

DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

BUREAU OF SAFETY AND REGULATION

CONSTRUCTION SAFETY STANDARDS COMMISSION

(By authority conferred on the construction safety standards commission by sections 19 and 21 of Act No. 154 of the Public Acts of 1974, as amended, being SS408.1019 and 408.1021 of the Michigan Compiled Laws)

PART 27. BLASTING AND USE OF EXPLOSIVES

R 408.42701 Scope.

Rule 2701. This part provides for the training and testing of employees and for the storage, transport, and use of blasting materials for construction operations. This part also provides for the protection of other employees while working within a blast area.

History: 1979 AC; 1982 AACS.

R 408.42724 Definitions; B, C.

Rule 2724. (1) "Blast area" means the area of a blast, including the area immediately adjacent, within the influence of flying rock missiles.

(2) "Blaster" means an employee who is authorized by the employer to use explosives for blasting purposes, who carries a permit to use explosives for blasting purposes, issued by the employer as required by R 408.42732 of this part, and who meets the qualifications of R 408.42731 of this part.

(3) "Blasting agent" means any material or mixture of a fuel and an oxidizer which is used for blasting, but which is not classified as an explosive, and in which none of the ingredients are classified as explosives, if the mixed product cannot be detonated with a no. 8 test blasting cap when unconfined.

(4) "Blasting cap" means a metallic capsule which contains an initiating explosive and base charge, which is open at the upper end to accept a section of safety fuse, and which is used for initiating the primer or main charge. A "blasting cap" is also referred to as a fuse cap, regular, or ordinary blasting cap.

(5) "Blasting machine" means an electrical or electromechanical device which provides electrical energy for the purpose of energizing electric blasting caps.

(6) "Blasting materials" means the explosives and other materials needed to produce a blast.

(7) "Conveyance" means a mechanical device with not less than 4 wheels which is used to transport blasting materials underground horizontally.

History: 1982 AACS.

R 408.42725 Definitions; D to M.

Rule 2725. (1) "Detonating cord" means a flexible cord containing a center core of high explosive and used to detonate other explosives.

(2) "Detonator" means any device containing a detonating charge that is used for initiating detonation in an explosive. The term includes, but is not limited to, all of the following:

- (a) Electric blasting caps of instantaneous and delay types.
  - (b) Blasting caps for use with safety fuses.
  - (c) Detonating cord delay connectors.
  - (d) Non-electric instantaneous delay blasting caps.
- (3) "Electric blasting cap" means a blasting cap designed for, and capable of, initiation by means of an electric current.

(4) "Electric blasting circuitry" means a series, parallel, or series-in-parallel circuit used to distribute electrical energy by 1 or more of the following:

(a) "Bus wire" means 2 wires that form an extension of the lead line and connecting wire and common to all caps in parallel. In parallel firing, each of the 2 wires of each electric blasting cap is connected to a different bus wire. For series in parallel firing, each side of the series is connected to a different bus wire.

(b) "Connecting wire" means a wire of smaller gage than leading wire and used or connecting to lead lines or extending electric blasting cap leg wires from one borehole to another.

(c) "Lead wire" means the wire connecting the electrical power source with the electric blasting cap circuit.

(d) "Permanent blasting wire" means a permanently mounted, insulated wire which is used between the electric power source and the electric blasting cap circuit.

(5) "Electric delay blasting cap" means electric blasting caps with a build-in delay mechanism that delays the cap detonation from the application of current in predetermined time intervals from milliseconds up to about 1/2 to 1 second between successive nominal delay periods.

(6) "Explosives" means any chemical compound, mixture, or device whose primary purpose is to function by explosion; that is, substantially instantaneous decomposition with the release of gas and heat. Dynamite, nitroglycerin, picric acid, lead azide, fulminate of mercury, blasting caps, blasting agents, and detonating primers are examples of explosives.

(7) "Magazine" means any building, structure, or box, that is approved for the storage of explosive materials.

(8) "Misfire" means an explosive material charge that fails to detonate after an attempt at initiation.

(9) "Mud capping" means a mud-covered or unconfined explosive charge fired in contact with a rock surface without the use of a borehole. The term is synonymous with the terms "adobe charge" and "bulldoze."

History: 1982 AACS.

R 408.42726 Definitions; N to S.

Rule 2726. (1) "Non-electric delay device" means a detonator with an integral delay element used in conjunction with, and capable of being initiated by, a detonating impulse.

(2) "Primer" means a unit, package, or cartridge of explosives which is used to initiate other explosives or blasting agents and which contains detonator or a detonating cord to which is attached a detonator designed to initiate the detonating cord, which is inserted or attached at the time of use.

(3) "Safety fuse" means a flexible cord containing an internal burning medium by which fire or flame is conveyed at a continuous and uniform rate from the point of ignition to the point of use, usually a detonator.

(4) "Stemming" means an inert material placed in a borehole after the explosive for the purpose of confining explosive materials or to separate charges of explosive material in the same borehole.

(5) "Springing" means the practice of enlarging the bottom of a blast hole by the use of a relatively small charge of explosive material. This practice is typically used in order that a larger charge of explosive material can be loaded in a subsequent blast in the same borehole.

History: 1982 AACS.

R 408.42727 Employer responsibilities.

Rule 2727. (1) Before authorizing and issuing a permit to an employee to work with explosives, an employer shall train an employee in the proper method of handling, transporting, and using an explosive and shall instruct the employee in the applicable rules of this part. The employee shall be known as a blaster.

(2) An employer shall not allow an employee to handle, transport, or use an explosive while the employee is under the influence of intoxicating beverages, narcotics, or similar types of drugs.

(3) An employer shall establish, post, and make known to all employees at the work site, a method or code of blasting signals which are as effective as the signals listed in table 1. An employee who is not able to hear the blasting signal shall not be permitted in the blast area.

(4) An employer shall provide and maintain signs that identify a blast area at all approaches to the area. The signs shall be as prescribed in rule 2233 of Part 22. Signals, Signs, Tags, and Barricades, being R 408.42233 of the Michigan Administrative Code, except that the lettering shall not be less than 4 inches in height. Rule 2752 of this part covers the use of signs where radio transmitters create a hazard.

(5) Table 1 reads as follows:

TABLE 1

Warning signal.....A 1-minute series of  
long audible sounds  
5 minutes before the  
blast signal.

Blast signal.....A series of short  
sounds 30 seconds  
before the blast.

All clear signal.....A prolonged sound  
following inspection  
of the blast area.

History: 1982 AACCS.

R 408.42728 Employee responsibilities.

Rule 2728. (1) An employee shall not handle, transport, or use an explosive unless the employee has received training in, and is authorized to work with, explosives or is under the supervision of the blaster.

(2) An employee shall not handle, transport, or use an explosive while under the influence of intoxicating beverages, narcotics, or similar type drugs.

(3) An employee who drives a vehicle carrying an explosive shall have a knowledge of and follow federal and state rules and regulations governing the transportation of explosives.

(4) An employee shall use the method or code of blasting signals prescribed in R 408.42727(3) of this part.

History: 1982 AACCS.

R 408.42731 Employee qualifications.

Rule 2731. (1) An employee who handles, transports, or uses an explosive shall meet all of the following requirements:

(a) Have a corrected vision of not less than 20/40 acuity.

- (b) Have the physical strength and coordination to do the assigned task.
  - (c) Be free from known convulsive disorders and episodes of unconsciousness.
  - (d) Be able to hear and understand conversational levels of sound in an ordinary office environment.
  - (e) Be able to understand signs, labels, and instructions and be able to follow written or oral orders.
  - (f) Be able to distinguish colors.
- (2) A blaster shall be qualified by reason of training, knowledge, or experience in the field of transporting, storing, handling, and using explosives and shall have a working knowledge of federal, state, and local laws, rules, and regulations pertaining to explosives.
- (3) A blaster shall be required to furnish satisfactory evidence of his or her competence in handling explosives and his or her ability to perform the type of blasting that will be required in a safe manner.
- (4) Before an employer allows an employee to handle, transport, or use an explosive, or to work as a trainee, the employee shall be trained in the hazards and safeguards of the employee's assigned job and shall be instructed in the requirements of this part.

History: 1982 AACCS.

R 408.42732 Permit to handle, transport, and use explosives; requirements.

Rule 2732. (1) A blaster shall obtain a permit to handle, transport, and use explosives issued by the employer.

(2) A permit shall contain, at a minimum, all of the following information:

\_\_\_\_\_  
 (Name of Employer)                      (Title)

\_\_\_\_\_  
 (Name of Employee)                      (Employee Signature)

"The above employee has received training in the handling, transportation, and use of explosives and applicable rules as required by the Michigan Construction Safety Standards Commission standard, Part 27. Blasting and Use of Explosives."

RESTRICTIONS:  
 (list)

DATE ISSUED:

EXPIRATION DATE:  
 (not to exceed 3 years)

(3) Before the employer issues a permit, the employer of the blaster shall secure a permit from the department of state police as prescribed in section 3 of Act No. 202 of the Public Acts of 1970, being S29.43 of the Michigan Compiled Laws.

(4) An employee shall be rechecked in the requirements of R 408.42731 not less than every 3 years and be issued a new permit.

(5) The permit shall be in the possession of the employee and shall be shown if requested by the director or a department representative.

(6) The permit is valid only while working for the employer who issued the permit.

History: 1982 AACCS.

R 408.42733 Blaster supervision of the storage, transportation, and use of explosives required; trainee supervision.

Rule 2733. (1) The storage, transportation, and use of an explosive material shall be directed and supervised by a competent employee who is experienced in the storage, transportation, and use of explosives. A person who is experienced in this field shall be known as a blaster.

(2) A trainee in the use of an explosive shall work under the direct supervision of the blaster.

(3) A blaster shall not be assigned more than 3 trainees at any one time.

History: 1982 AACS.

R 408.42734 Records of permits and explosives.

Rule 2734. (1) An employer shall maintain records of permits issued, including the date of issuance, and records of the type of explosives involved. The records of explosives shall contain all of the following information:

(a) Date of purchase.

(b) Place of purchase.

(c) Date of use.

(d) Quantity used.

(e) Balance on hand.

(f) Date, plant, and shift code.

(2) These records shall be maintained at the jobsite and shall be available for inspection.

History: 1982 AACS.

R 408.42735 Storage of explosives.

Rule 2735. (1) An explosive shall be stored as prescribed in the commerce in explosives, 27 C.F.R. part 181, April 1979, as adopted by reference in R 408.42799(1) or as prescribed in section F-2703.0, storage of explosives, of the BOCA basic fire prevention code, 1984 edition, as adopted by reference in R 408.42799(4).

(2) A storage magazine shall be constructed and maintained as prescribed in chapter 3, aboveground storage of explosive materials, of NFPA standard no. 495-1982, as adopted by reference in R 408.42799(5).

(3) An explosive shall not be permanently stored in an underground area unless there is a minimum of 2 modes of exit from the area in which the magazine is located.

(4) An underground magazine shall be not less than 300 feet from a shaft, adit, caisson, or active underground work area.

(5) An underground magazine that contains detonators shall be located not less than 50 feet from a magazine which contains another explosive or blasting agent.

History: 1982 AACS; 1988 AACS.

R 408.42737 Explosives generally.

Rule 2737. (1) A fire shall not be fought if there is an imminent danger of an explosion by an explosive due to the fire. Employees shall be removed to a safe area and employee entry to the fire area shall be prevented.

(2) Smoking, a spark, or a flame-producing device, including a firearm, shall not be permitted within 50 feet of an explosive.

(3) Precautions shall be taken when using an explosive in a congested area or in close proximity to a structure to contain the explosion by using mats or by other methods to control the throw of fragments which could cause injury to an employee.

(4) An explosive shall not be used in the proximity of utility lines without the knowledge and consent of the utility firm.

(5) Black powder shall not be used as an explosive.

(6) The preparation of an explosive and blasting operations shall be stopped at the approach of and during an electrical storm. Employees shall be removed from the blast area.

(7) If possible, a blasting operation aboveground shall be conducted between sunup and sundown.

(8) A blasting agent or explosive shall not be abandoned.

(9) Leaking or deteriorating explosives shall be destroyed under the immediate supervision or direction of the manufacturer.

(10) Only a nonsparking tool shall be used in the handling of an explosive, except that a slitter may be used to open fiberboard cases if the slitter does not contact the metal fasteners of the casing.

(11) An unused detonator and explosive shall be removed from the work place and shall be returned to the magazine.

History: 1982 AACS.

R 408.42741 Transport of explosives; vehicles.

Rule 2741. (1) The storage compartment of a vehicle that is used for the transportation of more than 6,000 pounds of explosives shall be entirely enclosed and without windows. The doors of the storage compartment shall be equipped with strong hinges that are securely bolted on the inside and shall be provided with a padlock, which shall be kept locked when an explosive is carried in the vehicle. The entire vehicle body shall be constructed so that bolts, screws, nails, or any metal does not protrude on the inside of the vehicle.

(2) A vehicle that transports an explosive shall have signs which read "EXPLOSIVES" on all 4 sides and which have letters that are not less than 5 inches high and white on a red background or shall have signs that conform to the provisions of 49 C.F.R. SS100 to 177, as adopted by reference in R 408.42799(2).

(3) A vehicle that transports an explosive shall be equipped with a portable fire extinguisher which does not have less than a 2A10-BC rating and which is in operable condition. The vehicle driver shall be trained in the use of fire extinguishers.

(4) A vehicle that is used to transport an explosive shall not be left unattended.

(5) A vehicle that is used to transport an explosive shall be capable of carrying the imposed load and shall be in good mechanical condition. The imposed load shall not be more than the rated capacity of the vehicle.

(6) A vehicle that carries an explosive shall not be taken inside a garage or shop for repairs or servicing, except for emergency repairs under the blasters supervision.

(7) An explosive shall not be transported in any form of trailer, except pursuant to the provisions of 49 C.F.R. SS100 to 177, as adopted by reference in R 408.42799(2).

(8) A vehicle that carries an explosive shall be operated by an employee who is not less than 21 years of age.

(9) Auxiliary lights that are powered by a conveyance's electrical system shall not be installed on a conveyance that is used to transport explosives underground.

(10) Trucks that are used to transport explosives underground shall have the electrical system checked weekly to detect any failures which may constitute an electrical hazard. A certification record that includes all of the following information with respect to an inspected truck shall be prepared and the most recent certification record shall be maintained on file at the site:

(a) The date of the inspection.

(b) The signature of the person who performed the inspection.

(c) A serial number or other identifier.

History: 1982 AACS; 1994 AACS.

R 408.42742 Transport of explosives.

Rule 2742. (1) If explosives are transported by a vehicle with an open body, a class D magazine or the original manufacturer's container shall be used. The magazine shall be secured to the bed of the vehicle. An original manufacturer's container shall be restrained within the bed of the vehicle so as to prevent movement or displacement of the container. The bed of the vehicle shall be lined with wood.

(2) Explosives shall be delivered directly to an approved magazine or blast area.

(3) An explosive shall not be transported on a vehicle with a detonator or with other cargo, unless it is stored in a class D magazine or IME 22 cap box as specified in 49 C.F.R. SS100 to 177, as adopted by reference in R 408.42799(2) of this part.

(4) An original container or class D magazine that is used for transporting both detonators and explosives on the same car or conveyance shall be physically separated by a distance of 24 inches or by a solid partition not less than 6 inches thick or an IME 22 cap box.

(5) Metal, metal tools, carbides, oils, matches, electric storage batteries, inflammable substances, acids, and oxidizing or corrosive compounds shall not be transported in the bed or body of any vehicle or vessel containing explosives.

History: 1982 AACCS.

R 408.42743 Vertical transport of explosives.

Rule 2743. (1) When transporting an explosive vertically, all of the following provisions shall be complied with:

(a) The explosive shall be hoisted and lowered in a closed original container or class D magazine on a cage or hoisting platform.

(b) The container or magazine shall be placed on a wooden floor of the cage or platform.

(c) Other materials shall not be permitted in the same cage or shaft conveyance.

(d) An employee shall not be permitted in a shaft or hoistway, nor within 100 feet of the hoistway, during the time an explosive is being transported in the shaft or hoistway.

(e) The hoist or crane operator shall be notified before the loading and unloading of explosives.

(f) A hoist shall be in compliance with rules 1476 and 1477 of Part 14. Tunnels, Shafts, Caissons, and Cofferdams, being R 408.41476 and R 408.41477 of the Michigan Administrative Code, and the applicable subrules of rule 1001 of Part 10. Lifting and Digging Equipment, being R 408.41001 of the Michigan Administrative Code.

(2) If a crane and platform is used, a voice communication system shall be established between the operator and the loading and unloading area.

(3) Excluding a safety hook, the cage or platform shall be connected to the loadline by a positive closed swivel connector.

History: 1982 AACCS.

R 408.42744 Underground transport of explosives.

Rule 2744. (1) When conveying an explosive underground horizontally, an employee shall not be permitted to ride on the conveyance, except for those employees who use the explosives and the operator of the conveyance.

(2) The quantity of an explosive that is taken underground shall be not more than that required for a single blast. The explosive shall be taken to the blast area without delay.

History: 1982 AACCS.

R 408.42751 Loading explosives.

Rule 2751. (1) Before an explosive is delivered to a blast area, all of the following provisions shall be complied with:

(a) All employees, except for those employees directly connected with the blast, shall be removed from the blast area.

(b) Electrically powered machines and equipment, except for a machine that is used to load a hole, shall be de-energized.

(c) A power cable that is within 50 feet of an explosive shall be de-energized and locked out.

(2) A drill hole shall conform to the following requirements:

(a) Be large enough to freely admit the explosive.

(b) A hole that has contained an explosive shall not be deepened.

(c) Only those holes to be fired in the next blast shall be loaded within a given blast area.

(d) A drill hole which has been sprung and which is not water-filled shall be cooled not less than 2 hours before an explosive is loaded.

(3) Procedures that permit safe and efficient loading shall be established before loading is started.

(4) Tamping of explosives shall be done only with wood or static free plastic rods which do not have exposed metal parts, except that the connectors may be non-sparking metal. Violent tamping shall not be done. A primer or detonator shall not be tamped.

(5) Except for an explosive that is specifically manufactured for such use, an explosive shall not be loaded or used in a potentially explosive atmosphere.

(6) A blast hole in open work shall be stemmed to the collar or to a point that will confine the charge.

(7) A bore hole shall not be sprung if the bore hole is adjacent to or near a hole that is loaded. A flashlight battery shall not be used to spring a hole.

(8) When loading a long line of holes with more than 1 loading crew, the crews shall be separated by a distance that is consistent with a safe and efficient operation.

(9) Loaded holes shall not be left unattended unless the holes are protected against accidental detonation.

(10) The drilling of holes shall not be started until all remaining butts of old holes are examined for unexploded charges. If unexploded charges are found, they shall be reported to the supervisor immediately and refired as prescribed in rule 2759 of this part, before work proceeds.

History: 1982 AACCS.

R 408.42752 Extraneous currents; radio transmitters; warning signs.

Rule 2752. (1) Before adopting any system of electrical firing, the blaster shall conduct a thorough survey for extraneous currents. All dangerous currents found by the survey shall be eliminated before any holes are loaded.

(2) Blasting operations shall be suspended and all persons shall be removed from the blasting area during the approach of and during an electrical storm.

(3) A prominent display of signs warning against the use of mobile radio transmitters shall be posted on all roads within 1,000 feet of the blasting operation.

(4) The blasting sign shown in figure 1 shall be used in advance of the blast area. This sign shall be used in sequence with the signs prescribed in subrules (5) and (6) of this rule.

(5) The sign shown in figure 2 shall be posted not less than 1,000 feet from the blast area.

(6) The sign shown in figure 3 shall be used at the end of the blast area either with or preceding an "End Construction Zone" sign.

(7) Warning signs shall be prominently displayed during the loading and firing of the blast. Warning signs shall be covered or removed when an explosive is not in the area or when an explosive is secured in a magazine.



(8) If a source of extraneous electricity makes the use of electric blasting caps dangerous, a non-electric system shall be used to fire the blasts.

(9) An electric detonator in a hole that has been primed shall be short-circuited until wired into a blasting circuit.

(10) A blaster shall take precautions to prevent the accidental discharge of an electric blasting cap from current induced by radar, a radio transmitter, lightning, an adjacent powerline, a dust storm, or other source of extraneous electricity and shall comply with the standards set forth in the institute of the makers of explosives publication no. 20 (1978), entitled "Radio Frequency Energy - A Potential Hazard in the Use of Electric Blasting Caps," as adopted by reference in R 408.42799(3).

History: 1982 AACS.

#### R 408.42753 Wiring the charge.

Rule 2753. (1) A blast that is detonated with an electric blasting machine or other power source shall not be made if there is a possibility that a lead wire or permanent blasting wire might be thrown over a live powerline by the force of the explosion or if extraneous electricity from sources such as, but not limited to, radar, a radio transmitter, lightning, an adjacent powerline, or a dust storm might make the use of electric blasting caps dangerous.

(2) All electric blasting caps that are used for a single blast shall be from the same manufacturer.

(3) The connecting wire, lead wire, and bus wire of an electric blasting circuit shall be of sufficient current-carrying capacity to carry the prescribed current to fire the blast as planned. The power circuit shall not be grounded. The connecting wire and lead wire shall be insulated and shall be in good condition.

(4) When blasting underground, both of the following provisions shall be complied with:

(a) A safety switch which can be locked in the off position shall be installed in the lead wire and the switch shall have a short-circuiting arrangement from the lead wire to the cap circuit.

(b) A gap of not less than 5 feet shall be provided in the lead wire between the main firing switch and the source of power. This gap shall be bridged by a flexible jumper cord immediately before firing the blast.

(5) When using a power circuit, the firing switch shall be locked in the off position at all times, except when firing. The key to the lock shall be entrusted only to the blaster. The firing switch shall be designed so that the lead wire to the cap circuit will be automatically short-circuited when the switch is in the off position and so that the lead wire will be disconnected.

(6) A blasting machine shall be capable of delivering its rated power and shall be wired as prescribed by the manufacturer of the blasting caps used. The number of caps used shall not exceed the rated capacity of the machine.

(7) A blaster shall be in charge of the blasting machine or approved power circuit and the blaster shall be the only person to connect the lead wires.

(8) Electric blasting caps and circuits shall be tested using only blasting galvanometers or other instruments which have been designed and approved for this purpose.

(9) A connection shall be made from the bore hole back to the source of the firing circuit and shall remain shorted until the charge is to be fired.

(10) When firing a circuit of electric blasting caps, care shall be exercised to ensure that an adequate supply of delivered current is available.

(11) The wires of an electrical firing device or fuse shall not be subjected to a harmful strain.

History: 1982 AACS.

#### R 408.42754 Detonating cord.

Rule 2754. (1) Detonating cord shall be selected which is consistent with the type and condition of a bore hole, stemming, and explosive used.

(2) Detonating cord that extends from a bore hole or charge shall be cut from the spool before loading the remainder of the hole or placing an additional charge.

(3) Detonating cord shall be free of kinks, loops, or sharp angles and shall be handled so as to avoid damage or severing.

(4) Cord connections shall be inspected at each connection before firing.

(5) Detonating cord shall be taped or otherwise secured to a blasting cap with the end of the cap containing the explosive charge pointing in the direction in which the detonation is to proceed.

(6) A detonator that is used to fire a trunk line shall not be brought to the loading area nor attached to the detonating cord until all other preparations for the blast are completed.

(7) The detonating cord shall be connected in a competent, positive, and approved manner. Knot-type or other cord-to-cord connections shall be made only with cord in which the explosive cord is dry.

(8) If detonating cord millisecond-daily connectors or short-interval-delay electric blasting caps are used with a detonation cord, the blaster shall follow the methods recommended by the manufacturer.

History: 1982 AACS.

#### R 408.42755 Safety fuse.

Rule 2755. (1) A cap crimper shall be used for attaching a blasting cap to a safety fuse. The crimper shall be in good condition and shall be accessible for use.

(2) When preparing a safety fuse, the blaster shall do all of the following:

(a) Cut a short piece from the end on the supply reel to assure a fresh cut end of the safety fuse.

(b) Assure that the fuse is not less than 3 feet in length.

(c) Compute the burning rate of the fuse in relation to the distance from a place of safety.

(d) Reject a damaged fuse and dispose of it as prescribed in R 408.42737.

(f) Cut fuse squarely across with a clean sharp blade.

(3) An employer or employee shall not carry a detonator or primer on their person.

(4) Not more than 12 fuses shall be lighted by a blaster when handlighting devices are used, except that if 2 or more safety fuses in a group are lighted by means of an ignition cord or other fuse-lighting device, the group may be counted as 1 fuse.

(5) The drop fuse method of dropping or pushing a primer or explosive with a lighted fuse is not permitted.

(6) The hanging of a fuse on a nail or other projection which would cause a sharp bend is not permitted.

(7) A fuse shall not be capped, and a primer shall not be made up, in a magazine or near a possible source of ignition.

(8) Not less than 2 employees shall be present when multiple cap or fuse blasting is done by the hand-lighting method.

(9) A cap and fuse shall not be used for firing a mudcap charge unless the charge is sufficiently separated to prevent 1 charge from dislodging other shots in the blast.

(10) A safety fuse shall not be used for firing 2 or more charges which must detonate simultaneously.

History: 1982 AACS.

#### R 408.42756 Primers.

Rule 2756. (1) A primer shall comply with the following requirements:

(a) The blasting cap shall not be pulled out of the primer cartridge.

(b) The blasting cap shall be in the safest and most effective position in the primer cartridge.

(c) If necessary, the primer shall be water-resistant.

(d) The whole primer assembly shall be loaded safely, easily, conveniently, and in the preferred position in the charge.

(2) The blasting cap shall be inserted deep into the center of the primer cartridge and shall lie as close as possible along the cartridge's long axis.

- (3) A dynamite punch shall be used for punching holes through the primer cartridge for the insertion of a cap, wire, or detonating cord.
- (4) A dynamite primer assembly shall be made immediately before the start of the loading operation.

History: 1982 AACCS.

R 408.42757 Pre-blast blaster responsibilities; stationing flagman during blasting.

Rule 2757. (1) Before firing a blast, the blaster in charge of the operation shall do all of the following:

- (a) Set the time of the blast.
  - (b) Make sure all persons are out of the blast area.
  - (c) Give the proper warning signals as prescribed in R 408.42727 after making certain that all employees and equipment have been removed from the hazard area.
  - (d) Barricade or post entrances to prevent the inadvertent entry of employees into the blast area.
- (2) At least 1 flagman shall be safety stationed on a street or highway which passes through the danger zone to stop traffic during blasting operations. The flagmen shall be equipped with traffic control devices and protective equipment as prescribed in rule 2223 of Part 22. Signals, Signs, Tags, and Barricades, being R 408.42223 of the Michigan Administrative Code.

History: 1982 AACCS.

R 408.42758 Post-blast requirements.

Rule 2758. (1) Immediately following a blast, the lead wire or permanent blasting wire shall be disconnected and short-circuited, and the blasting machine or power source shall be locked in the off position.

(2) An employee shall not return to the blast area until visibility has returned to normal and the air quality meets minimum requirements.

(3) The blaster shall make an inspection of the blast area to determine if all charges have been exploded before allowing an employee to return to the blast area.

History: 1982 AACCS.

R 408.42759 Misfires.

Rule 2759. (1) If a misfire is found, both of the following requirements shall be complied with:

(a) The blaster shall immediately report this misfire to his or her supervisor and shall prevent all employees from entering the area, except for his or her helper.

(b) A new primer shall be inserted and the hole shall be reblasted. If this procedure might present a hazard, the explosive shall be washed out with water or blown out with oil-entrained air.

(2) If a misfire occurs while using a fuse arrangement, all employees shall be prevented from entering the area for a period of not less than 3 hours. The blaster shall then enter the area for inspection purposes and shall follow the procedures set forth in subrule (1) of this rule, if necessary.

(3) Drilling, digging, or picking is not permitted until all holes that contain unexploded charges have been detonated or removed.

History: 1982 AACCS.

R 408.42761 Underwater blasting.

Rule 2761. (1) A loading tube and casing used for underwater blasting shall be made of the same non-sparking metals.

(2) Explosives used for underwater blasting shall be water-resistant.

(3) Swimmers, divers, and vessels shall not be less than 1,500 feet away from a blast area when a blast is made, except that a vessel containing only the blaster and his or her crew members may remain at the outer edge of the blast area if they will not be placed in jeopardy by the blast. Those on board the vessel in the blast area shall be notified before the blast is fired. Blasting flags or coast guard-approved warning devices shall be displayed at a distance of not less than 1,500 feet from the blast area.

(4) If more than 1 charge is placed underwater, a float device shall be attached to an element of each charge in a manner that will release the float device when the charge is fired.

History: 1982 AACS.

R 408.42762 Blasting in pressurized working chamber.

Rule 2762. (1) Only a blaster and those employees necessary to transport an explosive shall enter an air lock with the explosive. Other material or equipment shall not be moved through the air lock at the same time that the explosive is moved through. A detonator and explosive shall be transported in separate containers into the pressurized working chamber.

(2) Metal pipe, rails, an air lock, and the steel tunnel lining shall be electrically bonded together and shall be grounded near the portal or shaft and cross bonded together at not less than 1,000-foot intervals throughout the length of the tunnel. An air supply pipe shall be grounded at the delivery end.

(3) When blasting near or in a mixed face, the blast charge shall be light with light burden on each hole. Advance drilling shall be done as excavation in the rock face approaches a mixed face to determine the nature and extent of rock cover and the remaining distance to soft ground.

History: 1982 AACS.

R 408.42763 Explosive containers, wrapping, or packing material; disposal; use of deteriorated or damaged explosives or blasting supplies prohibited.

Rule 2763. (1) An empty container, wrapping, or packing material that has contained an explosive shall not be used again for any purpose. The container, wrapping, or packing material shall be destroyed by burning in an area where people or property will not be endangered.

(2) Explosives or blasting supplies that are obviously deteriorated or damaged shall not be used.

History: 1982 AACS.

R 408.42799 Referenced standards.

Rule 2799. (1) The commerce in explosives, 27 C.F.R. part 181, April, 1979, established by the United States department of commerce, bureau of alcohol, tobacco, and firearms, is adopted herein by reference. Copies of 27 C.F.R. part 181 may be purchased at a cost of \$1.60 from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402, by ordering stock number 048-012-00052-3.

(2) The provisions of 49 C.F.R. SS100 to 177, established by the United States department of transportation, are adopted herein by reference. Copies of these provisions may be purchased at a cost of \$7.00 from the United States Government Printing Office, Washington, DC 20402.

(3) The institute of the makers of explosives publication no. 20 (1978) entitled "Radio Frequency Energy - A Potential Hazard in the Use of Electric Blasting Caps," is adopted herein by reference. Copies of this publication may be purchased at a cost of \$1.00 from the Institute of the Makers of Explosives, 1575 Eye Street, Suite 550, Washington, DC 20005.

(4) Section F-2703.0, storage of explosives, of article 27 of the BOCA basic fire prevention code - 1984 edition, is herein adopted by reference. Copies of section F-2703.0 may be purchased at a cost of \$24.00

from the Building Officials and Code Administrators International, Inc., 4051 W. Flossmoor Road, Country Club Hills, Illinois 60477.

(5) Chapter 3, aboveground storage of explosive materials, of NFPA standard no. 495-1982, is herein adopted by reference. Copies of chapter 3 may be purchased at a cost of \$8.00 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(6) The publications listed in subrules (1), (2), (3), (4), and (5) of this rule may be inspected at, or purchased at the appropriate cost from, the Safety Standards Division, Bureau of Safety and Regulation, Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30015, Lansing, Michigan 48909.

(7) Other state standards referred to in this part by R 408.42727(4), R 408.42743(1)(f), and R 408.42757(2) may be reviewed or purchased from the safety standards division.

History: 1982 AACCS; 1988 AACCS.