methods.
 - (d) No more than twelve fuses may be lighted by any individual when hand lighting devices are used, provided that when two or more safety fuses in a group are lighted as one by means of igniter cord, or other similar fuse-lighting devices, they may be considered as one fuse.
 - (e) The so-called "drop fuse" method of dropping or pushing a primer or any explosive with a lighted fuse attached is prohibited.
- (4) Use of detonating cord.
- (a) Care shall be taken to select a detonating cord consistent with the type and physical condition of the bore hole and stemming and type of explosives used.
 - (b) Detonating cord shall be handled and used with the same precaution as with other explosives.
 - (c) The line of detonating cord extending out of a bore hole or from a charge shall be cut from supply spool before loading the remainder of the bore hole or placing additional charges.

- (d) Detonating cord shall be handled and used with care to avoid damaging or severing the cord during and after loading and hooking-up.
- (e) Detonating cord connections shall be made in accordance with approved methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.
- (f) All detonating cord trunklines and branchlines shall be free of loops, sharp kinks, or angles that direct the cord back toward the oncoming line of detonation.
- (g) All detonating cord connections shall be inspected before firing the blast.
- (h) When detonating cord millisecond-delay connectors or short-interval-delay electric blasting caps are used with detonating cord, the practice shall conform strictly to the manufacturer's recommendations.
- (i) When connecting a blasting cap or an electric blasting cap to detonating cord, the cap shall be taped or otherwise attached securely along the side or the end of the detonating cord, with the end of the cap containing the explosive charge pointed in the direction in which the detonation is to proceed.
- (j) Detonators for firing the trunkline shall not be brought to the loading area nor attached to the detonating cord until everything else is in readiness for the blast.

(H) Underwater blasting.

- (1) Loading tubes and casings of dissimilar metals shall not be used in electric blasting because of possible electric transient currents from galvanic action of the metals and water.
- (2) In marine blasting only water-resistant blasting caps and detonating cords shall be used. When a loading tube is necessary one of a nonsparking type shall be used.
- (3) No blast shall be fired while any vessel under way is closer than one thousand five hundred feet to the blasting area. Those on board vessels or craft moored or anchored within one thousand five hundred feet shall be notified before a blast is fired.
- (4) If swimming or diving operations are in progress in the vicinity of the blasting area, signals and arrangements shall be agreed upon to assure that no blast shall be fired while any employee is in the water.

(5) Blasting flags shall be displayed.

(6) When more than one charge is placed under water, a float device shall be attached to an element of each charge in such manner that it will be released by the firing. Misfires shall be handled in accordance with the requirements of paragraph (G)(1)(d) of this rule.

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