

**Subchapter 17. Mine Safety Orders**  
**ARTICLE 1 INTRODUCTION**

**MSO Committee**  
**Sacramento**  
**May 8, 2014**

**§6950. Title.**

These Orders shall be known as the Mine Safety Orders.

NOTE: Authority cited: ~~Sections 6312, 6500, 6502, Labor Code.~~ Sections 142.3 and 7997, Labor Code.

**§6951. Superseded Orders.**

These Mine Safety Orders supersede all previous Mine Safety Orders published in California Administrative Code, Title 8, Chapter 4, Subchapter 12.

**§6952. Purpose.**

The Mine Safety Orders are designed to promote safety at mines and are promulgated as standards for the guidance of employers and employees. They are consistent with the policy expressed in Section 21, Article XX, of the Constitution of the State of California--a policy which includes "full provision for securing safety in places of employment."

There are other Orders in Title 8 that contain required standards for the guidance of employers and employees in addition to the Mine Safety Orders. These other Orders include, but are not limited to, General Industry Safety Orders, Construction Safety Orders, Electrical Safety Orders, and Unfired Pressure Vessel Safety Orders. NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

~~**§6953. Excerpts from the California Labor Code.**~~ **Deleted as unnecessary. Add Back**

**§6953. Excerpts from the California Labor Code.**

The following provisions of Division 5, Part 1, Chapter 2, of the California Labor Code, 2013 Edition, are applicable to all employments:

"Section 6401. Every employer shall furnish and use safety devices and safeguards, and shall adopt and use practices, means, methods, operations, and processes which are reasonably adequate to render such employment and place of employment safe. Every employer shall do every other thing reasonably necessary to protect the life and safety of employees."

"Section 6406. No person shall do any of the following:

"(a) Remove, displace, damage, destroy or carry off any safety device, safeguard, notice, or warning, furnished for use in any employment or place of employment.

"(b) Interfere in any way with the use thereof by any other person.

"(c) Interfere with the use of any method or process adopted for the protection of any employee, including himself, in such employment or place of employment.

"(d) Fail or neglect to do every other thing reasonably necessary to protect the life and safety of employees."

#### **§6954. Application.**

(a) These orders establish minimum safety standards in places of employment at mines and premises appurtenant thereto.

NOTE: Unless otherwise designated in this subchapter, the phrase "division" refers to the current Division of Occupational Safety and Health or any of its predecessors including the former Division of Industrial Safety or the Division of Occupational Safety and Health Administration. Reference to the former Division of Industrial Safety or Division of Occupational Safety and Health Administration in these orders is meant to refer to their successor, the Division of Occupational Safety and Health, or any subsequent successor agency.

(b) At mines these Orders take precedence over any other Safety Orders of the Division with which they are inconsistent.

(c) Machines, equipment, processes, and operations not specifically covered by these Orders shall be governed by the General Industry Safety Orders.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Sections 142.3 and 6302(d), Labor Code.

(a) These Orders establish minimum safety standards in places of employment at all mines and premises appurtenant thereto on mine property, including access and haulage roads.

NOTE: The Division of Occupational Safety and Health, Mining and Tunneling Unit (The Division), and the United States Department of Labor, Mine Safety and Health Administration (MSHA) exercise concurrent jurisdiction over mines and mine-related mills in California. In situations where the requirements differ, those requirements most protective of employee safety shall be followed.

At mines and mine related mills At locations where these Orders are applicable, these Orders take precedence over any other Safety Orders of the Division with which they are inconsistent. When Crane Orders are applicable, GISO Crane Orders will be used.

Machines, equipment, processes, procedures, and operations not specifically covered by these Orders shall be governed by other applicable safety orders contained in Title 8, California Code of Regulations.

Any employer performing work at a location subject to these Orders, including temporary and contract labor, is bound by these Orders, and all other applicable safety orders in Title 8, California Code of Regulations.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§6955. Scope.**

(a) The operations to which these Orders apply are those employed at mines in the extraction of minerals, either metallic or nonmetallic. These operations include:

(1) Prospecting, exploration, development, extraction of minerals, and other operations in connection therewith.

(2) Placer and hydraulic mining.

(3) Transportation of men, materials and equipment in areas and operations covered by these orders.

(4) Operations and maintenance of the equipment applicable to the foregoing.

(a) These Orders apply to all employers and employees working at mines above and below ground and mine-related mills where metallic or nonmetallic ore, minerals, gravel, sand, rock, stone, or other materials intended for sale, processing, or manufacturing are extracted or removed from the earth. These operations include:

(1) Surface and underground mines, quarries and borrow pit operations.

(2) Milling operations at mine sites including screening and/or portable crushing.

(3) Prospecting on mine property, exploration on mine property, development, extraction of minerals, and other operations in connection with mines and mills.

(4) Placer and hydraulic mining.

(5) Transportation of men, materials and equipment on mine property and/or in operations covered by these orders.

(6) Operations and maintenance on mine property of the equipment applicable to the operations listed above.

EXCEPTION: Underground vaults, or similar types of structures, which are entered by utility employees to perform work are not under the jurisdiction of these Orders. **Move to 7 below**

(b) The operations to which these Orders do not apply include:

1. Concrete batch plants, hot mix asphalt plants, and hot mix or recycle plants not located either on or off mine property.

2. Brick manufacturing plants not located on mine property;

NOTE: If the brick manufacturing plant is connected to a mine, the jurisdiction of the Mine Safety Orders ends at the point where milling of the crude clay ceases and actual brick manufacturing begins.

3. Gypsum processing plants not located on mine property;

NOTE: If the gypsum manufacturing plant is connected to a mine, the jurisdiction of the Mine Safety Orders ends at the point where milling of the crude gypsum ceases and actual gypsum manufacturing begins.

4. Clay pipe and refractory plants and ceramic manufacturing plants;

5. Salt processing plants not located on mine property;

NOTE: If the salt manufacturing plant is connected to a mine, the jurisdiction of the Mine Safety Orders ends at the point where milling of the ~~crude~~ salt ceases and actual salt processing begins.

1. Pipejacking where the pipe is less than thirty (30) inches in diameter;

NOTE: If employees enter a pipe less than thirty (30) inches in diameter to perform work, compliance personnel shall refer the activity to the M&T Unit for evaluation.

2. Bore or jacking and receiving pits, which are excavated and provided with support as part of work not performed by a boring contractor; and

6. Borrow pits where no milling beyond the use of a grizzly is involved.

7. Underground vaults or similar types of structures, which are entered by utility employees to perform work.

NOTE: Free Technical Assistance Service (Labor Code, Sections 6354 and 6355).

In order to encourage voluntary compliance with occupational safety and health regulations, free on-site Technical Assistance service is provided by Cal/OSHA. Employers may request this free on-site Technical Assistance for mines by contacting the Cal/OSHA Mining and Tunneling Unit. Employees and employee groups may also participate at the invitation of the employer, or may request Technical Assistance away from the job site.

Technical Assistance services include:

(1) Information, advice, and recommendations on specific safety and health problems in the workplace;

(2) ~~providing~~ Providing help to employers in instituting an effective accident and illness prevention program or improving an existing program; and

(3) ~~training~~ Training in good safety and health practices, and in recognition and correction of hazards through on-site surveys.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

AUTHORITY: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code, California Labor Code Sec. 7950 through 7955 and an Interagency Agreement between the Occupational Safety and Health Administration and the Mine Safety Health Administration in the United States Department of Labor (44 Federal Register 22827- 22830).

#### **§6956. Permits for Variations from These Orders.**

(a) When the Division finds that, under such conditions as shall be specified, a variation from the terms of a Safety Order will give such freedom from danger as the employment reasonably permits, the Division upon written application, after investigation and such hearing as the Division may direct, may make and enter its order permitting such variation from the terms of

the said Safety Order in a place of employment, upon such conditions as it may specify and upon the provision and use of such safety measures and appliances as shall in the judgment of the said Division secure the safety of employees. A copy of said order shall be posted conspicuously under glass at the place of employment and shall be maintained in legible condition during the time said order is in effect.

(b) An appeal from a decision of the Division concerning a permit for variation from these Orders may be made to the Industrial Safety Board.

(c) When the Division has reason to believe or upon receipt of a complaint that a variation does not provide such freedom from danger as the employment reasonably permits, the Division, after notice to the employer and to the complainant where a complaint has been received and after hearing, may continue in force, suspend, revoke, or modify the conditions specified in such order.

(d) Where death or serious personal injury at the place of employment appears in the judgment of the Division to be attributable to a variation from the terms of a Safety Order, the Division may set aside or amend said variation order after notice to the employer and such hearings as the Division may direct. Notice of such action shall be conspicuously posted at the place of employment.

(e) No declaration, act, or omission of the Division or of its representatives, other than a written order authorizing a variation as permitted under this Order, shall be deemed to exempt, either wholly or in part, expressly or impliedly, any employer or place of employment from full compliance with the terms of any Safety Order issued by the Division.

Any permit for variance from these safety orders shall be in accordance with Title 8, Chapter 3.5 – Occupational Safety and Health Standards Board, Subchapter 1.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§6957. Responsibility of Independent Contractors.** Deleted as unnecessary.

## **Article 2 DEFINITIONS**

### **§6958. Definitions.**

The following definitions shall apply in the application of these Orders.

Access Shaft. A vertical shaft used as a regular means of worker access to underground mines and tunnels under construction, renovation, or demolition, or from underground operations.

**Deleted portions are from original Tom Carrel Act**

Acceptable. Acceptable to the Division.

Angle of Repose. The maximum slope at which a heap of any loose or fragmented solid material will stand without sliding or come to rest when poured or dumped in a pile or on a slope.

Approved. Approved by the Division of Occupational Safety and Health. Those products, devices, systems, or installations meeting the requirements of Section 3206 of the General Industry Safety Orders. For the purposes of these Orders, this shall include MSHA approval or certification of equivalency.

Appurtenant. A thing is deemed to be incidental or appurtenant to land when it is by right used with the land for its benefit.

Auxiliary Ventilation System. A secondary ventilation system used to deliver the required airflow to all work areas a work area of the mine not sufficiently ventilated by the main ventilation system.

Back. The roof, ceiling, or arch of a passage in a mine.

Barrier. A conspicuously marked material object that warns or prevents entry or passage of persons or vehicles, or flying materials. Barriers must be placed far enough from the hazard to prevent injury to employees.

Berm. A pile or mound of material capable of restraining a vehicle.

Berm. A pile or mound of material to prevent over travel and/or over turning of equipment along roadways and at dump points. The vehicle speed must be controlled and the berm must be of sufficient size and maintained to prevent over travel and/or overturning of equipment.

Berm – Elevated Roadway. A pile or mound of material along an elevated roadway capable of moderating or limiting the force of a vehicle in order to impede the vehicle's passage over the bank of the roadway.

Berm – Dumping Locations. A pile or mound of material at a dumping location provided to prevent overtravel and/or overturning at dumping locations.

Booster Fan. A fan installed in the main airstream or a split of the main airstream to increase airflow through a section or sections of a mine.

Borrow Pit. Borrow Pit means an area of land where the overburden, consisting of unconsolidated rock, glacial debris, or other earth material overlying bedrock is extracted from the surface. Extraction occurs on an "as-needed" basis, for use as fill materials by the extracting party in the form in which it is extracted. No milling is involved, except for the use of a scalping screen (grizzly) to remove large rocks, wood and trash. Borrow Pits are subject to these Orders when they are located on mine property or related to mining. (For example, a borrow pit used to build a road or construct a surface facility on mine property is subject to Division jurisdiction.) Borrow pits are not subject to these Orders when the excavated material is not processed except for scalping and is used by as fill material.

Bulkhead. A tight partition or stopping in a mine.

Conveyance. A container for moving personnel and/or materials, cage, cab, skip, bucket, enclosure, platform, material conveyor or similar device used to lift, hoist or otherwise carry muck, minerals, materials, or employees, normally associated with a shaft or incline.

Combustible. Capable of being ignited and consumed by fire. Wherever combustible substances or materials are mentioned in these Orders, flammable and extremely flammable substances and materials are included.

Competent Person. A person at least 21 years of age and having abilities and experience that fully qualify him for the duties he is assigned. A person having abilities and experience that fully qualify him for the duties he is assigned. One who is capable of identifying existing and predictable hazards in the surroundings or working area which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. A Supervisor, a certified Safety Representative, or a certified Gas Tester, or a trained person designated by the owner or operator. One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are dangerous, hazardous, or unsanitary to employees, and who has authorization to take prompt corrective measures to protect employees.

Division. The Division of Industrial Safety. The California Division of Occupational Safety and Health (DOSH) including the Mining and Tunneling Unit.

Escapeway. A designated passageway by which persons can safely leave an underground mine.

Extremely Flammable. Having a flash point of 20 degrees Fahrenheit or less, when tested by the Tagliabue open cup method. See Combustible above. **Extremely Flammable not in MSOs**

Face. The head of the tunnel where soil is being removed, or that area in a mine where digging is underway. **Deleted portions are from original Tom Carrel Act**

Face or Bank - Surface Mine. The sides from the bottom or floor of a pit to the un-mined ground surface surrounding the pit. Where one or more benches or levels are used in a pit, each bench or level has a separate face.

Face—Underground Mine. That part of any adit, tunnel, stope, shaft, or raise, or other operation where excavating is progressing, or was last done.

Fire Resistant. Capable of withstanding propagation of a fire for a period not less than one hour.

Fire resistant Hydraulic Fluids. An approved fluid of such chemical composition and physical characteristics that it will resist the propagation of flame, or meet the requirements of 30 CFR Part 35. A fluid of such chemical composition and physical characteristics that it will resist the propagation of flame.

~~Fireproof. Fire resistant. See "Noncombustible Material." Delete~~

~~Fixed. The machine or device, whether designed for mobility or not, is fastened or remains in place and is not moved about while being operated. This includes material stackers that move around a fixed pivot point.~~

~~Flammable. Capable of being easily ignited or burning rapidly. See Combustible above.~~

~~Flammable Gas. A gas or gassy mixture which when once ignited will allow flames to be self-propagated throughout the mixture, independent of and away from the source of ignition.~~

~~Flammable Vapor. The gaseous form of a substance that is normally a liquid or a solid that will burn in the normal concentrations of oxygen in the air.~~

~~Flash Point. The lowest temperature at which a liquid or a solid gives off flammable vapor in sufficient quantity to burn instantaneously at the approach of a flame or spark.~~

~~Ground Support. Wood, steel, concrete, rockbolts, shotcrete, wire mesh, or other materials used for bracing or supporting the ground.~~

~~Haulage Vehicle. As used in these Orders, a self-propelled vehicle other than railroad cars or locomotives, designed to transport 2.5 cubic yards or greater of minerals, dirt, rock, concrete, asphalt, rubble, sand and/or gravel, ore, waste, overburden, or muck at a pit or mine. The term "haulage vehicle" includes trucks, dump trucks, truck-and-trailer combinations, front-end loaders, scrapers, load-haul-dump units, carryalls, and all other similar equipment used for haulage.~~

~~High Potential High Voltage. More than 650 600 volts~~

~~Highway. Any street, alley, or road, publicly or privately maintained and open for use for the public for use for the public for the purposes of vehicular travel. Definition moved to Explosive Orders~~

~~Hoisting. The act of lifting or lowering muck, materials, equipment, and/or personnel in a conveyance.~~

~~Hoist--Material. A device for lifting or lowering muck, materials, or equipment. It includes tugger-type winches when used to lift and lower muck, materials, or equipment.~~

~~Hoist--First Class Personnel. A device equipped with the necessary safeguards as required by Section 7126 used to raise and lower personnel.~~

~~Incline. A sloping shaft between 20 and 70 degrees from the horizontal. An angled underground travelway that is neither horizontal nor vertical. Inclines include declines and ramps.~~

Intrinsically Safe. A device or system that is incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a mixture of flammable gas and air at its most ignitable composition.

Jumbo. A mobile platform or series of platforms, usually on wheels, to provide work areas for employees and the machines, tools, or materials being used.

Low Voltage. 650 600 volts or less.

Magazine. A building, other than the explosives manufacturing building, or other structures especially designed for the storage of explosives, or any cave or other structure adapted to the storage of explosives.

Main Ventilation System. A primary system used to deliver the required airflow to all work areas of the mine. When ventilation lines are used they shall be rigid and MSHA approved flame resistant and shall meet the requirements of 30CFR Part 7 Section 7.24 (7-1-08 Edition).

Mill. Includes any ore mill, sampling works, concentrator, and any crushing, grinding, finishing, or screening plant used at, and or in connection with, an excavation or mine.

Mine. An area of land from which minerals are extracted in non-liquid form.

Mine. An area of land from which minerals are extracted in non-liquid form by workers on the surface or underground. Private ways and roads appurtenant to such area, and lands, excavations, underground passageways, shafts, slopes, tunnels and workings, structures, facilities, equipment, machines, tools, or other property including impoundments, retention dams, and tailings ponds, on the surface or underground, used in, or to be used in, or resulting from, the work of extracting such minerals from their natural deposits in nonliquid form, by workers, or used in, or to be used in, the milling of such minerals or the work of preparing such minerals.

Mine Opening. Any opening or entrance from the surface into an underground mine, including portals and shafts.

Mineral. As used in these Orders, Any substance, organic or inorganic, found in nature as part of the earth and having sufficient value away from its natural location to be mined, quarried, or dug for its own sake or its own specific use.

Movable. The machine or device that can be, and usually is, moved about in course of normal operations, but is too heavy to be carried. This includes self-propelled machines.

Muck. Excavated dirt, rock, minerals or other material.

MSHA. The United States Department of Labor, Mine Safety and Health Administration.

Noncombustible Material. A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors

when subjected to fire or heat. Concrete, masonry block, brick, and steel are examples of noncombustible materials.

Permissible. Applied to any device, equipment, or appliance, means that such device, equipment, or appliance is classed as by the Mine Safety and Health Administration. Applied to a machine, apparatus, or device which is capable of releasing sufficient electrical or thermal energy to cause ignition, but which has been investigated by MSHA certifying that this energy cannot escape into explosive atmospheres when the device is maintained in accordance with the requirements of the approving agency.

Man-Deck Personnel Cage. An enclosed shaft conveyance for the vertical transportation of employees.

Portable. The machine or device can be, and usually is, manually held or carried about in the course of normal operation, and is not fastened in place.

Portable. A machine or device which can be, and usually is, carried about in the course of normal operation.

Portal. A nearly level entrance to an underground mine, including any related cut, arch, ground support, or retaining walls.

Public Conveyance. Any railroad car, street car, ferry, cab, bus, airplane, or other vehicle which is carrying passengers for hire. **Definition moved to Explosive Orders**

Qualified Person, Attendant, or Operator. A person designated by the employer, who by reasons of their training and experience has demonstrated their ability to safely perform their duties and, where required, is properly licensed and/or certified in accordance with federal, state, or local laws and regulations.

Ramp. An inclined passageway in a mine suitable for rubber-tired equipment or conveyors. Ramps are also called inclines or declines. The inclination is typically below 30 degrees.

Railroad. Any railway or tramway which carries passengers for hire, on the particular line or branch in the vicinity where explosives are stored, or where explosive manufacturing buildings are situated. **Definition moved to Explosive Orders**

Refuge Station. **Place of Refuge.** On every mine level where a 30-inch passageway cannot be maintained, Places of Refuge affording a clearance of at least 2 feet between the widest portion of the haulage equipment or train and the nearest edge of the Place of Refuge shall be provided at intervals of not more than 200 feet and at all permanent work stations. Places of Refuge shall be not less than 4 feet long, plainly marked and kept free of rubbish. **Rename as "Shelter Hole"**

Refuge Chamber. A refuge chamber shall be maintained within 5,000 feet of the face of a working place without two escapeways. Workers shall be provided with emergency rescue equipment and trained in its use. Refuge chambers shall be equipped with a continuous breathable compressed air supply meeting the requirements of Section 5144(i) Breathing Air

Quality and Use in the General Industry Safety Orders, a telephone, potable water and means of isolating the chamber from the mine atmosphere. The emergency equipment, air supply, and rescue chamber installation shall be acceptable to the Division. An area, place, haven or shelter within an underground mine that can be sealed off from the rest of the mine to protect miners who are unable to get out of the mine in an emergency. The shelter contains equipment (such as food, air, water, first aid, communication, and sanitation facilities that allow the miners to survive until they can be retrieved, rescued or escape. **See letter from vendor below**

**EMAIL**

Thanks again for inviting MineARC Systems to attend the recent Advisory Committee meeting in Van Nuys, it was my pleasure coming over to sit in the meeting. We look forward to offering our assistance going forward, in particular, to provide recommendations to the committee on:

1. Further refining the definition of "Refuge Chambers"
2. Establishing minimum refuge chamber performance guidelines

On the subject of "Refuge Chamber" definition, our recommendation is to mirror MSHA's definition as found in the 30 CFR, "Refuge Alternatives for Underground Coal Mines; Final Rule" (aka: "Final Rule"). Although the Final Rule is currently written for coal mining operations, MSHA has done a good job in defining what a refuge chamber is (highlighted for you in the attached PDF). Our recommendation is to expand slightly on MSHA's definition, to include a specific notation on the chamber's ability to operate independent of mine conditions. This will lend itself nicely to addressing possible issues such as compressed airline failure, electrical failure, and what can be included in a refuge chamber to mitigate the risks associated with these issues.

Our recommended revision to the California Mine Safety Orders, Article 2 Definitions for Refuge Chambers is as follows:

**"A protected, secure space with an isolated atmosphere and integrated components that create a life-sustaining environment, independent of mine infrastructure and conditions, for persons trapped in an underground mine."**

Key words being "*independent of mine infrastructure and conditions*". In addition, we also look forward to discussing the recommended minimum requirements for refuge chambers, to assist mine operators in providing not only a "place to go" during emergencies, but more importantly a "well equipped place to go" to provide safety and life support to crews and/or visitors during emergencies.

As always, we are here to assist in any way possible.

Thanks and regards,

**Rob Frashefski**

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## Letter

January 30, 2014

Steve Hart

State of California, Div. of Occupational Safety & Health

Mining & Tunneling Unit Headquarters

1367 E. Lassen Ave., Suite B-4

Chico, CA 95973

Re: Refuge Chamber revisions to Cal/OSHA Mine Safety Orders, Subchapter 17

Dear Mr. Hart,

Thank you for inviting MineARC Systems America as technical contributors to the Cal/OSHA Mine Safety Orders Advisory Committee. We look forward to assisting your office in any way possible and would like to introduce the following items as they pertain specifically to Refuge Chambers in Subchapter 17:

### **Deadly Hazards Associated with Entrapment:**

During underground emergencies, such as fire, entrapment due to smoke and heat is very likely when secondary escape is not available. During these types of events, workers seeking safety in a refuge chamber will likely encounter one or more of following life-threatening scenarios:

☒ **Failure of Compressed Air Supply** – Historically the primary, and perhaps “only”, supply of fresh air to occupants in a refuge chamber, compressed air lines are likely to fail during fire due to burning of HDPE piping, rubber air lines, and rubber Victaulic couplings on hard-piped systems. In addition, oil residue and burning components on heated air lines can vaporize and contaminate the air supply before air flow actually fails. The result: occupants no longer have a fresh air supply, toxins may have been introduced into the chamber, and there is no longer positive pressure on the system. This hazard is well documented in multiple mine emergencies.

**Oxygen Supply** – When compressed air fails, refuge occupants no longer have a source of fresh breathing air. Oxygen will quickly be depleted through normal breathing in the now completely sealed refuge chamber.

**Carbon Dioxide** – When compressed air fails, and positive pressure is lost, occupants no longer have the ability to flush carbon dioxide (CO<sub>2</sub>) from within the now-sealed chamber. CO<sub>2</sub> is exhaled by occupants during normal respiratory activity at rates from 30-50 liters per hour. CO<sub>2</sub> concentrations will rise to toxic levels rapidly, if it is not flushed or otherwise mitigated within the chamber. CO<sub>2</sub> asphyxiation is very likely.

**Carbon Monoxide (CO)** - in a fire, carbon monoxide is always present and very likely to be introduced into the chamber upon entry by occupants. It can also be siphoned into the chamber through a failed compressed air line (as in item 1 above) before the supply is isolated by the occupants. CO is also endogenously produced by smokers and can be added to the sealed refuge interior through normal respiration.

**Heat & Humidity** - Apparent temperature (combination of dry bulb temperature and humidity) inside the sealed refuge chamber is very likely to rise to deadly levels due to ambient temperature, metabolic heat from occupants and other sources such as electrical equipment and exothermic reactions of scrubber chemicals. The MSHA maximum apparent temperature for long term exposure is 95 degrees Fahrenheit – which is likely to be exceeded inside the refuge chamber very quickly, without the use of a properly sized cooling/dehumidifying system.

### **International Standards:**

Since 2011, MineARC Systems has been a contributing member of the International Tunneling Association (ITA), Work Group 5; a global consortium of tunneling engineers, manufacturers, contractors and safety professionals tasked with improving tunneling safety guidelines worldwide. The ITA WG5 has introduced refuge chamber standards as part of this guideline, focusing specifically on mitigation of the risks of entrapment. In addition, MineARC Systems has been instrumental in developing underground mining guidelines such as the *Western Australian Guidelines for Refuge Chambers in Underground Mines* – perhaps the most comprehensive mining guideline in existence, and one which also addresses many of these same universal risks of entrapment.

### MineARC Systems Recommendations:

MineARC recommends that revisions to Cal/OSHA Subchapter 17 include the requirement of refuge chambers in underground operations and, perhaps more importantly, clear definition of the basic specifications which a refuge chamber should include in order to properly mitigate the most likely risks of entrapment.

To mirror our on-going efforts with the ITA and other international guidelines, MineARC recommends the following minimum considerations for underground mining operations within the State of California. Modern refuge chambers are no longer a passive safety retreat, but rather, incorporate a great deal of technical advancement, functionality and performance including:

- 1. Refuge Chamber Definition** – In lieu of secondary escapeway, or where other concerns exist, a refuge chamber is to be provided, capable of ensuring safe respirable atmosphere independent of underground conditions (i.e.: in the event of failure of compressed air feed or loss of main electrical power supply). Refuge to be constructed of fire resistant material, able to maintain a positively pressurized and sealed internal atmosphere.
- 2. Occupancy** – Refuge chambers should be sized accordingly to provide a safe go-to area for maximum number of crews and visitors in underground workings, at any given time. In addition, refuge chambers should provide minimum 0.75 m<sup>2</sup> (8 ft<sup>2</sup>) floor space per occupant and minimum volume of 1.5m<sup>3</sup> (53 ft<sup>3</sup>) per occupant.
- 3. Entrapment Duration** – Refuge chamber to be capable of providing maximum number of occupants with breathable air, cooling and potable water for each occupant for a minimum 36 hours (Note: Cal/OSHA to review and decide here what length of time is best suitable... i.e.: 36 hours, 48 hours, etc.). *MineARC Systems recommends 36 hours minimum, keeping in mind the potential time needed to bring fires under control and mobilize rescue crews.*
- 4. Primary Life Support (External Compressed Air)** – Refuge to include compressed air system capable of providing minimum 3CFM (85 Liters) per occupant, per minute, with means of regulating flow and isolating system during emergencies. System should include filtering or other means of ensuring breathing air quality, with ability to remove of moisture (condensation) accumulation prior to introduction into the refuge.
- 5. Positive Pressure** – Refuge system should include automatic means to ensure that internal pressure (i.e.: from compressed air system) is relieved at maximum 0.18 psi. *Note: Equivalent to MSHA 30 CFR.*
- 6. Secondary Life Support (Oxygen Supply)** – Refuge chamber to include secondary breathing air cache in the form of medical grade or aviator style oxygen cylinders. Cache to be sized accordingly to provide minimum 0.5 liters (0.02 cubic feet) O<sub>2</sub> per minute, per occupant, for the intended entrapment duration of the refuge (per #3 above). System should also be capable of being regulated, in order to maintain O<sub>2</sub> concentrations between 18.5%-23%. *Note MSHA minimum flow is 0.62 L/min/occupant with acceptable concentration of 18.5%-23%.*
- 7. Carbon Dioxide Removal** – Refuge chamber to be equipped with CO<sub>2</sub> removal system capable of removing no less than 24 liters / hour / occupant for the intended entrapment duration of the refuge (per #3 above). System must be able to maintain CO<sub>2</sub> concentration at 1% or less within the chamber at all times. *Note: MSHA threshold is 1%.*
- 8. Carbon Monoxide Removal** – Refuge chamber to include a carbon monoxide removal system, capable of maintaining CO levels below the maximum long term exposure limit of 25ppm within the chamber, for the intended duration (per #3 above).
- 9. Cooling & Dehumidifying** – The refuge chamber shall include a cooling/dehumidifying system with minimum capacity of 120 watts per occupant.
- 10. Atmospheric Monitoring** – Refuge chamber to be equipped with means of monitoring interior levels of oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) and carbon monoxide (CO) in order to properly determine what actions are necessary in order to sustain life within the refuge during occupancy.

We trust that the committee will consider adoption of these basic life-saving guidelines for underground mining operations. MineARC Systems remains dedicated to product development, testing and application of refuge chambers to the underground mining and tunneling industries worldwide, and we look forward to continuing our contributions to Cal/OSHA.

Regards,

Rob Frashefski, North American Sales Manager, MineARC Systems America LLC

~~Return Air. The mine air or ventilation that has passed through the active mine working and is returning to the surface.~~ **Deleted as unnecessary**

~~Return Air Course. The air course through which the vitiated air of a mine is returned or conducted to the surface. The portion of the main ventilation system between the point where working air is removed or exhausted from the underground environment and its point of release into the outside atmosphere.~~ **Not in MSOs Delete**

Rock Burst. A sudden and violent failure of overstressed rock resulting in the instantaneous release of large amounts of accumulated energy.

Safety Can. An closed container approved by Underwriters' Laboratories, Inc., (UL), the Factory Mutual Engineering Corp., (FM), or MSHA, for flammable liquids, of not more than 5 gallons capacity, having a flash-arresting screen, spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire heat.

Secured or Securely Fastened. The device or object referred to is so anchored that it will not become accidentally detached, displaced, or removed under normal use and foreseen circumstances.

Shaft. A vertical or near-vertical inclined passageway to underground workings, normally equipped with a hoist, through which mining operations, including ventilation, are conducted. A shaft is either vertical or inclined at an angle greater than 20 degrees from the horizontal. A shaft is vertical if its alignment is greater than 70 degrees from the horizontal; a shaft is inclined if its alignment is greater than 20 degrees and up to 70 degrees from the horizontal. A winze or raise in which men are hoisted or lowered shall be considered a shaft. for the purpose of these Orders.

Shall and Should. Shall means mandatory and should means recommended.

Shelter Holes. An intentional widening of a haulageway to provide safety for employees walking in the haulageway at any location where a 30-inch passageway cannot be maintained.

Stope. An underground excavation resulting from actual mining of ore, as distinguished from other excavations, such as drifts, crosscuts, raises, or winzes.

Substantially Constructed or Substantial Construction. Construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, usage, and deterioration it was designed to withstand.

~~Timber. Wood, steel, concrete, or other materials used for bracing or supporting the ground.~~ **Deleted as unnecessary (see Ground Support above)**

~~Trackless Vehicle. A type of vehicle that does not run on railroad tracks. Deleted as unnecessary~~

~~Tramway. An aerial passenger tramway device used to transport passengers, muck, or minerals by the use of overhead steel cables (or by ropes) supported in one or more spans.~~

~~Underground. Mines, tunnels or similar confined excavations under the surface of the earth.~~

~~NOTE Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.~~

### **Article 3 REPORTS TO THE DIVISION**

#### **§6959. Mine Openings and Closings.**

~~(a) The owner, operator, or person in charge of any mine or mill under the Scope of these Orders shall notify the nearest Mining and Tunneling Unit Office before starting or stopping suspending operations for a period planned to exceed 90 days, of the approximate or actual date mine operation will commence or cease suspend operations~~

~~(b) Notifications required by this Section shall include the following:~~

- ~~(1) The mine name; and,~~
- ~~(2) The company legal name; and,~~
- ~~(3) Mailing address; and,~~
- ~~(4) Telephone number or contact information; and,~~
- ~~(5) Name and Title of person in charge; and,~~
- ~~(6) Approximate or actual starting date or closing suspension date; and,~~
- ~~(7) Type of mine or mine facility; and,~~
- ~~(8) Estimated number of employees; and,~~
- ~~(9) Whether operations will be continuous or intermittent; and,~~
- ~~(10) Precise mine location (Latitude and Longitude, Township and Range, or another equally precise method).~~

~~(c) Notifications shall be made by telephone, fax, electronic mail, or certified mail, and shall be documented by the owner, operator, and/or employer.~~

~~NOTE: Submitting a copy of the MSHA 30CFR Part 56 Section 56.1000 required notification along with a copy of the MSHA required Notification of Legal Identity to the nearest Mining and Tunneling Office shall be accepted as compliance with this Section.~~

#### **§6960. Reports to the Mining and Tunneling Unit**

~~(a) In addition to the serious injury, illness, or fatality reporting requirements of Section 342 of the Cal/OSHA regulations, the The employer shall notify the nearest Office of the Cal/OSHA Mining and Tunneling unit by telephone immediately, but no longer than two hours after the employer knows or with diligent inquiry would have known, of any serious event or change of~~

conditions that increases the hazards to employees. Incidents that require this two-hour reporting are: include, but are not limited to the following:

(1) Fire, that cannot be extinguished within 30 minutes, or an unplanned ignition or explosion of gas or dust.

(2) Breakage of cables or other gear by which men passengers are hoisted or lowered, overwinding of cables, or other operational hoisting failures which endanger employees.

(3) A sudden inrush of water, gas, mud, petroleum products, or other material which causes engulfment or otherwise endangers employees.

(4) Engulfment of workers for over 30 minutes by failure of material or ground, or entrapment due to hoisting equipment malfunctions which endangers employees.

(5) An unstable condition at an impoundment, refuse pile, or waste bank which requires emergency action in order to prevent failure, or which causes individuals to evacuate an area. ; or, failure of an impoundment, refuse pile, or waste bank.

(6) In surface and underground mines, any serious problem of ground instability, rock burst, or failure of ground support systems, unplanned ground movement, ground shifting, or face collapse including unplanned roof and/or rib fall in active workings.

(7) Any major haulage accident such as a runaway vehicle, train, locomotive, rail car, or an equipment collision or rollover that injures an employee, or causes more than \$500 in property damage.

(8-7) Any fatality, serious injury, or serious illness which is required to be reported to the Division by Section 342 of the Cal/OSHA regulations.

(9 8) Advancement within 100 feet of any other mine working. Advancing a mine working within 100 feet of any other mine working suspected of containing a dangerous accumulation of water or gases, or presenting any other hazard to employees such as subsidence or ground instability.

(4) Overwinding while men are being hoisted. **Moved up to (2) above**

(5) Serious inrush of water. **Moved up to (3) above**

(4) Advancing a mine working within 100 feet of any other mine working suspected of containing a dangerous accumulation of water or gases. **Moved down to (9) above.**

(6) An unplanned ignition or explosion of gas or dust. **Moved up to (1) above**

(10) Any other accident, occurrence, or change of condition that increases or may increase the hazards of mining. **Relocate – see (9) above.**

(7) Crushing of active mine workings. **Moved up to (6) above.**

~~(8) Any serious problem of ground instability.~~ **Moved up to (5 and/or 6) above**

~~(9) Fatal accidents and accidents resulting in two or more serious injuries.~~ **Obsolete**

~~(9) Any other accident, occurrence, or change of condition that tends to materially increase the hazards of mining.~~ **Vague and unenforceable**

NOTE: The reporting requirements of this Section are in addition to the blasting incident reporting of Section 5248 of the General Industry Safety Orders.

(b) The notification required in (a) shall include the following information:

- (1) Date , time , and type of event; and
- (2) Mine name and location; and
- (3) Employer's legal name, address, and telephone number; and
- (4) Name and job title of person making report; and
- (5) Results of employer's preliminary investigation; Employer's preliminary assessment of the situation as known at the time of the report.
- (6) Corrective actions taken by the employer prior to the time of the report.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$6961. Prejob Safety Conference.**

The Division and the owner of a mine, if he is not the operator of the mine, shall be notified before any initial mining operation or construction may be started at any mines or tunnels. A prejob safety conference shall be held with an authorized representative of the Division for all underground operations. Representatives of the tunnel or mine owner, the employer, and employees shall be included in the prejob safety conference. There will normally be only one prejob safety conference held at each mine. If a mine has suspended operation for a period exceeding 24 months, the employer shall notify the nearest Office of the Cal/OSHA Mining and Tunneling unit by telephone to determine if an additional prejob safety conference may be necessary. **Add PJ Form as Appendix**

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~~**\$6961**~~ **\$6962. Underground Mine Classifications.** **NEW**

(a)When the preliminary investigation of a mine project is conducted by the owner, their agent, or the agency proposing construction of the mine, the geologic information shall be submitted to the Division for review and classification relative to flammable gas or vapors. The preliminary classification shall be obtained from the Division prior to mine opening and in all cases prior to actual underground construction. In order to make the evaluation, the following will be required:

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(1) Plans and specifications;

(2) Geological reports, including any information indicating flammable gas or vapors.

(3) Proximity and identity of existing utilities and abandoned underground tanks;

(4) History or past use of the mine location, including existing adjacent mines or tunnels, if known;

(5) The Division may require additional drill holes or other geologic data prior to making gas classifications.

(b) The Division shall classify all underground mines or portions of mines into one of the following classifications:

(1) Nongassy, which classification shall be applied to mines where there is little likelihood of encountering gas during the construction and operation of the mine.

(2) Gassy, which classification shall be applied to mines where it is likely gas will be encountered, or if a concentration greater than 5 percent of the LEL of:

(A) Flammable gas has been detected not less than 12 inches from any surface in any open workings with normal ventilation.

(B) Flammable petroleum vapors that have been detected not less than 3 inches from any surface in any open workings with normal ventilation.

(C) A notice of the classification shall be prominently posted at the mine site, and all personnel shall be informed of the classification and its posted location.

(D) Special conditions unique to the site required to ensure the safety of employees may be listed upon the classification, and all personnel must know and follow any special conditions listed on the classification.

(E) The Division shall classify or reclassify any mine as Gassy if the preliminary investigation or past experience indicates that any gas or petroleum vapors in hazardous concentrations is likely to be encountered in such mine or if the mine is connected to a Gassy or Extrahazardous excavation and may expose employees to a reasonable likelihood of danger.

(F) For the purpose of reclassification and to ensure a proper application of the classification, the Division shall be notified immediately if a gas or petroleum vapor exceeds any one of the individual classification limits described in subsection (b) above or abandoned workings have been intersected. No underground excavation works shall continue until the need for reclassification has been evaluated by the Division.

(G) A request for reclassification may be submitted in writing to the Division by the employer and/or owner's designated agent whenever the identification of any specific changes and/or conditions that have occurred subsequent to the initial classification criteria such as geological information, bore hole sampling results, underground tanks or utilities, ventilation system, air quality records, and/or evidence of the lack of intrusions of explosive gas or vapor into the underground atmosphere.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

#### Add Rescue Plan

### Article 4. ACCIDENT PREVENTION PROGRAM

#### ~~§6965. §6963. Injury and Illness Prevention Program.~~

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Every employer shall establish, implement and maintain an effective Injury and Illness Prevention Program in accordance with Section 3203 of the General Industry Safety Orders; and include the following additional training requirements:

(a) The employer shall hold meetings at least ~~once each month~~ with supervisory personnel and foremen for a discussion of safety problems and accidents that have occurred, including recommendations of ways and means for the prevention of accidents. A record of such meetings shall be kept, stating the meeting date, time, place, supervisory personnel present, subjects discussed, suggestions made and corrective action taken, and maintained for inspection by the Division.

(b) Supervisory personnel shall ~~conduct "toolbox" or "tailgate" safety meetings~~ with their crews at least weekly on the job to emphasize safety. Records of all meetings shall be kept, stating the meeting date, time, personnel present, subjects discussed, and corrective actions taken if any, and maintained for inspection by the Division.

(c) At mines employing fewer than five employees, a ~~weekly "tailgate" safety meeting~~ may be used in lieu of the required safety committee meetings to discuss accidents, "near misses", unsafe conditions or actions, and recommendations to prevent future accidents.

(d) ~~The employer shall train all employees to immediately notify their supervisor~~ of any: (1) unsafe or dangerous workplace conditions; (2) defects and damage of ground control, machinery, apparatus, or equipment; (3) accidents or "near misses" occurring in the workplace. The employer shall investigate such reports promptly, and shall take such actions as required to correct unsafe or dangerous conditions.

(e) The employer shall ensure that scheduled workplace inspections are conducted to identify unsafe conditions and work practices, and identify and evaluate hazards, in accordance with the following:

(1) At all surface mining operations, the employer shall designate a supervisor or other competent person to examine each working place at ~~least once each shift~~

(2) At all underground mining operations, the employer shall designate a supervisor, Certified Safety Representative, or other competent person to examine each working place at least ~~twice during each working shift~~. One inspection shall be made during the early part of the work shift and another inspection during the later part of the work shift.

(f) All employees at mines shall be trained in the possible hazardous conditions and the protective measures to be taken to eliminate those hazards, including site-specific training in the following topics, where applicable:

1. Self-rescue and respiratory devices;
2. Employee and material transportation, check-in/check-out system;
3. Warning signals and communication methods;
4. The work environment, location, and mining methods;
5. Mine map, escape routes, emergency evacuation, emergency medical plans;
6. Fire-warning signals and firefighting procedures;
7. Mine gases, air monitoring, and ventilation plans;
8. Work procedures and safety plans for ground control, highwalls, water hazards, pits and spoil banks;
9. Illumination and night work;
10. Dust, noise, and other health hazards, air monitoring, and exposure control plans;
11. Electrical hazards;
12. Explosives (if used);
13. House keeping procedures to conform to Section 7062.
14. Heat Illness procedures to conform to Section 3395.
15. Confined Space procedures to conform to Section 5157.
16. Statutory rights of employees and their representatives.
17. Authority and responsibility of supervisors.
18. First Aid and emergency medical procedures.

(g) The training required in the above section shall be reviewed annually for every employee, and repeated as necessary.

(h) In addition to the training required by this section every person with direction, control or authority over miners, including all first-line and second-line supervisors, (leadworkers, foremen, supervisors, superintendents, etc.) shall be trained in their duties and responsibilities and the following topics:

1. The employer's Injury Illness Prevention Program and the supervisor's responsibilities under that program.
2. The requirements of the Mine Safety Orders and other applicable Safety Orders.
3. The identification and evaluation of workplace hazards and unsafe conditions, and appropriate actions for correcting, mitigating, and protecting workers from those hazards.
4. The procedures for obtaining emergency medical assistance.
5. Supervisor's responsibilities for reporting and documentation.

6. When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to ensure the miners work safely, safely and take charge in case of an emergency.

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(i) The training required in subsection (h) shall be reviewed annually for every supervisors, and repeated as necessary.

(k) An outline of the training program, and a copy of the training materials and handouts, shall be available for inspection by employees and the Division upon request.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

~~§6963.~~ ~~§6964.~~ **Code of Safe Practices**

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(a) Each employee, when first hired, shall be trained in the employers Code of Safe Practices and shall be provided with the sections applicable to their work. The Code of Safe Practices shall also be posted at the jobsite or be provided to each supervisory employee who shall have it readily available.

(b) The employer shall adopt and use of a Code of Safe Practices for the employer's surface and underground mining operations.

(c) Copies of such code shall be readily available at the job site for employee use and inspection by the Division.

~~§6962.~~ ~~§6965.~~ **Safety Bulletin Boards.**

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(a) A safety bulletin board shall be provided at each mine. All notices pertaining to the mine safety shall be posted on the safety bulletin board at a location where employees congregate. All required postings and other pertinent notices pertaining to mine safety (Mine Classification, applicable Diesel Permit(s), site Emergency Plan, and any special orders, rules, special conditions, or regulations to be used shall be prominently posted at the mine site. Fire escape and safety diagrams, rescue contact information, emergency medical contact procedure, availability of the Code of Safe Practices, citations, and other safety notices) also shall be posted on the safety bulletin board and maintained in legible condition.

(b) A second bulletin board may be used for posting other bulletins, pictures, slogans, and circulars.

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~~§6964.~~ ~~§6966.~~ **Safety Committee.**

(a) At least once every month a safety committee shall make a detailed inspection of all working places and equipment. The safety committee shall include at least one hourly employee who is regularly assigned to the area being inspected. The committee shall note any

unsafe practices and conditions and shall promptly report their findings to the person in charge. A written record shall be made of the suggestions offered and action taken.

(b) At mines employing fewer than five ~~men~~ persons, personal safety instruction for all employees each month will be accepted in lieu of the safety committee required by subsection (a) of this section.

~~§6965.~~ **This subsection relocated to 6963(d) (See above ).**

Any unsafe condition of ground control, defects in or damage to machinery, apparatus, or equipment resulting in unsafe or dangerous conditions, and accidents occurring in course of operations which may result in personal injury, shall be reported to the employer. The employer shall investigate such reports promptly, and shall take such actions as may be required to correct the condition if it is in fact unsafe or dangerous.

~~§6966. §6966. Supervision.~~ **This subsection relocated to 6963(h)(6) (See above ).**

~~(a) The operator of every mine shall appoint a competent man who shall be personally in charge of the work and the employees therein.~~

~~(b) The operator of such mine may be personally in charge of such work and employees.~~

~~(c) Some competent person in authority shall be on duty whenever employees are working in a mine. § 57.18009~~

When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to ensure the miners work safety and take charge in case of an emergency.

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~~§6967. Certification of Safety Representatives at Underground Mines.~~ **REWRITTEN SEE BELOW**

(a) The employer shall designate a competent safety representative, certified by the Division experienced in underground mining with the responsibility of administering the safety program. He shall institute action to correct unsafe conditions and unsafe practices.

Every person requesting certification as a safety representative shall submit a completed application form to the Division. Upon submission of an application for certification as a safety representative, the Division shall collect the amount of \$15.00 for examination fee which is non-refundable. Renewal fees are \$5.00 annually.

(b) Labor Code Excerpts: Section 8003.

"Violation of regulations, rules, orders, or special orders adopted by the board or division as a condition of certification shall be punishable by suspension or revocation of certification, unless such violation is responsible for death or injury to employees, in which case it shall be punishable as a misdemeanor."

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§6967, Safety Representatives and Gas Testers at Underground Mines.**

(a) At all underground mines where these Orders apply, the employer shall designate an on-site Safety Representative who is qualified and experienced to recognize hazardous conditions in underground mining and is certified by the Division. The on-site Safety Representative shall monitor the work and have the authority to correct unsafe conditions and practices, or stop the work if an imminent hazard exists, and shall be responsible for directing the required safety and health programs. **LC 7962**

(b) An on-site Safety Representative shall be present at underground mines when employees are doing work covered by these Orders. At mines with fewer than 5 miners underground, having an on-site Safety Representative present at the worksite during the main shift and readily available within 30 minutes on subsequent shifts of the same day shall meet the requirements of this section. This exception shall not apply at underground mines classified as Gassy or Extrahazardous, nor at those mines where the Division requires a full-time on-site Safety Representative because of specific hazardous conditions. **LC7962**

(c) All applicants for certification as a Safety Representative shall meet the following minimum requirements: **LC 7999, TSO 8406**

(1) Two years experience performing safety-related work in underground mines or equivalent tunnel experience acceptable to the Division.

(2) In lieu of one year of the above experience, applicants may substitute equivalent education or work experience as follows:

(A) Work experience in the capacity of managing or directing underground mining or tunneling safety programs which is acceptable to the Division, or

(B) Formal safety related education degree in safety or certification as a graduate Mining Engineer, a Certified Mine Safety Professional (CMSP), a Certified Safety Professional (CSP), a Certified Industrial Hygienist (CIH), a Professional Safety Engineer (PSE), or similar education acceptable to the Division.

(3) Be able to communicate with affected employees.

(4) Be of such physical condition that it would not interfere with the proper performance of their duties.

(5) Be thoroughly familiar and conversant with all the Mine Safety Orders and other applicable safety orders.

(6) Knowledge of the means and methods of underground mining operations.

(7) The ability to identify and evaluate unsafe conditions; and knowledge of the safeguards required to protect employees from the effect of these hazards.

(8) Pass a written and oral examination administered by the Division.

(e) Where these safety orders require gas testing, the employer shall designate an on-site Gas Tester who shall be qualified to perform the required air and gas testing, hot work monitoring, and ventilation testing, and is certified by the Division. The Gas Tester shall also ensure that air testing equipment is properly maintained, calibrated and operated. The Gas Tester shall perform the required air and ventilation testing, record the findings, and report the results to the supervisor and/or Certified Safety Representative. The Gas Tester shall have the authority to order an evacuation when required by these Orders. **TC 8406 LC 7999**

EXCEPTION: The Gas Tester certification requirements shall not apply to Public Fire Departments or off-jobsite mine rescue teams during emergency operations and training, provided that the rescue team is trained in the proper operation, use, and calibration of the ventilation and gas detecting instruments that they use.

(f) All applicants for certification as a Gas Tester shall meet the following minimum requirements:

(1) One year of experience performing underground work in mines or tunnels. Up to six months of underground work experience may be satisfied if the applicant has a formal safety related education degree or certification as a graduate Mining Engineer, a Certified Mine Safety Professional (CMSP), a Certified Safety Professional (CSP), a Certified Industrial Hygienist (CIH), a Professional Safety Engineer (PSE), or similar certification acceptable to the Division.

(2) Be of such physical condition that it would not interfere with the proper performance of their duties.

(3) Be able to communicate with all affected employees.

(4) Knowledge of the gases that may be encountered underground, the hazards they pose, and the safeguards required to protect employees from their effect.

(5) Demonstrate proficiency in the operation, use and calibration of ventilation and gas detection instruments; and the interpretation and documentation of the readings obtained.

(6) Be thoroughly familiar and conversant with all the Mine Safety Orders and other applicable safety orders.

(7) Pass a written and oral examination administered by the Division. **LC 7999**

(g) Gas Tester and/or Safety Representative Certification – Application and Examination.

(1) The Division shall only certify an individual for the specific types of work for which they are qualified. Every person requesting Gas Tester or Safety Representative Certification shall submit a signed Gas Tester/ Safety Representative Application Form for each certification requested.

accompanied by a non-refundable application fee of \$15.00 (fifteen dollars) for each application. The application form may be obtained from any Mining and Tunneling Unit office.

(2) In order to obtain a Gas Tester or Safety Representative Certification, applicants that meet the eligibility requirements shall pass a written and oral examination given by the Division. The examination shall include questions related to the certification requested, and may also include field tests or demonstrations to determine the candidate's qualification to perform the duties of the certification requested. Gas Testers will be required to perform practical tests, including operation and calibration procedures, for air testing equipment.

(3) The Division shall determine any limitations specific to the candidate's knowledge and experience that shall be placed on the certificate.

(4) Candidates who fail the examination process shall wait a minimum of 90 calendar days to re-apply and be re-examined. They shall re-submit a signed Gas Tester/Safety Representative Application Form accompanied by an additional non-refundable application fee of \$15.00 (fifteen dollars) for each application.

(5) A Gas Tester or Safety Representative Certification is not transferable. **LC 7999**

(h) Expiration and Renewal. **LC 8001**

(1) Each Gas Tester or Safety Representative Certification issued under this subsection shall be valid for a period of five years, unless revoked or suspended.

(2) The application process, examination, limitations, and fees for renewal of Gas Tester and/or Safety Representative Certification shall be the same as those required for a new certification, in accordance with subsection (f) of this section.

(i) Suspension or Revocation - Gas Tester's or Safety Representative's Certification. **LC 8003**

(1) The Division shall initiate an investigation to determine the need to suspend a Gas Tester's or Safety Representative's Certification when in the opinion of the Division:

(A) There is a question or doubt as to the competency of the Gas Tester or Safety Representative, or

(B) The Division believes the Gas Tester or Safety Representative has not complied with the requirements, safety orders, or rules of the Division.

(2) The Gas Tester or Safety Representative shall be given a notice of hearing by the Division and a hearing shall be held before suspending or revoking a Gas Tester or Safety Representative Certification.

(3) If the hearing results in the suspension or revocation of the certificate, the Gas Tester or Safety Representative shall be required to surrender the certificate to the hearing officer at the time of the hearing.

(4) Hearings shall be conducted in accordance with Title 8, Division 1, Chapter 3.2, Subchapter 2, Article 1.6-Adjudicative Hearings (Title 8 sections 340.40 through 340.52).

NOTE: Free Technical Assistance Service (Labor Code, Sections 6354 and 6355).—**Moved to Scope - Section 6955**

In order to encourage voluntary compliance with occupational safety and health regulations, free on-site Technical Assistance service is provided by Cal/OSHA. Employers may request this free on-site Technical Assistance for mines by contacting the Cal/OSHA Mining and Tunneling Unit. Employees and employee groups may also participate at the invitation of the employer, or may request Technical Assistance away from the job site.

Technical Assistance services include: **Move to Scope**

(1) Information, advice, and recommendations on specific safety and health problems in the workplace;

(2) providing Providing help to employers in instituting an effective accident and illness prevention program or improving an existing program; and

(3) training Training in good safety and health practices, and in recognition and correction of hazards through on-site surveys.

NOTE: Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

## Article 5. CARE OF INJURED

### §6968. First-Aid, CPR, and AED Training.

#### GENERAL

(a) At underground mines employing more than 5 men, a sufficient number of supervisors and workmen shall be trained in the U.S. Bureau of Mines Manual of First-Aid Instructions so that at least 25 percent of the personnel are so trained.

(b) Some person trained in first aid shall be readily available at surface operations where five or more workers are employed at one time.

(c) The training should be given by the U.S. Bureau of Mines, or it may be given by an instructor holding an effective first-aid instructor's certificate from the U.S. Bureau of Mines, or by anyone holding an effective Red Cross Instructor's Certificate, or by a licensed physician.

(a) At all surface and underground mines, at least one employee per five employees or portion thereof on a shift, shall be trained in first-aid, cardiopulmonary resuscitation (CPR) and be readily available to provide first-aid. There shall be a minimum of two trained persons per shift and per location (surface or underground). For the purposes of this subsection, if employees

are working both aboveground and underground, each location shall be considered separately in determining the number of first-aid providers, unless the locations can readily communicate with each other and quickly promptly provide first-aid.

(b) First-aid providers shall have a valid certificate of first-aid, cardiopulmonary resuscitation (CPR), and automated external defibrillator (AED) training from the American Red Cross, Mine Safety and Health Administration (MSHA), American Heart Association, or equivalent training program that can be verified by documentary evidence.

(c) The required first-aid, cardiopulmonary resuscitation (CPR), and automated external defibrillator (AED) training shall be made available at no cost to all employees. **Ref: 30CFR 56.18010**

#### **§6969. Care of the Injured.**

(a) The employer shall provide for emergency medical services at all mines covered by these orders. Emergency medical services shall be provided before work begins, and shall include the following:

(1) At least one basket-type stretcher, or equally appropriate type stretcher with straps for securing an injured person in the stretcher, a woolen blanket, a waterproof blanket or equivalent covering, and adequate first-aid materials shall be provided at a central location for surface mines, and near the primary surface access to the underground work area(s) at underground mines.

(2) If more than 25 persons are working at the same time on a shift, an additional stretcher equipped as required in subsection (a)(1) for each 25 persons or fraction thereof shall be provided and located as designated in subsection (a)(1) above.

(a) Every mine shall be provided with an approved mine-type stretcher, a woolen blanket or equally warm covering, and a waterproof covering for injured employees unless ambulance service is readily available to all locations in the operation.

(b) If more than 25 men are working underground at the same time, an additional stretcher, blanket, and waterproof covering for each 25 men or fraction thereof shall be provided.

Each stretcher shall be provided with at least 20 feet of one-half-inch rope, or equivalent, for securing an injured man in the stretcher.

(3) Where work locations may require it, suitable rigging and a safe means for hoisting or lowering stretchers containing injured persons shall be provided.

(c) When considered necessary by the Division, stretchers shall be provided with a rope or other safe means for hoisting or lowering.

(d) Adequate first-aid dressing shall be provided and placed at locations about the mine convenient for treatment of injured employees.

Note: It is recommended that the employer seek the advice of a medical doctor regarding the type and quantity of first-aid dressings to be placed about the mine.

(4) At underground mines an additional stretcher and adequate first-aid materials shall be located within 5 minutes travel time from the working face. If multiple faces are in operation, additional stretchers shall be so located so that the 5 minute travel time to a stretcher is not exceeded. Each stretcher underground shall be equipped as required in subsection (a)(1). **TSO 8420(a)(2)**

(5) In addition to the requirements in subsection (a)(1), adequate first-aid materials shall be provided and placed at locations about the mine convenient for treatment of injured employees. At least one adequate first-aid kit shall be provided for each 15 employees or fraction thereof at both aboveground and underground work locations. For the purposes of these safety orders, adequate first-aid materials shall consist of those required for 6 to 15 employees in Section 1512(c)(1) of the Construction Safety Orders, or those determined by an employer-authorized licensed physician, and the following:

(A) six (6) compresses or surgical pads suitable for pressure dressings.

(B) Six (6) triangular bandages.

(C) Suitable splinting material.

(D) Appropriate personal protection devices (CPR masks if mouth-to-mouth CPR is used, nitrile gloves, etc.) for bloodborne pathogens. **TSO 8420(a)(4)**

(6) A recommended method of treatment shall be kept readily available at all times where dangerously poisonous substances are used. A method prescribed by a medical doctor is acceptable. Water or other appropriate neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used. In addition to these requirements, Article 109 Hazardous Substances and Processes of the General Industry Safety Orders shall also apply when hazardous substances and/or processes are used.

(7) First-Aid and rescue equipment and materials required by this section shall be maintained in a dry, sanitary, and usable condition, and shall be readily available to employees. Where blankets are required, they shall be kept in sealed, moisture and dust-proof containers. **TSO 8420(a)(5)**

(c) First-aid kits, boxes, and containers shall be prominently marked to indicate their purpose. **TSO 8420(a)(6)**

(d) Weekly Monthly Frequent inspections shall be made of all first-aid materials to ensure expended items are replaced. stocked materials are on hand in case of an emergency. **TSO 8420(a)(7)**

(e) First-Aid materials shall be kept in dry, sanitary, and usable condition, and shall be readily available to employees.

(f) A recommended method of treatment shall be kept readily available at all times where dangerously poisonous substances are used. A method prescribed by a medical doctor is

~~acceptable. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.~~

~~(e) An effective and reliable means of communication shall be provided for contacting emergency medical services and obtaining assistance in an emergency. The name, address, and contact information of the physician, hospital, ambulance, and helicopter service (if applicable), to be called in an emergency shall be posted on the safety bulletin board and at telephones in all mines, and in the hoist room of underground mines.~~ **TSO 8420(a)(8)**

~~(f) Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons. At locations where ambulance response time is more than 30 minutes, the following shall be provided:~~ **TSO 8420(b)**

~~(1) A designated emergency transportation vehicle properly equipped and maintained so that it can safely transport an injured worker to the hospital in the expected terrain, weather, and road conditions. NOTE: This could be a vehicle normally used for employee transportation, provided that an occupied stretcher can fit within the passenger compartment. The intent of this Order is that there shall be no unnecessary delay in getting seriously injured employees to medical attention. Ambulance service should be utilized where possible, but it is recognized that mines exist in isolated places not possible to reach by ambulance. Therefore, "suitable means of transportation" means the type of transportation ordinarily used by employees when going to or coming from a mine not possible to reach by ambulance.~~

~~(2) A properly maintained automated external defibrillator (AED) and at least two persons trained and available to operate the device and provide cardiopulmonary resuscitation (CPR).~~

~~(3) A person with first-aid training meeting the requirements of Section 6968(b) of these orders shall be available and responsible for first-aid care at all times when work is in progress. The first-aid provider shall have access to a appropriate medical professional licensed physician for consultation.~~

~~(4) In addition to the required emergency transportation vehicle, approved emergency medical helicopter service shall be prearranged for remote areas of difficult access where vehicle ground transportation time to the nearest emergency room exceeds  $\pm$  one hour.~~

~~(g) (18-14) Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons.~~

~~(h) (18-12) The name, address, and telephone numbers of the physician, hospital, and ambulance to be called in an emergency shall be posted on the safety bulletin board and at telephones and in the hoist room of underground mines.~~

~~(i) Some suitable means of transportation shall be readily available where the services of an ambulance cannot be secured in one hour.~~

## **Article 6. GENERAL SAFETY PRECAUTIONS**

### **§6973. General Safety Precautions.**

**GENERAL**

~~(a) Every reasonable precaution shall be taken to insure the safety of workmen in all cases, whether or not provided for in these orders.~~

~~(a) The employer shall ensure that every reasonable effort is taken to ensure the safety of workers in all cases, whether or not provided for in these orders.~~ **Orders.**

~~(b) No employee shall be permitted to work in an unsafe place unless for the purpose of making it safe and then only after proper precautions have been taken to protect him while doing such work.~~

**(b) No employees shall be permitted to work in a location where identified hazards that affect the safety of employees exist except for the purpose of making it safe and then only after proper precautions have been taken to protect them, control the hazards while doing such work. 8410(d)**

~~(c) Prior to~~ **At the beginning of each shift or the start of new work, the employer a competent person shall make a thorough survey of the conditions of the work area to determine, so far as practicable, the predictable hazards to employees and the kind and extent of safeguards necessary to perform the work in a safe manner. TSO 8410(b), CSO 1511(b)**

~~(c) (20-1) Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.~~

~~(d) Intoxicating beverages or substances shall not be permitted or used in or around mines. Persons under the influence of, or impaired by, intoxicating beverages or substances shall not be permitted on the job site. No employee shall knowingly be permitted or required to work while the employee's ability, vision, or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.~~

**30 CFR § 56 and 57.20001**

**Intoxicating beverages and narcotics.**

Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.

**§8410. General Safety Precautions. TSO**

(a) The employer shall ensure that every reasonable effort is taken for the safety of employees, whether or not provided for in these orders.

(e) No person shall be permitted to use or possess any intoxicating liquors or drugs at any place of employment where these safety orders apply. When any person is known or suspected of being under the influence of an intoxicating liquor or drugs, he/she shall not be permitted to enter or remain on the job site.

**Rule 17 (1919 CA TSOs)** (a) No person shall, while under the influence of intoxicating liquor, be permitted to enter any tunnel or any of the buildings connected with the operation of the same where men are employed, and no one shall carry intoxicating liquors into the same.

~~(d) (3-9) Men shall examine their working places before starting work and frequently thereafter, and any unsafe condition shall be corrected.~~

(e) Only a bar blunt on one end shall be used for loading at chutes or for barring down loose rock in any part of the mine.

(f) All spikes, nails, and other sharp objects that protrude and may cause injury shall be bent down or removed.

(g) No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

~~(g) No employee shall be assigned, or allowed, or be required to work alone unless they can effectively communicate with others, can be heard, or can be seen.~~

## **UNDERGROUND**

(h) Materials shall not be placed or permitted to remain where they can fall down a shaft, manway, winze, raise, or other opening.

~~(i) Employees shall be warned when others are working above or below them so employees will not be injured by falling rock or materials.~~

(i) Employees shall be warned when others are working above or below them so they will not be injured by falling rock or materials. No tools, equipment, rock, or materials shall be dropped, lowered, or allowed to fall unless employees located below are protected by either an isolated danger area delineated by physical barriers with warning signs or an assigned spotter who shall alert nearby workers and deny entry into the danger area.

~~(j) (3-22) No other work shall be done in a working place until it has been barred down and made safe for work. The roof and sides shall be examined several times during the working shift.~~

(j) No other work shall be done in a working place until it has been barred down, evaluated for proper ground support, and made safe for work. The roof and sides shall be examined for loose rock and ground movement ~~several times at least twice~~ during the working shift.

(k) Employees shall be trained to examine their working places before starting work and frequently thereafter, and to correct any unsafe condition they find. If the employees cannot correct the condition, they shall bring the condition to the attention of their supervisor.

(l) Oncoming shifts shall be informed of any accidents, near misses, hazardous occurrences or conditions that have affected or might affect employee safety, including liberation of gas, haulage accidents, equipment failures, earth or rock slides, cave-ins, flooding, fires or explosions. **TSO 8410(o)**

~~(j) (3-22) No other work shall be done in a working place until it has been barred down and made safe for work. The roof and sides shall be examined several times during the working shift. **Repeated**~~

~~(m) In addition to the requirements of subsection (g) of this section, working alone is prohibited in sinking, enlarging, and maintaining shafts, or while installing and/or maintaining equipment located in a shaft.~~

#### **§6974. Entry System for Underground**

##### **Mine Employees.**

~~(a) The operator of every mine shall provide and maintain on the surface a check list by which every man shall be checked into and out of the mine on each shift.~~

~~Note: This may be done by several methods, such as the use of time cards, numbered cap lamps, check boards with metal checks, having the employee report to a clerk or timekeeper when he enters or leaves the mine, or any other method acceptable to the Division.~~

~~(b) At the end of the shift the check list shall be examined to see if all men are out of the mine, except men who are authorized to remain therein.~~

~~If the check list indicates that an unauthorized employee remains in the mine, a prompt search shall be made for the missing man.~~

~~(a) Check-in, Check-out system. A check-in/check-out system shall be provided at the surface to provide an accurate record of the persons underground in the mine. The records shall be on the surface at a location protected from fire, explosion, or other hazards. Every person underground shall carry a positive, durable means of identification.~~

~~(b) At the end of each shift the check-in/check-out system shall be examined to see that all persons are out of the mine, except those authorized to remain underground. If the system examination indicates an unauthorized person remains in the mine, a prompt search shall be made for that missing person.~~

~~(c) Strangers or visitors shall not be allowed to enter any place where these safety orders apply, unless they are accompanied by a person designated by the employer. **TSO 8410(g)**~~

### **Article 7. Drinking Water, Change Rooms, and Sanitation**

#### **§6975. Drinking Water.**

##### **GENERAL**

~~(a) Water suitable for drinking shall be available to all employees during working hours.~~

~~This may be accomplished by piping water into the mine and providing drinking fountains or by providing individual canteens or by other sanitary means.~~

~~(b) Common drinking vessels are prohibited.~~

~~(a) Potable water shall be provided within 5 walking minutes of at all active working areas and be available to all employees during working hours. This may be accomplished by piping potable water into the mine and providing drinking fountains or by providing individual canteens or by other sanitary means.~~

~~(b) Communal drinking vessels are prohibited.~~

~~(c) If single service cups are provided, a sanitary container for unused cups and a receptacle for used cups shall be provided.~~

~~(d) When water is cooled by ice, the ice shall be potable or shall not come in contact with the water.~~

~~(e) Potable water sources shall be posted. Non-potable water sources shall also be posted, unless a blanket posting concerning non-potable water sources is provided.~~

~~(f) Potable water systems shall be constructed to prevent backflow or backsiphonage of non-potable water.~~

**Ref: 30CFR56.20002**

~~**§6976. Change Rooms.—**~~ **Replaced Below**

#### **SURFACE**

~~(a) Where the lack of such facilities constitutes a hazard to health and safety, the division may require heated change rooms, with shower baths, or other washing facilities; hot and cold water; lavatories; and adequate space for the clothing of employees.~~

~~(b) Change rooms shall be kept clean, orderly and in a sanitary condition.~~

~~(c) Change rooms shall be located at a point convenient to the pit.~~

~~**§6977. Change Rooms.—**~~ **Replaced Below**

#### **UNDERGROUND MINES**

~~The provisions of T8 6977 of Part 6, T 24, are incorporated herein as a part of these regulations and reads as follows:~~

~~T8 6977. Change Rooms. In addition to the provisions of Part 2, the following shall apply to all mine construction.~~

~~(a) The operator of every mine shall provide a change room for the use of employees for drying clothes and bathing.~~

(b) The change room shall be placed in a convenient location for use by employees but, because of the danger of fire, it shall not be nearer than 100 feet from any mine opening, fan house, or hoist house.

(c) Except as provided in subsection (c) of this section the change room shall be equipped with shower baths having hot and cold water, and shall have at least 1 shower for each 15 men on a shift working in the mine.

(d) Change rooms shall be provided with adequate means of heating and lighting, and shall be kept in a reasonably clean and sanitary condition.

(e) Mines which employ fewer than 10 men and which have no suitable water available on the property for washing or bathing need not comply with the shower bath provisions of this section, but shall provide their employees with washing facilities that are reasonably clean and sanitary.

(f) The change room shall be available to employees at all times when they are going on or coming off shift.

(g) It is recommended that working clothes be either elevated by suitable means, such as chains, to the upper air of the change house or that separate rooms be used for working and street clothes.

#### **6976. Change Houses, Showers, and Washing Facilities.**

##### (a) Change Houses

(1) At surface mines, if the lack of facilities to change clothes or take showers before going home poses a health or safety hazard to employees, the employer shall provide a change house meeting the requirements of this section. **Table**

(2) At all underground mines, the employer shall provide a change house meeting the requirements of this section.

(3) Change houses shall provide:

(A) Separate dressing rooms, or a change house that provides for each sex, when applicable; and

(B) Suitable facilities for changing clothes, along with provisions for drying work clothes and storing street clothes; and

(C) Heating and lighting; and

(D) Hand washing facilities; and

(E) Toilet facilities; and

(F) At least one separate shower bath with an adequate supply of hot and cold water for each ten (10) employees or fraction thereof of each sex on a shift.

(4) At a mine with 5 or less employees, a dressing room for each sex (if applicable) with a washing facility, a separate shower room, and a separate toilet room with a washing facility shall be accepted as meeting the requirements of this section, provided the dressing rooms, shower room, and toilet room offer full privacy and are lockable from the inside.

(5) Change houses and showers shall be maintained in a clean, orderly, and sanitary condition.

(6) The change house(s) shall be placed in a convenient location for use by employees. At underground mines, they shall be located at least 100 feet from any mine opening, fan house, or hoist house.

(7) The change house(s) shall be available to employees at all times when they are going on or coming off shift.

(8) Working clothes shall be elevated by suitable means, such as chains, to the upper air of the change house, or separate rooms for working and street clothes shall be provided, or the employer shall provide equivalent means to dry work clothes and store them separately from street clothes.

(a) Showers. When showers are provided, they shall meet the requirements of Section 3366(f) of the General Industry Safety Orders.

(f) Where showering is required by the employer or these orders:

(1) Separate shower rooms shall be provided for each sex. One shower facility with hot and cold water feeding a common discharge line shall be provided for each ten employees, or numerical fraction thereof, who are required to shower during the same shift. When there are less than five employees, the same shower room may be used by both sexes provided the shower room can be locked from the inside. (Title 24, part 5, section 5-910(a)2(F))

(2) Body soap or other appropriate cleansing agents convenient to the shower shall be provided.

(3) Employees who use showers shall be provided with individual clean towels.

*For use of  
Advisory  
Committee  
Only*

**RECHECK 3366 (f) AT COMMITTEES REQUEST**

(f) Where showering is required by the employer or these orders:

(1) Separate shower rooms shall be provided for each sex. One shower facility with hot and cold water feeding a common discharge line shall be provided for each ten employees, or numerical fraction thereof, who are required to shower during the same shift. When there are less than five employees, the same shower room may be used by both sexes provided the shower room can be locked from the inside. (Title 24, part 5, section 5-910(a)2(F))

(2) Body soap or other appropriate cleansing agents convenient to the shower shall be provided.

(3) Employees who use showers shall be provided with individual clean towels.

(c) Washing Facilities.

General. Washing facilities shall be provided as required by this section and as follows: A minimum of one washing station shall be provided for each ten employees or fraction thereof of each sex on a shift. Washing stations provided to comply with this requirement shall at all times: **EXISTING LAW? See 3366 below.**

**§3366. Washing Facilities.**

(a) Washing facilities for maintaining personal cleanliness shall be provided in **every place of employment**. These facilities shall be reasonably accessible to all employees. (Title 24, Part 5, Section 5-910(a)2(A))

(b) Washing facilities shall be maintained in good working order and in a sanitary condition. (Title 24, Part 5, Section 5- 910(a)2(B))

(c) Lavatories, including those associated with toilet rooms shall be made available according to the following table:

Type of Employment	Number of Employees	Minimum Number of Lavatories
Industrial-factories warehouses, loft buildings, and similar establishments	1 to 100	<b>1 for each 10 employees.</b>
	over 100	1 additional for each additional 15 employees or fraction thereof.

(A) Be maintained in a clean, orderly, and sanitary condition;

(B) Have an adequate supply of hot and cold water for effective washing;

(C) Have a readily available supply of soap or other suitable cleansing agent;

(D) Have a readily available supply of single-use towels or a warm-air blower;

(E) Be located and arranged so that any time a toilet is used, the user can readily wash their hands; and

(F) When provided in association with a non-water carriage toilet facility:

1. Provide a sign or equivalent method of notice indicating that the water is intended for hand washing; and

2. Be located outside of the toilet facility and not attached to it.

3. Provide an adequate supply of water for effective hand washing.

EXCEPTION to subsection (c)(1)(F)(2): Where there are less than 5 employees on a shift, and only one toilet facility is provided, the required washing facility may be located inside of the toilet facility.

EXCEPTION to subsection (c)(1): Mobile crews having readily available transportation to a nearby toilet and hand washing facility.

(2) Washing facilities for hazardous substances. Where employees are engaging in the application of paints or coatings, or in other operations involving substances which may be harmful to the employees, washing facilities shall be provided in near proximity to the worksite and shall be so equipped as to enable employees to remove such substances. Facilities provided to comply with this requirement shall at all times:

(A) Be maintained in a clean, orderly, and sanitary condition;

(B) Have an adequate supply of hot and cold water sufficient for effective removal of the hazardous substance from skin surfaces; and

(C) Have a readily available supply of soap, and where necessary to effect removal, special cleansing compounds designed specifically for removal of the hazardous substance from skin surfaces; and

(D) Have a readily available supply of single use towels or a warm-air blower. Ref: TSO 8431(b)(3,4)

**6977. Food Handling and Temporary Sleeping Quarters. *Proposed New***

(a) Food Handling. All food service facilities and operations shall be maintained in a clean and sanitary condition and shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located

(b) Temporary Sleeping Quarters. When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted, and maintained in a clean and sanitary condition. They shall also meet the applicable laws, ordinances and regulations of the jurisdictions in which they are located. TSO 8431

**56978. Sanitation. *Rewritten Below as Toilet Facilities***

(a) An adequate number of dry or water closets shall be provided at convenient locations on the main working levels or on the surface. Ready means of access shall be provided to each closet.

Note: For purposes of this section, "convenient" means within five minutes of travel from any working place.

(b) Means shall be provided for removing the contents of each closet and for cleansing of the closet. The contents shall be removed often enough to prevent the closet from becoming offensive.

(c) Each closet shall be provided with some disinfectant or deodorant to be sprinkled upon the contents thereof.

~~(d) All men employed at any mine where closets are provided shall be required to use such closets.~~

**6978. Toilet Facilities.**

(a) At least one toilet facility shall be provided for each ~~10~~ **should be 15?** employees or fraction thereof on a shift. Separate toilet facilities shall be provided for each sex. Both toilets and urinals may be provided for male bathrooms, but the number of toilets shall not be less than two-thirds the required number of toilet facilities. Toilet facilities shall be located within ~~easy 5~~ **minutes** walking distance to work locations unless employees have a means of transportation readily available for their use. **GISO 3364**

**§3364. Sanitary Facilities.**

(a) Separate toilet facilities shall be provided for each sex according to the following table:

Number of Employees	Water Closets*
1 to 15.....	1
16 to 35.....	2
36 to 55.....	3
56 to 80.....	4
81 to 110.....	5
111 to 150.....	6
over 150.....	1 additional for each 40 employees or Fraction thereof.

\*Urinals may be installed instead of water closets in toilet rooms to be used only by men provided that the number of water closets shall not be less than two-thirds of the minimum number of toilet facilities specified.

EXCEPTION: Where there are 5 or fewer employees on a shift, separate toilet facilities for each sex are not required provided the toilet facilities can be locked from the inside and contain at least one toilet.

(b) At underground workplaces, required toilet facilities shall be provided on the main working levels and/or on the surface, but must be located within ~~5~~ **10** minutes travel time from any working place. **TSO 8433, existing MSO**

(c) Each toilet facility shall be readily accessible. **Existing**

~~(d) If water closets~~ **fixed toilet facilities are not feasible, non-water carriage disposal facilities shall be provided. Unless prohibited by applicable local regulations, these facilities may include chemical toilets, recirculating toilets, or combustion toilets, except that combustion toilets shall not be used underground. Existing MSO**

(1) The employer shall provide for the regular removal of waste contents and cleansing of each non-water carriage toilet facility, to prevent them from becoming offensive.

(e) Toilet facilities shall be kept clean, sanitary, maintained in good working order, designed and maintained in a manner which will assure privacy and provided with an adequate supply of toilet paper.

(f) A deodorizing means shall be provided for each toilet facility.

(g) All employees at a mine shall be required to use the toilet facilities.

(h) All toilet facilities shall have readily available hand washing facilities meeting the requirements of Section 6976(c) of these Orders. **TSO 8433**

(i) The requirements of this section shall not apply to mobile crews having readily available transportation to nearby toilet and hand washing facilities. **CSO 1526**

### **Article 10. Personal Protection**

#### **6979. Work Over or Near Water at Surface Mines**

(a) The following safety devices shall be provided for and used by employees at those surface mine locations where the employees work over or near water:

EXCEPTION: Where employees are continuously protected by standard railings, safety nets, personal fall arrest systems, personal fall restraint systems or positioning systems, or other equally protective provisions of these Orders.

(1) Personal Flotation Devices (PFD). Employees shall be required to wear U. S. Coast Guard approved personal flotation devices that are marked or labeled Type I PFD, Type II PFD, or Type III PFD, or a U.S. Coast Guard approved Type V PFD that is marked or labeled for use as a work vest for commercial use or for use on vessels.

(2) Ring Buoys. U. S. Coast Guard approved 30-inch ring buoys with at least 150 feet of 600-pound capacity line shall be readily available for emergency rescue operations. Distance between ring buoys buoy stations shall not exceed 200 feet.

(3) Lifesaving Boats. Where practicable, one or more lifesaving boats, either manually or power-operated, shall be provided and readily accessible at all times. Lifesaving boats shall be properly maintained, ready for emergency use and equipped with oars and oarlocks attached to the gunwales, boathook, anchor, a ring buoy with 50 feet of 600-pound capacity line, and two U. S. Coast Guard approved personal flotation devices. Oars are not required on boats that are powered by an inboard motor.

(A) Where, because of swift current, lifeboats cannot be used, a line shall be stretched across the stream with tag lines or floating planks trailing in the water at intervals not to exceed 6 feet. If this is impracticable, some other arrangement for providing effective life lines near the water surface shall be provided. **CSO 1602**

(b) When employees work over or near water, the employer shall prepare a water rescue plan based on the actual site conditions. The plan shall discuss the protective measures and/or

equipment that shall be used and shall detail how a water rescue, if necessary, shall be accomplished. Affected employees shall be trained in the plan, and the training shall be documented.

(c) The personal flotation devices, ring buoys and lines, rescue boats, and other water rescue equipment shall be kept in usable and clean condition, ready for immediate use when employees are exposed to drowning work over or near water. This protective and rescue equipment shall also be regularly inspected by a qualified person and removed from service if damaged, or if buoyancy or fastening capability is affected. These inspections shall be documented by the employer.

**§6980. Personal Protection. Replaced Below**

**GENERAL**

(a) Employees shall be safeguarded with personal protective equipment as required by the General Industry Safety Orders.

(b) (15-2) All persons shall wear suitable hard hats when in or around a mine or plant where falling objects may create a hazard.

(c) (15-2) Every person underground shall be safeguarded by an approved safety hat or safety cap.

(d) (15-3) All persons shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

(e) (15-3) Every employee underground shall be safeguarded by safety boots or safety shoes.

(f) (15-4) All persons shall wear safety glasses, goggles, or face shields, or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected eyes.

(g) (14-14) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

(h) (15-7) Protective clothing or equipment and face shields or goggles shall be worn when welding, cutting, or working with molten metal.

(i) (15-20) Life jackets or belts shall be worn where there is danger from falling into water.

**6980. Personal Protection.**

**GENERAL**

(a) Employees shall be safeguarded with suitable personal protective equipment provided and used as required by Article 10 of the General Industry Safety Orders.

(b) All persons shall wear suitable approved head protection (hard hats) when in or around a mine or plant where falling objects may create a hazard. Head protection shall be selected and labeled as required in Sections 3381(b) and 3381(c) of the General Industry Safety Orders.

(c) Every person underground shall be safeguarded by wearing approved head protection (hard hats), selected and labeled as required in subsection (b). The required head protection shall be equipped with a factory-installed cap lamp bracket.

(d) All persons shall wear suitable approved protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet. The protective footwear shall be suitable for the hazard and selected in accordance with Sections 3385(b) and 3385(c) of the General Industry Safety Orders.

(e) Personal protective equipment shall be maintained in good operating and sanitary condition. **TSO 8414(j)**

(f) Every employee underground shall wear suitable approved protective footwear (steel-toed), selected in accordance with subsection (d).

(g) All persons shall wear eye protection suitable for the hazards they are exposed to. These include approved safety glasses, goggles, or face shields, or other suitable protective devices. Eye protection shall be selected in accordance with Section 3382 of the General Industry Safety Orders.

(h) Approved face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

(i) Suitable protective clothing or equipment and approved face shields or goggles shall be worn when welding, cutting, or working with molten metal.

(j) Clothing appropriate for the work being done shall be worn. Loose sleeves, tails, ties, frills, lapels, cuffs, or other loose clothing or jewelry shall not be worn around machinery in which it might become entangled.

(k) Clothing saturated or impregnated with flammable liquids, corrosive substances, irritants, or oxidizing agents shall be promptly removed, and shall not be worn until cleaned. **CSO 1522**

NOTE. Personal work clothing that may be exposed to fire or flame shall not be treated with fabric softener or other material which may increase flammability. **New**

(l) Hand Protection. Suitable protection for the hands and other exposed skin areas shall be provided and used where work involves exposure to cuts, burns, corrosives, irritants or other harmful substances.

(k) Suitable body protection shall be provided for employees whose work exposes parts of their body, not otherwise protected as required by other orders in this article, to hazardous or flying

substances or objects in accordance with Title 8, Section 1522 of the Construction Safety Orders. **TSO 8414(f)**

(m) Unless otherwise protected by personal protective equipment required by other orders of this article, employees shall be provided with suitable body protection when parts of their body are exposed to injurious, hazardous, and/or flying materials.

(n) Where the occupational duties of an employee expose him/her to substances which may be harmful, facilities for proper cleansing of the skin shall be provided in accordance with Sections 6976(c)(2) and 6976(b) of these Orders. Employees shall be trained to wash promptly and thoroughly after exposure to injurious substances.

(o) Suitable rubber boots and rain gear shall be provided and used where wet conditions are encountered. **TSO 8414(f)(3)**

#### HEARING PROTECTION

(1) Occupational exposure to noise shall be controlled in accordance with Section 5096 with Sections 5095 through 5100 (including attached Appendices) of the General Industry Safety Orders. When noise exposure exceeds the sound levels listed in Section 5096, Table N-1 of the General Industry Safety Orders (An 8-hour-time-weighted-average of 90 decibels or equivalent.), hearing protection shall be provided by the employer and shall be worn by the exposed employee(s). Employees and other persons shall be informed of the work locations where hearing protection is required. Exposure to excessive sound levels shall be eliminated or at least reduced by feasible engineering or administrative controls. **TSO 8414(g)**

(2) When noise exposure is an 8-hour-time-weighted average of 85 decibels or greater, the employer shall make hearing protectors available to and ensure use by the exposed employees.

(3) Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer.

(4) The employer shall provide noise training to all employees who are exposed to noise at or above an 8-hour-time-weighted average of 85 decibels. Employees shall be informed of the following:

(A) The effects of noise on hearing;

(B) The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care.

(5) The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

(6) Hearing protectors shall be replaced as necessary.

Hearing Protector Attenuation. **TSO 8414(h)**

(1) The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The employer shall use one of the methods described in Article 105, Control of Noise Exposure, Appendix E, Methods for Estimating the Adequacy of Hearing Protector Attenuation, of the General Industry Safety Orders.

(2) Hearing protectors must attenuate employee exposure at least to an 8-hour-time-weighted average of 90 decibels as required by Section 5096(b).

(3) For employees with a known standard threshold shift, hearing protectors must attenuate employee exposures to an 8-hour-time-weighted-average of 85 decibels or below.

(4) The adequacy of hearing protector attenuation shall be reevaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

RESPIRATORY PROTECTION

(1) Respirator Protection. When it is impracticable to remove harmful dusts, fumes, mists, vapors, or gases or where emergency protection against occasional and/or relatively brief exposure is needed, the employer shall provide, and the employee exposed to such hazard shall use, respiratory protective equipment as prescribed below in Sections 5144 (including attached Appendices) of the General Industry Safety Orders

PROTECTION FROM ELECTRIC SHOCK AND ARC FLASH/BURN. **TABLE**

(1) Work shall not be performed on exposed energized parts of equipment or systems until the following conditions are met: **2320.2 LVEO**

(A) The employer has determined that the work is to be done while the equipment or systems are energized, and this decision is documented; and

(B) Involved employees are trained on the work techniques and hazards involved in working on energized equipment, and this training is documented; and

(C) Suitable personal protective equipment and protective insulating equipment shall be provided and used on or near energized equipment for the protection of employees where there is a recognized hazard of electrical shock or arc flash/burns; and

(D) Suitable barriers or approved insulating material shall be provided and used to prevent accidental contact with energized parts; and

(E) Where required for personnel protection, suitable barriers, tags, or signs are in place; and

(F) The personal work clothing of employees exposed to the hazards of flames or electric arcs shall not contain materials which will increase the extent of injuries (i.e. nylon, rayon, acetate, polyester) unless the fabric has been treated with flame retardant. If employees will work on equipment energized at 300 volts or more, the employer shall consider providing, shall provide flame resistant work clothing.

**Repeat Downy note again?**

(2) When protective insulating equipment (i.e. approved insulating gloves, insulating blankets, insulating equipment, insulated tools, live-line tools) is used for work on energized electrical equipment, it shall be selected, used, approved, maintained, inspected, and tested in accordance with Section 2320.2 of the Low Voltage Safety Orders and Section 2940.6 of the High Voltage Safety Orders depending on the voltage where it is used.

(3) After the authorized work on an energized system or equipment has been completed, the employer shall ensure that temporary protective equipment and barriers are removed and that permanent barriers and/or covers are reinstalled. 2320.2 LVSO

Self-Rescue Devices for Underground Mines. No W65 allowed in Washington

(1) A self-rescue device or devices approved by NIOSH/MSHA shall be provided and be immediately available for each person underground. This requirement shall be met by providing the following equipment:

(A) A one-hour rated Self-Contained Self-Rescuer or Filter-Self-Rescuer; or

(B) Any other NIOSH/MSHA approved self-contained breathing apparatus (SCBA) rated for one-hour or longer.

(2) Selection of self-rescue devices shall be in accordance with Section 5144 of the General Industry Safety Orders and shall consider the mine classification, the presence of naturally occurring toxic air contaminants in the mine, and the limitations of Filter-Self Rescuers (FSRs).

(3) In mines classified as Gassy, self-rescue devices shall be worn or carried by each person underground at all times.

(4) In mines classified as Nongassy, where the wearing or carrying of the self-rescue device is hazardous to an employee, it may be placed in a readily accessible location no more than one minute or 25 feet from the employee.

(A) Where a person works on or around mobile equipment, their self-rescue device(s) may be placed in a readily accessible location on such equipment.

(6) When self-rescue devices are placed in an underground storage location, a sign made of reflective material with the word "SELF-RESCUERS" shall be conspicuously posted at each storage location. Direction signs made of reflective material shall be posted underground leading to each storage location.

(7) Additional caches of self-rescue devices shall be provided underground to allow all persons to escape on foot from work areas to the nearest rescue chamber (if provided) or the surface. These emergency escape caches shall contain sufficient quantities (at least 1 per affected person per cache) of self-rescue devices and shall be so placed along planned escape route(s) that escaping persons are required to travel no more than 5,000 feet to reach a new cache, a refuge chamber (if provided), or the surface. Escape travel distance shall be computed using the formula  $\text{Travel Distance} = \text{Horizontal Distance} + 3X(\text{Vertical Distance})$ , where the vertical distance is the length of all passageways in the planned escape route(s) with a slope of 20 degrees or more from the horizontal.

**Check formula: which one?  $T/1000 + S/300 = \text{Less than ONE}$  (From 7080)**

(8) All self-rescue devices shall be inspected, tested, and maintained in accordance with the manufacturer's requirements. Particular attention shall be given to ensure the established service life is not exceeded. Is yellow "good" or "bad"??

(9) Each person entering the mine shall be trained in the proper inspection, use, and limitations of the self-rescue device they will use before being permitted to go underground, with refresher training as recommended by the manufacturer, or at least annually, thereafter. Records of this training shall be maintained on the jobsite in accordance with Section 3203(b) of the General Industry Safety Orders. **TSO 8414k**

**We are proposing to move this following deleted requirement (Section 6981) to new Section 6983 "Bins, Bunkers, and Bulk Storage of Loose Material." How about 6982?**

**§6981. (15-5). Safety Belts and Life Lines.**

(a) Safety belts and lines shall be worn when men work where there is danger of falling.

No employee shall be permitted to enter any bin, bunker, or other storage place containing materials which may cave or run unless he is provided with and is wearing a safety belt with life line attached. He shall be attended by another workman, who shall keep the life line reasonably taut at all times.

(b) Life lines shall be of three-fourths inch diameter Manila rope or equivalent.

(c) Life lines subject to excessive fraying or rock damage shall be protected or shall have wire center rope. Seriously worn or damaged rope shall be promptly removed from service.

(d) Safety belts and life lines shall be inspected by a qualified person before each use. When fiber ropes show serious abrasion, broken fibers, cuts, fraying, or other defects, such defects shall be reported to the person in charge.

(e) When in use, the life line shall be secured so as to prevent it from being accidentally loosened or dislodged.

(f) Safety belts shall be of a type approved by the Division.

**56981. Guardrails and Fall Protection. See 6983**

(a) Employees at elevated work locations exposed to falling over 30 inches to the floor, ground, or level underneath shall be prevented from falling by guardrails, a personal fall arrest/fall restraint/positioning system, or other positive means providing equivalent protection and safety. If guardrails are used to satisfy this requirement, they shall be provided on all open sides and ends of unenclosed elevated work locations such as landings, balconies or porches, runways, walkways, ramps, platforms, or working levels. Where overhead clearance prohibits installation of a 42-inch guardrail, a lower rail or rails shall be installed. The railing shall be provided with a toeboard where the work location is above places where employees work or pass and the lack of a toeboard could create a hazard from falling tools, materials, or equipment.

**Guardrail exceptions:**

1. Runways used exclusively for oiling, adjusting or otherwise maintaining shafting or other machinery may have the guardrail on the side adjacent to the machinery omitted provided that the gap between the platform and the machinery where a person could fall is 10 inches or less and the machinery guarding requirements of the General Industry Safety Orders are complied with.

2. Portions of loading or storage platforms located next to railroad cars or trucks and used primarily for loading or unloading railroad cars or trucks; or waterside dock edges used for cargo loading and handling.

3. Open sides of storage platforms less than four feet wide which are loaded and unloaded exclusively by means of stackers or lift trucks handling palletized loads, where employees are not exposed to the falling hazard.

(b) Where the guardrail requirements of subsection (a) are impracticable due to machinery requirements or work processes, an alternate means of protecting employees from falling, such as a personal fall arrest/fall restraint/positioning system shall be used.

(c) When they are required, guardrails and toeboards shall meet the requirements of Section 3209 of the General Industry Safety Orders.

(1) If materials, tools, parts, and/or equipment for repairs, servicing, and/or maintenance are piled or stored on elevated work locations to such height that a standard toeboard does not provide protection, paneling or screening from floor to intermediate rail or top rail shall be provided. Where such paneling or screening extends to the top rail, midrails may be omitted.

(d) Openings in guardrails for ladderway access shall be protected as required by Section 3212(a)(2)(A) of the General Industry Safety Orders, which requires a swinging gate or equivalent protection to protect the opening.

(e) Appropriate personal fall arrest, personal fall restraint and positioning systems shall be approved, used, and meet the requirements of Section 1670 of the Construction Safety Orders.

(f) Personal fall arrest, personal fall restraint and positioning systems shall be inspected by a qualified person before each use. This inspection shall meet the manufacturer's requirements. When ropes, lifelines, webbing, lanyards, harnesses, belts, or other components show abrasion, broken fibers, cuts, fraying, or other defects, such defects shall be reported to the supervisor and the defective components removed from service until inspected by a qualified person and found safe to use. This removal and inspection shall be documented by the employer.

(g) When in use, life lines shall be secured so as to prevent them from being accidentally loosened or dislodged.

(h) Any lanyard, safety belt, harness, dropline, lifeline or other component subjected to in-service loading shall be immediately removed from service and shall not be used again for employee safeguarding.

## **Article 11. Materials--Storage and Handling**

### **§6982. Materials Storage and Handling.**

#### **GENERAL**

(a) Materials shall be stored in conformance with the Housekeeping and Maintenance Standards of the General Industry Safety Orders.

(b) (16-3) Hazardous materials shall be stored and handled in conformance with Hot, Flammable, Poisonous, Corrosive, and Irritant Substances Standards of the General Industry Safety Orders.

(c) (16-4) Hazardous materials shall be labeled in conformance with the Labeling of Injurious Substances Standards of the General Industry Safety Orders.

(d) (4-18) (16-5) Compressed and liquid gas cylinders shall be stored and/or secured in conformance with the General Industry Safety Orders.

(e) (16-6) Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

(f) (16-9) Men shall stay clear of suspended loads.

(g) (16-14) (16-15) Cranes and hoisting equipment for materials shall be constructed, operated, and maintained in conformance with the Cranes and Other Hoisting Equipment Standards of the General Industry Safety Orders.

(h) (16-11) Men shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard and the man is secured by a safety belt or equivalent.

(a) Material, wherever stored, shall not create a hazard. It shall be limited in height and shall be piled, stacked, or racked in a manner designed to prevent it from tipping, falling, collapsing, rolling or spreading. Racks, bins, planks, sleepers, bars, strips, blocks, sheets, shall be used where necessary to make the piles stable.

(b) The designed live load of an elevated floor or portion thereof of a commercial or industrial building, or of an elevated load carrying platform, shall be conspicuously posted using a durable metal sign, which shall not be defaced or removed. The designed live load shall not be exceeded.

(c) The buildings, structures, foundations, and fastenings of all prime movers, machines, and equipment shall be maintained to support safely and without dangerous vibration the loads imposed upon them.

(d) Storage racks shall be designed to safely support their intended loads and shall not be loaded in excess of their design capacity as recommended by the manufacturer.

(e) In addition to the requirements of these Orders, hazardous materials at mines shall be stored and handled in conformance with Article 109 and Group 20 of the General Industry Safety Orders.

(f) Hazardous materials at mines shall be labeled in conformance with Articles 109 and 135 of the General Industry Safety Orders.

(g) Compressed and liquid gas cylinders shall be used, stored and/or secured in conformance with Articles 76 and 78 of the General Industry Safety Orders, and Article 32 of the Construction Safety Orders.

(h) Valves on compressed gas cylinders shall be protected by valve protection devices when being transported or stored, and by being placed in a safe location and being secured in a special truck or rack, or being otherwise secured from falling or being knocked over when the cylinders are in use.

(i) Personnel ~~Men~~ shall stay clear of suspended loads. Loads shall be controlled by tag or restraint lines or other means if rotation of the load ~~is~~ may be hazardous.

(j) Cranes and hoisting equipment for materials shall be constructed, operated, and maintained in conformance with the crane and hoisting equipment requirements of Group 13 Cranes and Other Hoisting Equipment of the General Industry Safety Orders.

(k) Personnel ~~Men~~ shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks. Hoisting of employees at mines with cranes or derricks shall be in

accordance with Section 5004 of the General Industry Safety Orders; however Section 5004(c) shall not apply. **TSO 8495**

(l) All high lift trucks, forklifts, and similar lift trucks shall be constructed, used, operated, and maintained in accordance with Article 25 of the General Industry Safety Orders.

(m) When working with molten metal, in addition to the personal protection requirements of Section 6980, a suitable warning shall be given before molten metal is poured and before a container of molten metal is moved.

(n) Equipment and supplies shall be loaded, transported, and unloaded in a manner that minimizes the hazards of falling or shifting equipment or materials. Effective work procedures and/or devices shall be used to minimize hazards to employees.

**§6983. Bins, Bunkers, and Bulk Storage of Loose Material.** **Replaces (includes?) §6981. Guardrails and Fall Protection New Title? TABLE**

(a) Employees at elevated work locations exposed to falling over 30 inches to the floor, ground, or level underneath shall be prevented from falling by guardrails, a personal fall arrest/fall restraint/positioning system, or other positive means providing equivalent protection and safety. If guardrails are used to satisfy this requirement, they shall be provided on all open sides and ends of unenclosed elevated work locations such as landings, balconies or porches, runways, walkways, ramps, platforms, or working levels. Where overhead clearance prohibits installation of a 42-inch guardrail, a lower rail or rails shall be installed. The railing shall be provided with a toeboard where the work location is above places where employees work or pass and the lack of a toeboard could create a hazard from falling tools, materials, or equipment.

Guardrail exceptions:

1. Runways used exclusively for oiling, adjusting or otherwise maintaining shafting or other machinery may have the guardrail on the side adjacent to the machinery omitted provided that the gap between the platform and the machinery where a person could fall is 10 inches or less and the machinery guarding requirements of the General Industry Safety Orders are complied with.

2. Portions of loading or storage platforms located next to railroad cars or trucks and used primarily for loading or unloading railroad cars or trucks; or waterside dock edges used for cargo loading and handling.

3. Open sides of storage platforms less than four feet wide which are loaded and unloaded exclusively by means of stackers or lift trucks handling loads secured on pallets, where employees are not exposed to the falling hazard.

(b) Where the guardrail requirements of subsection (a) are impracticable due to machinery requirements or work processes, an alternate means of protecting employees from falling, such as a personal fall arrest/fall restraint/positioning system shall be used.

(c) When they are required, guardrails and toeboards shall meet the requirements of Section 3209 of the General Industry Safety Orders.

(1) If materials, tools, parts, and/or equipment for repairs, servicing, and/or maintenance are piled or stored on elevated work locations to such height that a standard toeboard does not provide protection, paneling or screening from floor to intermediate rail or top rail shall be provided. Where such paneling or screening extends to the toprail, midrails may be omitted.

(d) Openings in guardrails for ladderway access shall be protected as required by Section 3212(a)(2)(A) of the General Industry Safety Orders, which requires a swinging gate or equivalent protection to protect the opening.

(e) Personal fall arrest, personal fall restraint and positioning systems shall be approved, used, and meet the requirements of Section 1670 of the Construction Safety Orders.

(f) Personal fall arrest, personal fall restraint and positioning systems shall be inspected by a qualified person before each use. This inspection shall meet the manufacturer's requirements. When ropes, lifelines, webbing, lanyards, harnesses, belts, or other components show abrasion, broken fibers, cuts, fraying, or other defects, such defects shall be reported to the supervisor and the defective components removed from service until inspected by a qualified person and found safe to use. This removal and inspection shall be documented by the employer.

(g) When in use, life lines shall be secured so as to prevent them from being accidentally loosened or dislodged.

(h) Any lanyard, safety belt, harness, dropline, lifeline or other component subjected to in-service loading shall be immediately removed from service and shall not be used again for employee safeguarding.

**SPLIT GROUND CONTROL INTO GENERAL, SURFACE, AND UNDERGROUND**  
**Skip ahead to**

## **Article 12. — Ground Control**

**~~56984. (3-1). Face or Bank of Pit.~~**

**~~SURFACE~~ — **THIS SECTION WAS REWRITTEN AND COMBINED IN ARTICLE 12****

~~(a) All reasonable precautions shall be taken to free the face or bank of the pit from loose materials that may be dangerous to employees.~~

~~(b) Where practicable, the face of the pit shall be given a slope so as to minimize the danger of rock falling on employees.~~

~~(c) (3-3) Whenever the employer and/or the Division considers that the height and condition of the face constitutes a serious hazard to employees, it may require the installation of a bench or other suitable method of working. employees shall be protected by the installation of a bench or other suitable methods of working which provide equivalent protection shall be adopted.~~

~~(d) When a bench or multiple-bench method of operation is required, a setback of at least one-half the height of the single face or bank for each section of the face or bank shall be required. Additionally, the width and height shall be based on the type of equipment used for cleaning of benches or for scaling of walls, banks, and slopes.~~

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**30 CFR § 56.3130**

**Wall, bank, and slope stability.**

**MINING METHODS**

Mining methods shall be used that will maintain wall, bank, and slope stability in places where persons work or travel in performing their assigned tasks. When benching is necessary, the width and height shall be based on the type of equipment used for cleaning of benches or for scaling of walls, banks, and slopes.

**30 CFR § 56.3131**

**Pit or quarry wall perimeter.**

In places where persons work or travel in performing their assigned tasks, loose or unconsolidated material shall be sloped to the angle of repose or stripped back for at least 10 feet from the top of the pit or quarry wall. Other conditions at or near the perimeter of the pit or quarry wall which create a fall-of-material hazard to persons shall be corrected.

**Article 12. Ground Control – Surface and Underground**

**6984. -Ground Control - General**

~~(a) All reasonable precautions shall be taken to free the face or bank of the pit from loose materials that may be dangerous to employees.~~

Ground Movement Hazards. Mining methods shall be used that will not expose any employee to the hazards of unplanned ground movements in the portal, back/roof, face ribs and other workings of underground mines, and the highwalls, banks, benches, and slopes of open pit/quarry surface mines. **MSHA 56.3130**

~~(b) Where practicable, the face of the pit shall be given a slope so as to minimize the danger of rock falling on employees.~~

Ground Control - General.

~~(1) Where practicable, the face of the pit any open pit/quarry or mine portal shall be sloped so as to minimize the danger of rock falling on employees. remove the danger of face instability.~~

**MSO**

~~(2) Whenever the division considers that height and/or condition of the face or portal constitutes a serious hazard to employees, it may require the installation of a benching and/or sloping system or equivalent protection shall be provided. or other suitable method of working.~~

**MSO**

~~(3) When a bench or multiple-bench method of operation is required used, a setback of at least one-half the height of the single face or bank for each bench section shall be required provided or equivalent protection measures shall be established. **MSO**~~

~~(A) When determining the maximum permitted slope of the face and/or bench width and spacing, the ground control plan shall include and consider the following information: **MSO**~~

1. Nature of the material being excavated.
2. Extent to which the material is cemented or consolidated.
3. Height of the face.
4. Type and size of equipment used for cleaning the benches, or for scaling walls, banks, and slopes, and for mining at the face; and the amount of protection this equipment affords the operator.
5. Safety of exposed employees who are not protected by such equipment.

(4) Where the face is composed of loose or unstable materials, the slope of the face shall not exceed 50 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. **MSO**

(5) Where the face is composed of moderately compacted materials that are not firmly cemented or consolidated but which experience indicates will stand well in place, the slope shall not exceed 65 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. **MSO DRAG LINE**

(6) Where the face is composed of firmly cemented or consolidated materials that experience indicates do not ~~shall spall~~ or cave readily, the slope shall not exceed 80 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. As an alternative to sloping in hard compact soil, benching is permitted provided that a slope ratio of 3/4 horizontal to 1 vertical (53.1° from the horizontal) or flatter is used. **MSO CSO Drag Line**

(7) Excavations in sand, gravel, or other material (such as stockpiles) shall be sloped to an angle at which employees will not be endangered by falling or sliding materials. **MSO**

(c) Ground Control Plan. Each employer shall establish and follow a ground control plan at every surface and underground mine where employees are exposed to the hazards of ground movement and falling rocks. The plan shall be prepared by a qualified person, shall be in writing, shall be consistent with prudent engineering design, and shall insure safe working conditions. **NEW MSHA 57.3200, 57.3360 (UG), 57.3401**

(1) The ground control plan shall be in compliance with the provisions of this Article and shall address falling rock hazards and ground movement protection systems. It shall insure ground control stability suitable to the prevailing geological conditions and the mining system(s) to be used at the mine. It shall also address the additional measures that shall be taken to protect persons if unusual hazards are encountered.

(2) The ground control plan shall be kept current and updated quarterly and whenever ground conditions, ground control hazards, or operating conditions change. Changes to the ground control plan shall be designed and approved by a qualified person.

(3) The ground control plan shall include an inspection and testing procedure appropriate to the ground control system(s) used.

(4) The ground control plan shall be posted or be readily available to employees from their supervisors. The Plan shall be provided to the Division upon request.

(5) All employees affected by the ground control plan shall be instructed in its requirements. Such training shall be documented by the employer.

(d) Pits/Quarries Perimeter Walls

(1) No person shall be permitted under a face or bank where stripping operations constitute a hazard. **MSO**

(2) Where employees are endangered by materials rolling or sliding down the slopes above a pit/quarry, they shall be protected by removal from the danger area or by barriers, baffle boards, screens, or other devices that afford equivalent protection. **MSO**

(3) In locations where persons work or travel in performing their assigned tasks, loose, unconsolidated material shall be sloped to the angle of repose or stripped back for a safe distance, but in no case less than of at least 10 feet from the top of pit or quarry walls, and the loose, unconsolidated material shall be sloped to the angle of repose **MSO**

**Section 6985 has already been incorporated into 6984 (above).**

**Section 6986 has been incorporated into Section 6984 (above).**

**~~§6985. (3-1). Excavations of Sand, Gravel and Similar Material.~~**

~~(a) Excavations in sand, gravel, or other material shall be sloped to an angle at which employees will not be endangered by falling or sliding materials.~~

~~(b) When determining the maximum permitted slope of the face, consideration shall be given to:~~

~~(1) Nature of the material being excavated.~~

~~(2) Extent to which the material is cemented or consolidated.~~

~~(3) Height of the face.~~

~~(4) Type and size of equipment used at the face and amount of protection this equipment affords the operator.~~

~~(5) Safety of employees who are not protected by such equipment.~~

(c) Where the face is composed of loose or unstable materials, the slope of the face shall not exceed 50 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used.

(d) Where the face is composed of moderately compacted materials that are not firmly cemented or consolidated but which experience indicates will stand well in place, the slope shall not exceed 65 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used.

(e) Where the face is composed of firmly cemented or consolidated materials that experience indicates do not shall or cave readily, the slope shall not exceed 80 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used.

**§6985. Excavations of Sand, Gravel, and Similar Materials. Scaling and Support.**

(a) Excavations in sand, gravel, or other material shall be sloped to an angle at which employees will not be endangered by falling or sliding materials

Ground Condition Examinations. The employer shall designate competent person(s) to A ~~competent person shall~~ examine and test ground conditions daily in work areas prior to work commencing, after blasting, and as ground conditions warrant during the shift at **all surface and underground** mines. Additionally, **underground** haulageways and travelways and surface area highwalls and banks adjoining travelways shall be examined weekly or more often if changing ground conditions warrant. Records of these examinations shall be maintained for one year. **MSHA 56.3401**

**30 CFR § 56.3401 Use Above ?**

**Examination of ground conditions.**

Persons experienced in examining and testing for loose ground shall be designated by the mine operator. Appropriate supervisors or other designated persons shall examine and, where applicable, test ground conditions in areas where work is to be performed prior to work commencing, after blasting, and as ground conditions warrant during the work shift. Highwalls and banks adjoining travelways shall be examined weekly or more often if changing ground conditions warrant.

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(b) When determining the maximum permitted slope of the face, consideration shall be given to:

- (1) Nature of the material being excavated.
- (2) Extent to which the material is cemented or consolidated.
- (3) Height of the face.
- (4) Type and size of equipment used at the face and amount of protection this equipment affords the operator.
- (5) Safety of employees who are not protected by such equipment.

Corrections of Hazardous Conditions. Ground support shall be used where ground conditions, or mining experience in similar ground conditions in the mine, indicate that it is necessary. Ground conditions that create a hazard shall be taken down or supported before other work or travel is permitted in the affected area. Until made safe, the area shall be posted with warnings against entering and, if left unattended, barricaded have barriers installed to prevent unauthorized entry. **MSHA 56.3200**

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**30 CFR § 56.3200**

**Correction of hazardous conditions.**

**SCALING AND SUPPORT**

Ground conditions that create a hazard to persons shall be taken down or supported before other work or travel is permitted in the affected area. Until corrective work is completed, the area shall be posted with a warning against entry and, when left unattended, a barrier shall be installed to impede unauthorized entry.

~~(c) Where the face is composed of loose or unstable materials, the slope of the face shall not exceed 50 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. Location to Perform Scaling. Scaling shall be performed from a location which will not expose persons to injury from falling material, or other protection from falling material shall be provided. MSHA 56.3201~~

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**30 CFR § 56.3201**

**Location for performing scaling.**

Scaling shall be performed from a location which will not expose persons to injury from falling material, or other protection from falling material shall be provided.

~~(d) Where the face is composed of moderately compacted materials that are not firmly cemented or consolidated but which experience indicates will stand well in place, the slope shall not exceed 65 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. Scaling Tools. Where manual scaling is performed, a scaling bar shall be provided. This bar shall be blunt on one end and of a length and design that will allow the removal of loose material without exposing the person performing this work to injury. MSHA 56.3202~~

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**30 CFR § 56.3202**

**Scaling tools.**

Where manual scaling is performed, a scaling bar shall be provided. This bar shall be of a length and design that will allow the removal of loose material without exposing the person performing this work to injury.

~~(e) Where the face is composed of firmly cemented or consolidated materials that experience indicates do not shall or cave readily, the slope shall not exceed 80 degrees where the height is greater than can be reached by the dipper or bucket of the excavator or loader being used. Rock Fixtures. Rock bolts shall be installed selected by competent persons with a thorough knowledge of existing ground conditions and support systems. MSHA 57.3203~~

**30 CFR § 57.3203**

**Rock fixtures.**

- (a) When rock bolts and accessories addressed in ASTM F432-83, "Standard Specification for Roof and Rock Bolts and Accessories", are used for ground support, the mine operator shall--
- (1) Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-83; and,
  - (2) Make this certification available to an authorized representative of the Secretary.

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- (b) Fixtures and accessories not addressed in ASTM F432-83 may be used for ground support provided they--
- (1) Have been successful in supporting the ground in an area with similar strata, opening dimensions and ground stresses in any mine; or
  - (2) Have been tested and shown to be effective in supporting ground in an area of the affected mine which has similar strata, opening dimensions, and ground stresses as the area where the fixtures are expected to be used. During the test process, access to the test area shall be limited to persons necessary to conduct the test.
- (c) Bearing plates shall be used with fixtures when necessary for effective ground support.
- (d) The diameter of finishing bits shall be within a tolerance of plus or minus 0.030 inch of the manufacturer's recommended hole diameter for the anchor used. When separate finishing bits are used, they shall be distinguishable from other bits.
- (e) Damaged or deteriorated cartridges of grouting material shall not be used.
- (f) When rock bolts tensioned by torquing are used as a means of ground support,
- (1) Selected tension level shall be--
    - (i) At least 50 percent of either the yield point of the bolt or anchorage capacity of the rock, whichever is less; and
    - (ii) No greater than the yield point of the bolt or anchorage capacity of the rock.
  - (2) The torque of the first bolt, every tenth bolt, and the last bolt installed in each work area during the shift shall be accurately determined immediately after installation. If the torque of any fixture tested does not fall within the installation torque range, corrective action shall be taken.
- (g) When grouted fixtures can be tested by applying torque, the first fixture installed in each work place shall be tested to withstand 150 foot-pounds of torque. Should it rotate in the hole, a second fixture shall be tested in the same manner. If the second fixture also turns, corrective action shall be taken.
- (h) When other tensioned and nontensioned fixtures are used, test methods shall be established and used to verify their effectiveness.
- (i) The mine operator shall certify that tests were conducted and make the certification available to an authorized representative of the Secretary.

#### **Rock fixtures**

(1) Plans and specifications of the rock bolting installation, and the manufacturer's certification of the rock bolts compliance to ASTM F432-95, shall be available to the Division at the job site.

**Do not place bolts on a predetermined pattern.**

(2) Fixtures and accessories not addressed in ASTM F432-95 "Standard Specification for Roof and Rock Bolts and Accessories," may be used for ground support provided they:

(A) Have been successful in supporting the ground in an area with similar strata, opening dimensions and ground stresses in any mine; or

(B) Have been tested and shown to be effective in supporting the ground in an area of the affected mine which has similar strata, opening dimensions and ground stresses as the area where the fixtures are expected to be used. During the test process, access to the test area shall be limited to persons necessary to conduct the test.

(3) Bearing plates shall be used with fixtures when necessary for effective ground support.

(4) The diameter of finishing bits shall be within a tolerance of plus or minus 0.030 inch of the manufacturer's recommended hole diameter for the anchor used. When separate finishing bits are used, they shall be distinguishable from other bits.

(5) Damaged or deteriorated cartridges of grouting material shall not be used.

(6) When rock bolts tensioned by torquing are used as a means of ground support:

(A) Selected tension level shall be:

1. At least 50 percent of either the yield point of the bolt or anchorage capacity of the rock, whichever is less; and

2. No greater than the yield point of the bolt or anchorage capacity of the rock.

(B) The torque of the first bolt, every tenth bolt, and the last bolt installed in each work area during the shift shall be accurately determined immediately after installation. If the torque of any fixture tested does not fall within the installation range, corrective action shall be taken.

(7) When grouted fixtures can be tested by applying torque, the first fixture installed in each work place shall be tested to withstand 150 foot-pounds of torque. Should it rotate in the hole, a second fixture shall be tested in the same manner. If the second fixture also turns, corrective action shall be taken.

(8) When other tensioned and non-tensioned fixtures are used, test methods shall be established to verify their effectiveness.

(9) The mine operator shall certify that tests required by this section were conducted and make the certification available to an authorized representative of the Division.

**56986. ~~Overburden.~~ Ground support- Underground Only.**

(a) Sufficient mapping or exploratory drilling shall be performed to locate dangerous underground excavations. Ground Support Use. When ground support is necessary, the support system shall be designed, installed and maintained to control the ground in places where persons work or travel in performing their assigned tasks. Damaged, loosened, or dislodged timber used for ground support which creates a hazard to persons shall be repaired or replaced prior to any work, or travel in the affected area. **MSHA 57.3360**

**30 CFR § 57.3360**

**Ground support use.**

**SCALING AND SUPPORT--UNDERGROUND ONLY**

Ground support shall be used where ground conditions, or mining experience in similar ground conditions in the mine, indicate that it is necessary. When ground support is necessary, the support system shall be designed, installed, and maintained to control

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the ground in places where persons work or travel in performing their assigned tasks. Damaged, loosened, or dislodged timber use for ground support which creates a hazard to persons shall be repaired or replaced prior to any work or travel in the affected area.

~~(b) Dangerous underground excavations shall be backfilled or otherwise controlled to prevent workers or mobile equipment from falling into such excavations. All miners shall be supplied at all times with the timbers or other adequate ground support materials which are necessary to keep their working places supported in a safe condition. (c) If for any cause reason such necessary timbers such materials are not available, work at that place shall cease until timbers the necessary materials are supplied.~~ **MSO**

(c) Loose, unconsolidated material shall be stripped for a safe distance, but in no case less than 10 feet from the top of pit or quarry walls, and the loose, unconsolidated material shall be sloped to the angle of repose. **It is recommended that wood preservatives be used.** ~~If preservatives are used to increase the useful life of mine timbers. Such preservatives should shall be of a type which will not irritate the skin create a harmful exposure to employees or increase the flammability of the timbers.~~ **MSO Possible Respiratory hazard**

**§6987. Floors of Pits and Quarries Precautions – Surface and Underground Only Secondary Breakage - Surface and Underground**

(a) Sufficient mapping or exploratory drilling shall be performed to locate dangerous underground excavations. Prior to secondary breakage operations, the material, to be broken, other than hanging material, shall be positioned or blocked to prevent movement which would endanger persons in the work area. Secondary breakage shall be performed from a location which does not expose persons to danger. **MSHA 56 & 57.3400**

**30 CFR § 56.3400**

**Secondary breakage.**

**PRECAUTIONS**

Prior to secondary breakage operations, material to be broken, other than hanging material, shall be positioned or blocked to prevent movement which would endanger persons in the work area. Secondary breakage shall be performed from a location which would not expose persons to danger.

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~~(b) Dangerous underground excavations shall be backfilled or otherwise controlled to prevent workers or mobile equipment from falling into such excavations.~~

**§6988. (3-8). Face Inspection and Control. Precautions- Surface Only**

(a) A daily inspection shall be made of faces and banks where men are exposed to falling or rolling materials. The inspection shall be made by a competent person who shall dislodge or make safe any material dangerous to employees, or shall cause such material to be dislodged or made safe.

Persons shall not work or travel between machinery or equipment and the highwall or bank if they are within the danger area from falls or slides or where the machinery or equipment may hinder escape from falls or slides of the highwall or bank. When feasible, operators shall move equipment or machinery a safe distance away from the highwall or bank before dismounting.

The danger area shall extend a horizontal distance from the highwall or bank equal to the vertical height of the highwall. **MSHA 57.3430**

**30 CFR § 57.3430**

**Activity between machinery or equipment and the highwall or bank.**

Precautions--Surface Only

Persons shall not work or travel between machinery or equipment and the highwall or bank where the machinery or equipment may hinder escape from falls or slides of the highwall or bank. Travel is permitted when necessary for persons to dismount.

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**56/57.3430 Activity Between Machinery or Equipment and the Highwall or Bank**

This standard is applicable to surface mines and surface areas of underground mines. It addresses the hazards which exist when persons work or travel near a highwall or bank and their escape from a fall or slide of material could be hindered by the machinery and equipment in their escape path.

If escape could be hindered, no work or travel is permitted. If, however, the machinery or equipment poses no hindrance, the standard is not applicable. Consideration must be given to: the height of the wall or bank; the distance between the equipment and wall or bank; the size and positioning of the equipment; the location of the worker in relation to the escape route; and any surrounding noise levels or distractions which could prevent the detection of falling ground.

Where machinery or equipment becomes disabled near a highwall or bank, the equipment operator can often safely exit on the side away from the hazard. If this is not possible, exit on the wall side is permitted. Remounting on the wall side may also become necessary in order to reposition or move the equipment to a safe location for repairs. When the equipment is not removed for repair, it must be repositioned at the site so that workers will not be exposed to fall of ground hazards from which their escape is hindered.

(b) (3-9) No person shall be permitted to work near a face made unsafe by primary blasting, rains, freezing or thawing weather, or earthquakes, until the face has been inspected and made safe.

**Floors of Pits and Quarries.**

(1) Where underground workings or excavations, or dangerous subsurface conditions could be encountered during surface pit or quarry excavation or blasting, the employer shall use appropriate methods, such as records searches, on-site inspections and potholing, exploratory drilling, underground mapping, magnetometer surveys, and/or ground penetrating radar to detect these conditions prior to excavation or blasting. Blasthole drillers shall be trained to immediately report any voids encountered.

(2) When underground workings or excavations, or dangerous subsurface conditions are detected, the employer shall take positive safety measures to eliminate or control the hazards. Dangerous underground excavations shall be backfilled or otherwise controlled to prevent workers or mobile equipment from falling into such excavations.

**(c) Faces of Pits and Quarries**

(1) No person shall be permitted to work near a face made unsafe by primary blasting, excavation, rains, freezing or thawing weather, or earthquakes, until the face has been inspected and made safe. **MSO MSHA 56.3401**

**30 CFR § 56.3401**

**Examination of ground conditions.**

Persons experienced in examining and testing for loose ground shall be designated by the mine operator. Appropriate supervisors or other designated persons shall examine and, where applicable, test ground conditions in areas where work is to be performed prior to work commencing, after blasting, and as ground conditions warrant during the work shift. Highwalls and banks adjoining travelways shall be examined weekly or more often if changing ground conditions warrant.

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(2) At least once a week, or ~~often~~ more frequently if necessary, a competent person shall inspect the top of the face or bank for cracks that may indicate the imminence of slides or movement of the face. **MSO**

(3) Overhanging banks in pits are forbidden, except in: **MSO**

(A) Pits where material is moved away from the face by mechanical equipment having controls located at a safe distance so that no employee is required to approach the face in the course of normal operations.

(B) Hydraulic pits where the bank is undercut with a stream of water and the monitor is located at a safe distance from the bank.

(4) Where necessary, a watchman shall be employed at the face, to give warning when loose rock or other materials are about to fall. The watchman shall be provided with a whistle, siren, or other device that will give adequate warning to employees in the pit. The watchman shall have no other work to distract ~~his~~ their attention from ~~his~~ their duties as a watchman. **MSO**

(5) Work shall not be permitted on or near any bank or face at night unless the bank or face is illuminated to make any movement of rock or other material readily observable. **MSO**

(6) Provision shall be made to keep employees away from dangerous areas that are not working places. Signs shall be posted warning employees to keep away, or such dangerous areas shall be ~~barricaded~~ marked by barriers or otherwise guarded. **MSO**

(7) No work shall be permitted above or below ~~men~~ employees at the face if such work endangers their safety.

(8) Employees shall approach from above loose rock and areas to be scaled and shall scale from a safe location. **MSO**

(9) Safe means for scaling pit banks shall be provided. Hazardous banks shall be scaled before other work is performed in the hazardous bank area. **MSO**

(10) Workers at the face shall be protected as follows: **MSO**

(A) On top of the bank, by ~~fencing~~ marking with barriers, or providing with standard guard rails or equivalent berms and signage ~~ropes~~, by using railed platforms, or by using approved personal fall arrest, personal fall restraint and positioning systems in accordance with Section 1670 of the Construction Safety Orders. ~~by using safety belts and life lines.~~ This does not apply where the bank is less than ~~20~~ 7-1/2 feet high, or the slope below is less than 50 degrees from the horizontal ~~but what if the bank is 50 feet high?~~, or where no work is performed ~~within 10 feet of the edge.~~

(B) On the face, by removing loose rock from over the working place, ~~and by the use of safety belts and life lines, portable staging, boatswain chair, or skips especially designed for use at pit faces.~~ When the removal of loose rock requires the use of ropes to access the working face area, the employer shall perform the work in accordance with Section 3270.1, Use of Rope Access Equipment, of the General Industry Safety Orders. If a boatswain chair is used, the employee shall be attached thereto with a safety belt and life line. When necessary for safety, two or more persons shall be employed in cooperation with each other in drilling, blasting or removing loose rock.

1. A wire rope or manila rope with a steel core shall be used when suspending workers on the face during scaling operations. **MSO This is current requirement, but may not be compatible with 3270.1 ????? Rope must be approved??? TB**

**Subchapter 7. General Industry Safety Orders Group 1. General Physical Conditions and Structures Article 4. Access, Work Space, and Work Areas**  
**§3270.1. Use of Rope Access Equipment.**

**§3270.1. Use of Rope Access Equipment.**

(a) Scope and Application. This section establishes safety requirements for rope access and the use, care and maintenance of rope access equipment as defined in Section 3207. Rope supported work shall be permitted only when other means of access are not feasible or would increase the risk of injury to the employee and/or the public. The requirements of this section include, but are not limited to, the inspection of dams and spillways, access to interior or exterior structural and architectural components of buildings, highway/bridge inspection and maintenance, and access to powerplant penstocks.

Exception: (1) Window cleaning and exterior building maintenance as regulated by Articles 5 and 6 of these Orders; (2) Emergency search and rescue operations; (3) Entertainment performances and rehearsals.

(b) Approval. Rope access equipment shall be approved for its intended use as defined in Section 3206 of these Orders.

(c) Training.

(1) The employer shall establish, implement and maintain a written Code of Safe Practices for rope access work. The written Code of Safe Practices shall include, but not be limited to the following elements:

a. Methods of rope access and anchorage used by the employer.

b. Employee selection criteria.

c. Equipment selection and inspection criteria.

d. Roles and responsibilities of rope access team members.

e. Communication systems.

f. Employee training program.

g. Rescue and emergency protocol.

h. Identification of any unique site hazards that may affect the safety of employees using rope access methods.

(2) Employees shall be trained in accordance with the Code of Safe Practices, including rescue techniques. The employer shall evaluate the competence of the employee to perform rope access in accordance with the Code of Safe Practices including a hands-on demonstration by the employee of his/her rope access skills.

(3) Employees who perform rope access shall receive annual refresher training. The training shall include a reevaluation (e.g., hands-on demonstration) of the employee's ability to perform rope access in accordance with the Code of Safe Practices.

(4) Documentation of employee training shall be maintained as required by Section 3203 of these Orders.

(d) Equipment Inspection and Maintenance.

(1) The manufacturer's recommendations for use, care, inspection and maintenance of rope access equipment shall be followed.

(2) A qualified person shall inspect rope access equipment each day before and after use to determine that the equipment is safe for its intended use.

(3) Damaged or defective rope access equipment shall be immediately removed from service.

(e) Anchorage. Anchorages shall be sufficient to safety support at least twice the maximum anticipated dynamic load imposed upon them as determined by a qualified person.

(f) Personal Protective Equipment. Employees performing rope access work shall be provided personal protective equipment in accordance with Article 10 of these Orders.

(g) There shall be at least two trained employees present when rope access equipment and techniques are used.

(h) Trainer Qualifications. Employees who use rope access equipment and/or perform rope access shall be trained by persons with the qualifications and experience necessary

to effectively instruct the employee in the proper fundamentals of rope access, equipment, and techniques as described in subsection (c) of this section.

(i) The employer shall provide for the prompt rescue of employees in case of equipment malfunction or a fall, or shall assure that employees are able to rescue themselves.

(j) A safety, secondary, belay, or backup line, or other appropriate fall arrest device shall be used when the main line is the primary means of support, unless the employer can demonstrate that the second line or other fall arrest device would create a greater hazard or would otherwise be infeasible.

(l) When a safety line is used in conjunction with the main line, each line shall be provided with a separate anchor, and shall be separately fixed to the employee's harness. This shall not prohibit both lines from being attached to a single harness attachment point.

(k) Precautions (e.g., barricades, warning lines) shall be taken to control vehicular traffic and/or prevent unauthorized persons from walking or working beneath employees performing rope access operations.

(l) The employer shall conduct a pre-rope access briefing to discuss the objective(s) of the rope access work to be performed, any unusual site-specific hazards or environmental conditions that could affect the safety of the employee, and emergency procedures to be followed (e.g., employee rescue).

(C) At the foot of the bank by removing loose rock from above the working place, and maintaining a ready way of exit to a place of safety. **MSO SURFACE**

**6989. Precautions – Underground Only.**

(a) Ribs. Persons shall not work between machinery or equipment and ribs unless the area has been inspected, tested, and made safe.

(b) Rock Bursts:

(1) Operators of mines which have experienced a rock burst shall:

(A) Within twenty-four hours report to the nearest Division office each rock burst which:

1. Causes persons to be withdrawn; or

2. Impairs ventilation; or

3. Impedes passages passageways; or

4. Disrupts mining activity for more than one hour.

(B) Develop and implement a rock burst control plan within 90 days after a rock burst has been experienced.

(2) The plan shall include:

(A) Mining and operating procedures designed to reduce the occurrence of rock bursts; and

(B) Monitoring procedures where detection methods are used; and

(C) Other measures to minimize exposure of persons to areas which are prone to rock bursts.

(3) The plan shall be updated as conditions warrant.

(4) The plan shall be available to the Division and to miners or their representatives.

**NEW**

#### **§6990. Timbering--General.**

#### **UNDERGROUND**

(a) Every working place in the mine shall when necessary be kept securely timbered or otherwise supported to prevent injury to employees from falling material.

(b) All miners shall be supplied at all times with the timbers or other adequate materials which are necessary to keep their working places in a safe condition.

(c) If for any cause necessary ~~timbers~~ materials are not available, work at that place shall cease until ~~timbers~~ materials are supplied.

(d) It is recommended that wood preservatives be used to increase the useful life of mine timbers. Such preservatives should be of a type which will not irritate the skin or increase the flammability of the timbers.

~~Proposed for deletion by Ad Com. Or include in 6986???? TB~~

#### **6991. Bearing Sets.**

~~(a) (a)~~ Bearing sets shall be installed in all vertical shafts and in all inclined shafts where it is necessary to support the shaft timbers. ~~Where the shaft cannot be supported by conventional timbering methods???~~ **JRL**

~~(b) (b)~~ Bearing sets shall be installed as close to the shaft collar as is practical, and along the shaft at necessary intervals.

~~Note: It is recommended that~~ The distance between bearing sets shall be not more than 100 feet.

#### **Article 13. Illumination**

**§6992. (17-1). Surface Illumination.**

**Article 13 Replaced Below**

~~(a) — Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and work areas. Also see 6988 (f).~~

**56993. Illumination.**

**UNDERGROUND**

~~(a) Stationary lights shall be provided during working hours of all shaft stations during such time that they are in actual use.~~

~~(b) All places where hoists, pumps, or other machinery is operating in the proximity of persons in the mine shall be so lighted that the moving parts of such machinery can be readily distinguished.~~

~~(c) Where practical, electric lights shall be used for all stationary lighting in the mine. Electric lights shall be kept at a safe distance from flammable materials.~~

~~(d) No open flame light shall be left burning unattended on or near flammable materials.~~

~~(e) No gasoline, oil, or liquefied petroleum gases shall be taken underground for illuminating purposes.~~

~~This does not prohibit the use of permissible flame safety lamps in the mine.~~

~~(f) (17-10) Miner's individual electric cap lamps shall be carried for illumination by all persons underground.~~

**Article 13. Illumination**

**6992. Illumination Surface and Underground.**

(a) Sufficient illumination for safe working conditions shall be provided. Illumination by a primary lighting system or natural light shall be continuous when employees are present, and minimum illumination levels shall be as follows:

(1) General Areas with low activity – 3-foot-candles.

(2) Active outdoor work areas, indoor walking areas and warehouses, – 5-foot-candles.

(3) General mining plants and shops, batch plants, screening plants, equipment, electrical and machinery rooms, active storerooms, indoor change rooms, bathrooms and showers, - 10-foot-candles **TSOs**

(b) When adequate natural illumination or the primary lighting system cannot be made available to secure the safety of employees, suitable portable lights shall be provided. **3317**

(c) Skylights, windows, lamps, and other light accessories which provide the required illumination shall be kept sufficiently clean, adjusted, and repaired so as not to impair the illumination required for the safety of employees. **GISO 3317**

**3317. Illumination.**

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(a) Working areas, stairways, aisles, passageways, work benches and machines shall be provided with either natural or artificial illumination which is adequate and suitable to provide a reasonably safe place of employment. Minimum illumination levels for safety alone are listed for various typical areas in Table IL-1. (Title 24, Part 2, Section 512, Table 5-C.)

Needs to be in a Table

**TABLE IL-1  
MINIMUM LEVELS OF ILLUMINATION FOR SAFETY**

Hazards Requiring Visual Detection	Slight		High	
	Low	High	Low	High
Normal Activity Level				
Areas	Storage Yards Offices Locker Rooms	Loading Areas Warehouses Corridors Washrooms Spray Booths Inspection	Elevators Stairways Assembly Areas Layout Areas	Engine Rooms Processing Area Machine Shop Sheet Metal Works Woodworking Shops
Footcandles	0.5	1.0	2.0	5.0

NOTE: (1) To assure these levels at all times, higher initial levels need to be provided to compensate for their depreciation due to the decrease of light output of lamps with age and to the accumulation of dirt on lamps and room surfaces.(2) For areas or operations not covered above, and for recommended illumination levels for efficient visual performance in varied tasks and areas, refer to , ANSI/IES RP-7-1991, Practice for Industrial Lighting and ANSI/IES RP-1-1993, Practice for Office Lighting.(Title 24, Part 2, Section 512, Table 5-C)

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(b) When adequate natural illumination or permanent artificial illumination cannot be made available to secure the safety of employees, suitable portable lights shall be provided.

(c) Skylights, windows, lamps, and other light accessories which provide the required illumination shall be kept sufficiently clean, adjusted, and repaired so as not to impair the illumination required for the safety of employees.

**6993. Illumination Underground.**

(a) All underground work areas shall be illuminated by a primary lighting system or natural light whenever employees are present. The light shall be at least 5-foot-candles intensity and 10-foot-candles intensity at the active working face(s). **TSOs**

(b) Fixed lighting providing at least 10-foot-candles intensity shall be provided at all shaft stations, hoist stations, maintenance shops when they are in use.

(c) All places in the mine where hoists, pumps, or other machinery is operating near persons shall be illuminated to at least 10-foot-candles intensity.

(d) Only electric lights shall be used for all lighting in the mine. Electric lights shall be kept at a safe distance from flammable materials. Electric light fixtures shall meet the requirements of the Electrical Safety Orders and be approved for the location.

(e) No open-flame light shall be permitted underground, including permissible flame safety lamps.

~~(f) No gasoline, flammable liquid, oil, or liquefied petroleum gases shall be taken underground for illuminating purposes.~~

(f) Approved individual electric cap lamps shall be worn and/or carried for illumination by all persons underground.

(g) ~~Reflector~~ minimum Six square inches of reflecting tape shall be placed ~~along the outside on~~ both sides and back of all hard hats to improve the underground recognition of workers.

**Should reflectorizing requirement be in PPE section?**

**F. Required Mine Inspection or Investigation Supplies and Equipment**

Inspectors should be prepared to inspect mines and mills at all times during normal work hours. In that regard, they should always have the equipment and supplies necessary to conduct inspections or accident investigations. Depending on the types of mines or mills in their field office's area of responsibility, items such as, but not limited to, safety harnesses, underground cap lamps, life vests, and self rescuers may not be immediately available because they may be shared among several inspectors.

Excluding the sometimes shared equipment noted above, inspectors should have the following inspection equipment or supplies:

- hard hat, safety-toed boots, safety glasses with side shields, and gloves;
- specialized equipment or clothing, such as disposable coveralls, hoods, boots, etc., (for field offices with mines or mills having harmful chemicals or similar contaminants), foul weather gear (for offices with extreme mining conditions), or other items deemed appropriate by the district office;
- hearing protection;
- reflective coveralls or vests with appropriate reflective tape on hard hat (for field offices with underground mines);

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**30 CFR § 75.1719-4**

**Mining machines, cap lamps; requirements.**

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(a) Paint used on exterior surfaces of mining machines shall have a minimum reflectance of 30 percent, except cab interiors and other surfaces which might adversely affect visibility.

(b) When stationary light fixtures are used, red reflectors mounted in protective frames or reflecting tape shall be installed on each end of mining machines, except that continuous mining machines, loaders, and cutters need only have such reflectors or tape on the outby end. Reflectors or reflecting tape shall have an area of not less than 10 square inches.

(c) Each person who goes underground shall be required to wear an approved personal cap lamp or an equivalent portable light.

(d) Each person who goes underground shall be required to wear a hard hat or hard cap which shall have a minimum of **6 square inches of reflecting tape** or equivalent paint or material on each side and back.

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**Red Clip-On Suspenders (Example Only)**

2" Heavy-duty red

- Heavy-duty alligator clips
- Full Reflective

Part # 21015

Description Red Clip Suspender with Reflective Material

(h) Each person underground shall have a suitable secondary portable light which is immediately available for emergency use unless natural light or emergency lighting is adequate for escape. TSOs

**Article 15.— Mining Equipment and Practices**

~~6995. Mining Equipment and Practices.~~

**Article 15. Machinery and Equipment - Surface and Underground.**

**§6995. Machinery and Equipment .**

(a) Handheld power tools, other than rock drills, shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with equivalent safety devices.

§ 57.14116 Hand-held power tools.

(a) Power drills, disc sanders, grinders and circular and chain saws, when used in the hand-held mode shall be operated with controls which require constant hand or finger pressure.

(b) Circular saws and chain saws shall not be equipped with devices which lock-on the operating controls

(1) Manufacturer installed or required safety devices on hand held power tools shall not be removed, blocked, overridden, or defeated.

(b) Equipment shall be inspected before each use. Defects on any equipment, machinery, and tools that affect safety shall be corrected before use. Unsafe equipment or machinery shall be removed from service immediately and tagged or isolated so it will not be used until defects are corrected. MSO ~ MSHA 56.14100

**30 CFR § 56.14100**

**Safety defects; examination, correction and records.**

**SAFETY DEVICES AND MAINTENANCE REQUIREMENTS**

(a) Self-propelled mobile equipment to be used during a shift shall be inspected by the equipment operator before being placed in operation on that shift.

(b) Defects on any equipment, machinery, and tools that affect safety shall be corrected in a timely manner to prevent the creation of a hazard to persons.

(c) When defects make continued operation hazardous to persons, the defective items including self-propelled mobile equipment shall be taken out of service and placed in a designated area posted for that purpose, or a tag or other effective method of marking the defective items shall be used to prohibit further use until the defects are corrected.

(d) Defects on self-propelled mobile equipment affecting safety, which are not corrected immediately, shall be reported to and recorded by the mine operator. The records shall be kept at the mine or nearest mine office from the date the defects are recorded, until the defects are corrected. Such records shall be made available for inspection by an authorized representative of the Secretary.

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(c) When a signaler is used during slushing operations, they shall be positioned in a safe place.

(d) Machinery and equipment shall be designed, used, operated, inspected, maintained, and installed in accordance with Section 3328 of the General Industry Safety Orders.

**§8459. Mechanical Hazards. (from TSO)**

(a) An audible and visual warning shall be given before starting excavating or conveyor machinery.

(b) A thorough examination of the heading shall be made before starting excavation equipment to insure that all employees are in a safe location.

(c) Excavating machines shall be equipped with a deadman control.

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(d) Power transmission equipment, hazardous moving parts, and conveyors shall be guarded as required by Title 8, Group 6 of the General Industry Safety Orders.

(e) Cleaning, repairing, and servicing of machinery, equipment and prime movers shall be in accordance with Section 3314 of the General Industry Safety Orders.

(f) Emergency stop switches within reach of the operator shall be provided for emergency shutdown of all underground conveyors. Unguarded conveyors with access shall be equipped with emergency stop devices or cords along their full length.

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(g) An automatic device to prevent inclined conveyors from rolling backward shall be provided.

(h) Guarding shall be provided where workers are exposed to shear hazards from erector arms and other moving equipment.

(i) Erector arms shall be operated with a power up and power down system and shall have provisions for locking devices or safety pins.

(j) Tunnel support systems shall have adequate strength to resist the thrust of hydraulic jacks.

(k) Safety cables shall be provided on jacking shoes located above the spring line.

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(l) Where wire rope is used to tow tunnel machines, trailing gear and other similar equipment, all components used shall provide a safety factor of at least 2.5 to 1 and be equipped with means to prevent whipping in case the wire rope or connection fails.

(m) Employees shall not be permitted between the tunneling machine and any associated trailing equipment during the towing cycle.

(n) An audible alarm shall be provided that distinctly warns employees of the movement of tunneling machines and trailing gear such as during the regripping and towing cycles.

(o) Employees shall not be permitted on the deck area of a ~~training~~ trailing gear system where they may be exposed to being injured by railed equipment unless physical safeguards are provided for their protection

(e) Cleaning, repairing, servicing, setting-up, and adjusting of machinery, equipment, and prime movers, including lockout/tagout/~~blockout~~ shall be in accordance with Section 3314 of the General Industry Safety Orders.

**Subchapter 7. General Industry Safety Orders**  
**Group 2. Safe Practices and Personal Protection**  
**Article 7. Miscellaneous Safe Practices**

§3314. The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, Including Lockout/Tagout.

(a) Application.

(1) This Section applies to the cleaning, repairing, servicing, setting-up and adjusting of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees.

(2) For the purposes of this Section, cleaning, repairing, servicing and adjusting activities shall include unjamming prime movers, machinery and equipment.

(3) Requirements for working on energized electrical systems are prescribed in Sections 2320.9 or 2940.

(b) Definitions:

Affected employee. For the purpose of this section, an employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout or tagout, or whose job requires the employee to work in an area in which such activities are being performed under lockout or tagout.

Authorized employee or person. For the purposes of this section, a qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties including performing cleaning, repairing, servicing, setting-up and adjusting operations covered under this section.

Locked out. The use of devices, positive methods and procedures, which will result in the effective isolation or securing of prime movers, machinery and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal or other hazardous energy sources.

Normal Production Operations. The utilization of a machine or equipment to perform its intended production function.

Prime Mover. The source of mechanical power for a machine.

(c) Cleaning, Servicing and Adjusting Operations.

Machinery or equipment capable of movement shall be stopped and the power source de-energized or disengaged, and, if necessary, the moveable parts shall be mechanically blocked or locked out to prevent inadvertent movement, or release of stored energy during cleaning, servicing and adjusting operations. Accident prevention signs or tags or both shall be placed on the controls of the power source of the machinery or equipment.

(1) If the machinery or equipment must be capable of movement during this period in order to perform the specific task, the employer shall minimize the hazard by providing and requiring the use of extension tools (eg., extended swabs, brushes, scrapers) or other methods or means to

protect employees from injury due to such movement. Employees shall be made familiar with the safe use and maintenance of such tools, methods or means, by thorough training.

(d) Repair Work and Setting-Up Operations.

Prime movers, equipment, or power-driven machines equipped with lockable controls or readily adaptable to lockable controls shall be locked out or positively sealed in the "off" position during repair work and setting-up operations. Machines, equipment, or prime movers not equipped with lockable controls or readily adaptable to lockable controls shall be considered in compliance with Section 3314 when positive means are taken, such as de-energizing or disconnecting the equipment from its source of power, or other action which will effectively prevent the equipment, prime mover or machine from inadvertent movement or release of stored energy. In all cases, accident prevention signs or tags or both shall be placed on the controls of the equipment, machines and prime movers during repair work and setting-up operations.

Exceptions to subsections (c) and (d):

1. Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations are not covered by the requirements of Section 3314 if they are routine, repetitive, and integral to the use of the equipment or machinery for production, provided that the work is performed using alternative measures which provide effective protection.

2. Work on cord and plug-connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the work.

3. Where an employer has a uniform system with unique and personally identifiable locks designed for lockout, that are placed on the source of energy, accident prevention signs or tags are not required.

(e) Materials and Hardware. The employer shall provide accident prevention signs, tags, padlocks, seals or other similarly effective means which may be required for cleaning, servicing, adjusting, repair work or setting-up operations. Signs, tags, padlocks, and seals shall have means by which they can be readily secured to the controls. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds.

(f) Repetitive Process Machines. On repetitive process machines, such as numerical control machines, which require power or current continuance to maintain indexing and where repair, adjustment, testing, or setting-up operations cannot be accomplished with the prime mover or hazardous energy source disconnected, such operations may be performed under the following conditions:

(1) The operating station where the machine may be activated must at all times be under the control of a qualified operator or craftsman.

(2) All participants must be in clear view of the operator or in positive communication with each other.

(3) All participants must be beyond the reach of machine elements which may move rapidly and present a hazard to them.

(4) Where machine configuration or size requires that the operator leave his control station to install tools, and where machine elements exist which may move rapidly if activated, such elements must be separately locked out by positive means.

(5) During repair procedures where mechanical components are being adjusted or replaced, the machine shall be de-energized or disconnected from its power source.

Note: "Participant" shall mean any other person(s) engaged in the repair, adjustment, testing, or setting up operation in addition to the qualified operator or craftsman having control of the machine operating station.

(g) Hazardous Energy Control Procedures. A hazardous energy control procedure shall be developed and utilized by the employer when employees are engaged in the cleaning, repairing, servicing, setting-up or adjusting of prime movers, machinery and equipment.

(1) The procedure shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance, including but not limited to, the following:

(A) A statement of the intended use of the procedure;

(B) The procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;

(C) The procedural steps for the placement, removal and transfer of lockout devices and tagout devices and responsibilities; and,

(D) The requirements for testing a machine or equipment, to determine and verify the effectiveness of lockout devices, tagout devices and other hazardous energy control devices.

(2) The employer's hazardous energy control procedures shall be documented in writing.

(A) The employer's hazardous energy control procedure shall include separate procedural steps for the safe lockout/tagout of each machine or piece of equipment affected by the hazardous energy control procedure.

Exception to subsection (g)(2)(A): The procedural steps for the safe lockout/tagout of prime movers, machinery or equipment may be used for a group or type of machinery or equipment, when either of the following two conditions exist:

(1) Condition 1:

(A) The operational controls named in the procedural steps are configured in a similar manner, and

(B) The locations of disconnect points (energy isolating devices) are identified, and

(C) The sequence of steps to safely lockout or tagout the machinery or equipment are similar.

(2) Condition 2: The machinery or equipment has a single energy supply that is readily identified and isolated and has no stored or residual hazardous energy.

(h) Periodic inspection.

The employer shall conduct a periodic inspection of the energy control procedure(s) at least annually to evaluate their continued effectiveness and determine necessity for updating the written procedure(s).

(1) The periodic inspection shall be performed by an authorized employee or person other than the one(s) utilizing the hazardous energy control procedures being inspected.

(2) Where lockout and/or tagout is used for hazardous energy control, the periodic inspection shall include a review between the inspector and authorized employees of their responsibilities under the hazardous energy control procedure being inspected.

(3) The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the hazardous energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

(i) Whenever outside servicing personnel are to be engaged in activities covered by this section, the on-site employer's lockout or tagout procedures shall be followed.

(j) Training.

(1) Authorized employees shall be trained on hazardous energy control procedures and on the hazards related to performing activities required for cleaning, repairing, servicing, setting-up and adjusting prime movers, machinery and equipment.

(2) Each affected employee shall be instructed in the purpose and use of the energy control procedure.

(3) All other employees whose work operations may be in an area where energy control procedures may be utilized, shall be instructed about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

(4) Such training shall be documented as required by Section 3203.

(1) Accident prevention and lockout/tagout signs shall comply with Section 3340 of the General Industry Safety Orders.

(f) Employees shall not work on or from a piece of mobile equipment in a raised position until it has been blocked or secured to prevent lowering, rolling, or falling. The use of elevating work platforms or aerial devices shall be in accordance with Article 24 Elevating Work Platforms

and Aerial Devices of the General Industry Safety Orders. The use of haulage vehicles not designed to elevate employees shall be prohibited.

Note: Guardrail and fall protection requirements are found in Section 6981 of these orders.

**Is this already covered in 3314???** TB

(g) Elevated or raised equipment shall be lowered or secured from falling or accidental lowering during repair, servicing, or adjusting.

~~(h) Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.~~

(h) Chains, ropes, and drive belts shall be guided mechanically onto moving pulleys, sprockets, or drums except where equipment is designed specifically for hand feeding.

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**30 CFR § 57.14212**

**Chains, ropes, and drive belts.**

Chains, ropes, and drive belts shall be guided mechanically onto moving pulleys, sprockets, or drums except where equipment is designed specifically for hand feeding.

**Existing** Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow-moving equipment especially designed for hand feeding. **Note or (i)?**

(j) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(k) Belt dressing shall not be applied manually while belts are in motion unless a pressurized-type applicator is used that allows the dressing to be applied from outside the guards. **30 CFR § 56.14203**

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**Application of belt dressing.**

~~Belt dressings shall not be applied manually while belts are in motion unless a pressurized-type applicator is used that allows the dressing to be applied from outside the guards.~~

(l) Machinery shall not be manually lubricated while in motion if this exposes employees to injury, unless equipped with remotely located grease fittings or cups which eliminate the hazard.

(m) Welding operations shall be shielded to protect nearby employees from arc flash. All welding and cutting operations shall be in accordance with Group 10 Gas Systems for Welding and Cutting and Group 11 Electric Welding of the General Industry Safety Orders. Additionally, welding and cutting operations shall be ventilated and employees protected in accordance with Section 5150 Ventilation and Personal Protective Equipment Requirements for Welding, Brazing, and Cutting of the General Industry Safety Orders. **30CFR57.14213 Or Article 4 & 32 of Const Safety Orders???**

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**30 CFR § 57.14213**

**Ventilation and shielding for welding.**

- (a) Welding operations shall be shielded when performed at locations where arc flash could be hazardous to persons.
- (b) All welding operations shall be well-ventilated.

(n) Power transmission equipment, prime movers, machines and machine parts, conveyors, points-of-operation, and other hazardous parts of machinery shall be guarded as required by Group 6 and Group 8 of the General Industry Safety Orders.

~~(1) In addition to the requirements of Sections 4000 and 4001 of the General Industry Safety Orders for machine power controls, a positive power shutoff shall be readily accessible within 10 feet of each machine underground.~~

~~(12) Power transmission equipment and machinery guards shall be constructed and maintained to withstand the vibration, shock, and wear they are exposed to, and shall not create a hazard by their use. **MSHA 56.14112**~~

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**30 CFR § 56.14112**

**Construction and maintenance of guards.**

- (a) Guards shall be constructed and maintained to--
  - (1) Withstand the vibration, shock, and wear to which they will be subjected during normal operation; and
  - (2) Not create a hazard by their use.
- (b) Guards shall be securely in place while machinery is being operated, except when testing or making adjustments which cannot be performed without removal of the guard.

(o) All belt and chain drives shall be guarded to contain the whipping action of a broken belt or chain if employees are exposed to the hazard. ~~Already covered by 3328 below? TB~~

**§3328. Machinery and Equipment. GISO (For Reference??)**

(a) Machinery and equipment shall be of adequate design and shall not be used or operated under conditions of speeds, stresses, or loads which endanger employees.

(b) Machinery and equipment in service shall be inspected and maintained as recommended by the manufacturer where such recommendations are available.

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(c) Machinery and equipment with defective parts which create a hazard shall not be used.

(d) Machinery and equipment designed for a fixed location shall be restrained so as to prevent walking or moving from its location.

(e) Machinery and equipment components shall be designed and secured or covered (or both) to minimize hazards caused by breakage, release of mechanical energy (e.g.,

broken springs), or loosening and/or falling unless the employer can demonstrate that to do so would be inconsistent with the manufacturer's recommendations or would otherwise impair employee safety.

(f) Any modifications shall be in accordance with (a) and with good engineering practice.

(g) Machinery and equipment in service shall be maintained in a safe operating condition.

(h) Only qualified persons shall be permitted to maintain or repair machinery and equipment.

(p) Grinding machines and grinding wheels shall be operated in conformance with Article 21 Use, Care, and Protection of Abrasive Wheels of the General Industry Safety Orders.

**(Continued from above)**

(q) Before starting crushers or moving self-propelled mobile equipment, equipment operators shall sound a warning that is audible above the surrounding noise level or use other effective means to warn all persons who could be exposed to a hazard from the equipment.

**57.14200** ~~Too often~~ **Table**

~~old more reasonable?~~

(c) (9-5) Where other warning signals are not provided, the vehicle's warning device shall be sounded before moving the haulage vehicle.

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**30 CFR § 57.14200**

**Warnings prior to starting or moving equipment.**

**SAFETY PRACTICES AND OPERATIONAL PROCEDURES**

Before starting crushers or moving self-propelled mobile equipment, equipment operators shall sound a warning that is audible above the surrounding noise level or use other effective means to warn all persons who could be exposed to a hazard from the equipment

(r) In areas where flying or falling materials generated from the operation of screens, crushers, magnets, or conveyors create a hazard; guards, shields, ~~barricades~~, ~~barriers~~, or other positive protective measures shall be provided to protect exposed persons. **57.14110**

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**30 CFR § 57.14110**

**~~Flying or falling materials.~~**

~~In areas where flying or falling materials generated from the operation of screens, crushers, or conveyors present a hazard, guards, shields, or other devices that provide protection against such flying or falling materials shall be provided to protect persons.~~

**6996. Boilers and Pressure Vessels – Surface and Underground.**

(a) All boilers and pressure vessels shall be operated, designed, constructed, installed, inspected, and maintained in accordance with the Boiler and Fired Pressure Vessel Safety Orders and the Unfired Pressure Vessel Safety Orders. **MSHA 56.13001**

**30 CFR § 56.13001**

**General requirements for boilers and pressure vessels.**

All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

(1) All fired pressure vessels (boilers) shall be equipped with water level gauges, pressure gauges, automatic pressure relief valves, blowdown piping, and other safety devices to protect against hazards from flameouts, overpressure, fuel interruptions, and low water levels in accordance with the Fired Pressure Vessel Safety Orders. **MSHA**

**56.13030**

**30 CFR § 56.13030**

**Boilers.**

(a) Fired pressure vessels (boilers) shall be equipped with water level gauges, pressure gauges, automatic pressure-relief valves, blowdown piping, and other safety devices approved by the American Society of Mechanical Engineers to protect against hazards from overpressure, flameouts, fuel interruptions and low water level, all as required by the appropriate sections, chapters and appendices listed in paragraphs (b)(1) and (2) of this section.

(b) These gauges, devices and piping shall be designed, installed, operated, maintained, repaired, altered, inspected, and tested by inspectors holding a valid National Board Commission and in accordance with the following listed sections, chapters and appendices:

(1) The ASME Boiler and Pressure Vessel Code, 1977, Published by the American Society of Mechanical Engineers.

Section and Title

I Power Boilers.

II Material Specifications--Part A--Ferrous.

II Material Specifications--Part B--Non-ferrous.

II Material Specifications--Part C--Welding Rods, Electrodes, and Filler Metals.

IV Heating Boilers

V Nondestructive Examination

VI Recommended Rules for Care and Operation of Heating Boilers

VII Recommended Rules for Care of Power Boilers

(2) The National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979, published by the National Board of Boiler and Pressure Vessel Inspectors.

Chapter and Title

I Glossary of Terms

II Inspection of Boilers and Pressure Vessels

III Repairs and Alterations to Boiler and Pressure Vessels by Welding

IV Shop Inspection of Boilers and Pressure Vessels

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V Inservice Inspection of Pressure Vessels by Authorized Owner-User

Inspection Agencies

Appendix and Title

A Safety and Safety Relief Valves

B Non-ASME Code Boilers and Pressure Vessels

C Storage of Mild Steel Covered Arc Welding Electrodes

D-R National Board "R" (Repair) Symbol Stamp

D-VR National Board "VR" (Repair of Safety and Safety Relief Valve) Symbol Stamp

D-VR1 Certificate of Authorization for Repair Symbol Stamp for Safety and Safety Relief Valves

D-VR2 Outline of Basic Elements of Written Quality Control System for Repairers of ASME Safety and Safety Relief Valves

D-VR3 Nameplate Stamping for "VR"

E Owner-user Inspection Agencies

F Inspection Forms

(c) Records of inspections and repairs shall be kept in accordance with the requirements of the ASME Boiler and Pressure Vessel Code and the National Board Inspection Code. The records shall be made available to the Secretary or his authorized representative.

For more information: [See MSHA'S Program Policy Manual](#)

(d) Sections of the ASME Boiler and Pressure Vessel Code, 1977, listed in paragraph (b)(1) of this section, and chapters and appendices of the National Board Inspection Code, 1979, listed in paragraph (b)(2) of this section, are incorporated by reference and made a part of this standard. These publications may be obtained from the publishers, the American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, New Jersey 07007, Phone: 800-843-2763 (toll free); <http://www.asme.org>, and the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229. The publications may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration.

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Subpart M--Machinery and Equipment

(b) The required Permit(s) to Operate for boilers and pressure vessels shall be kept in accordance with Boiler and Fired Pressure Vessel Safety Orders and the Unfired Pressure Vessel Safety Orders. Required records of inspection and repair for boilers and fired pressure vessels shall also be kept and be readily available for inspection by the Division.

(c) Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

**6997. Compressed Air Systems.**

(a) The ends of every compressed air hose 3/4 inch or larger inside diameter shall be chained or otherwise secured, or a suitable automatic shut off valve or other equivalent safety device shall be installed, to prevent whipping in case of a disconnected hose. When 2 or more hoses are connected to each other, the connecting ends shall be secured together.

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**The TSOs require chains with ¾ inch hose. CSOs require chains with 1 inch hose.  
MSHA 56.13021 requires chains at ¾ inch hoses. TB**

(b) Material used to secure the hose ends shall be chain made of three-sixteenths-inch stock or of other material of equivalent strength.

(c) When an auxiliary compressed air tank is located on a jumbo or at any other place away from the rigid compressed air supply line, both ends of every length of connecting hose shall be secured.

(d) Air pipe lines 2 inches or more in diameter shall be adequately secured against unnecessary movement. Such pipe lines shall be protected against accidental impact from vehicles and falling objects at points where breakage of lines would constitute a hazard to employees.

(e) At no time shall compressed air be directed toward a person. When compressed air is used, it shall be so controlled, and suitable personal protective equipment or safeguards shall be used, to protect against the possibility of eye or body injury to the operator or other workers.

**GISO 3301**

(f) Compressed air or other compressed gases in excess of 10 pounds per square inch gauge shall not be used to blow dirt, chips, or dust from clothing while it is being worn. **GISO 3301-**

### **§3301. Use of Compressed Air or Gases. GISO**

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(a) Compressed air or other compressed gases in excess of 10 pounds per square inch gauge shall not be used to blow dirt, chips, or dust from clothing while it is being worn.

(b) Compressed air or gases shall not be used to empty containers of liquids where the pressure can exceed the safe working pressure of the container.

(c) The use of compressed air shall be so controlled, and proper personal protective equipment or safeguards utilized, as to protect against the possibility of eye or body injury to the operator or other workers.

(d) Abrasive blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

(e) Compressed gases shall not be used to elevate or otherwise transfer any substance from one container to another unless the containers are designed to withstand, with a factor of safety of at least four, the maximum possible pressure that may be applied.

(f) Pressure testing of any object shall be in accordance with Section 560(c) and (d) of the Unfired Pressure Vessel Safety Orders. Note: For further guidance in the utilization of compressed gases in cylinders see, Group 9; for portable tanks, rail tank cars, or motor vehicle cargo tanks, see Compressed Gas Association Pamphlet P-1-1965.

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(g) Compressed air or gases shall not be used to empty containers of liquids where the pressure can exceed the safe working pressure of the container. Compressed gases shall not be used to elevate or otherwise transfer any substance from one container to another unless the containers are designed to withstand, with a factor of safety of at least four, the maximum possible pressure that may be applied.

(h) The manufacturer's safe operating pressures for hoses, pipes, valves, filters, and other fittings shall not be exceeded. **No MSHA equiv.**

(i) Plastic pipe shall not be used for surface or underground compressed air line systems unless all requirements of Section 462 (Unfired Pressure Vessels) are met. **TABLE**

## **Subchapter 1. Unfired Pressure Vessel Safety Orders**

### **Article 3. Air Tanks**

#### **§462. Field Inspections and Reports.**

(a) All air tanks requiring a permit to operate shall be inspected internally and externally at least once every 3 years for portable tanks and once every 5 years for all other tanks by a qualified inspector.

This subsection shall not be applicable for air tanks which fulfill the requirements for an indefinite permit as provided in Section 461(h).

EXCEPTION: The internal inspection of tanks less than 2 years old may be waived at the discretion of the inspector, provided all other requirements of Section 462(c) are met.

(1) Ultrasonic thickness determination shall be permitted in lieu of, or in conjunction with, internal inspection for air tanks of 36" diameter or less. Thickness determinations shall be made in at least eight areas: two on each bead and two on both the top (upper) and bottom (lower) portions of the shell.

Thickness determinations indicating significant reduction in the material thickness over a general area (National Board Inspection Code Par. U-107 may be used as a guide) shall be shown on the inspection report as well as the calculations for the reduction in the allowable working pressure.

The qualified inspector's employer shall be responsible for the inspector's or ultrasonic examiner's competency in the use of the ultrasonic thickness gage, and the examiner's signed report shall be attached to the qualified inspector's inspection report.

(2) Air tanks shall be installed so that all drains, handholes, inspection plugs and manholes therein are easily accessible. Air tanks shall be supported with sufficient clearance to permit a complete external inspection and to avoid corrosion of external surfaces. Under no circumstances shall an air tank be buried underground or located in an inaccessible place.

(b) The owner or user of any air tank shall prepare it for inspection and make provisions to permit the required inspections to be made safely when requested to do so by the Division or a qualified inspector.

(1) Preparation for an internal inspection shall include the removal of such inspection plugs or plates as are deemed necessary by the qualified inspector.

(2) The qualified inspector shall decide whether a hydrostatic pressure test is necessary and if it is ordered, the owner or user shall make the necessary preparations for such tests by blanking off connections and filling the tanks with water and pressurizing the tank.

(3) If the owner or user finds the date set for inspection not convenient, the owner or user shall immediately ask the Division for a postponement and give good cause, in which case the inspection shall be permitted to be postponed for a period of not more than 30 days from the date first set for inspection.

(c) All air tanks subject to inspection under these Orders and regularly inspected by qualified inspectors not employed by the Division shall be exempt from periodic inspection by the Division if the tanks and systems conform to these Safety Orders and:

(1) Reports of all air tank inspections are submitted to the Division within 21 days of inspection;

(2) Reports indicate whether internal inspection or external inspection under pressure, or both, have been made.

(3) Reports give the reasons for any refusal to issue a permit and for any change in the allowable working pressure;

(4) Reports specify in detail the condition of the air tank and any changes or repairs ordered. If changes or repairs are ordered, a written report shall be furnished to the owner or user of the tank by the inspecting agency.

(d) Permits shall be issued only if tanks and systems comply in all respects with these orders and all inspection fees are paid.

(e) Qualified inspectors employed by insurance companies shall immediately notify the Division of the name of the owner or user, as shown on the permit to operate, the location and state serial number of every air tank on which insurance has been refused, canceled or discontinued, and shall give the reasons why.

(f) Qualified inspectors employed by other than insurance companies shall immediately notify the Division of the name of the owner or user and the location and state serial number of every tank inspected by them which is removed from active service or which is considered unsafe for further service as an air tank, and shall give the reasons why.

NOTE: Nothing in these order shall prevent a qualified safety engineer employed by the Division from inspecting any tank. However, no inspection fee shall be charged by the Division where the required inspection has been made and the provisions of subsection (c) above have been met.

(g) Qualified inspectors making the first field inspection of air tanks required by these Orders to have a permit to operate shall stamp on the tank a State serial number (unless a State serial number has previously been stamped thereon) which shall become a permanent means of identification. This assigned number shall be made either by steel die figures not less than 5/8 inch in height, or outlined by means of center punch dots with figures not less than 3/4 inch in height, and shall be stamped adjacent to the manufacturer's ASME Code stamping or above an inspection opening if the ASME Code stamping is not accessible.

(h) No state serial number or ASME Code stamping shall be permanently covered by insulating or other material unless such number and stamping is transferred to a fixed plate readily visible outside of all insulating material.

(i) Whenever the condition of an air tank is such as to make it unfit for air pressure service, a qualified safety engineer employed by the Division may affix a rejection mark (X) consisting of an "X" at least 1 inch in height with a circle at least 1/2 inch in diameter located between the upper arms of the "X". The rejection mark shall be outlined in center punch marks and located immediately above or adjacent to the state serial number.

(j) All air tanks shall have inspection openings in compliance with the ASME Code. When inspection openings are not provided, the owner or user shall provide such openings, one (1) in each head or in the shell near each head and approximately opposite the longitudinal seam, as follows:

(1) Tanks 12 inches or less in inside diameter shall have at least two threaded openings not less than 3/4 inch pipe size.

(2) Tanks less than 18 inches and more than 12 inches in inside diameter shall have at least two handholes or two plugged, threaded openings not less than 1 1/2 inch pipe size.

(3) Tanks 18 inches to and including 36 inches in inside diameter shall have a manhole or at least two handholes or two plugged, threaded inspection openings not less than

2-inch pipe size.

(4) Tanks exceeding 36 inches in inside diameter shall have a manhole, except those whose shape or use makes a manhole impractical; in which case two handholes 4 inches by 6 inches or two openings of equivalent area may be substituted for the manhole opening.

(5)(A) An elliptical manhole shall be not less than 11 inches by 15 inches or 10 inches by 16 inches in size. The inside diameter of a circular manhole shall be not less than 15 inches.

(B) A handhole shall be at least 2 inches by 3 inches in size. It may be larger, depending upon the size of the tank and the location of the opening.

(C) All access and inspection openings shall be designed in accordance with the rules of the ASME Code for openings.

(k) Air tanks used in systems which have had moisture removed to the degree that the air has an atmospheric dew point of -50° F or less, shall not be required to have inspection openings.

(l) Air tanks shall meet and be installed in accordance with the following requirements:

(1) Air tank supports and appurtenances shall be in accordance with Paragraph UG-22 and recommended design practices of Appendix G of Section VIII, Division 1 of the ASME Code with sufficient clearance provided under the tank to allow for operation of the drain valve.

(2)(A) Air compressor units which have a reciprocating compressor and a driving unit over two horsepower mounted on the tank shall be in accordance with the requirements of paragraphs (B) and (C) as follows:

(B) The tank manufacturer's data report shall show the tank and machinery supports provided by the tank manufacturer. When reinforcing pads are used as a means of stress distribution at the legs and/or base plate attachment they shall be designed to minimize regions of high stress concentration and be sealed in such a manner as to inhibit corrosion.

(C) Based on written certification from the vessel manufacturer stating compatibility of the vessel and compressor driving system, the assembler shall permanently affix a label or apply stamping with letters and figures not less than 5/32 inch in height to the side of the vessel machinery platform showing 462(1)(2) compliance. In those cases where the tank manufacturer is the assembler, this data shall be permitted to be stamped on the ASME Code nameplate, separated from the ASME Code stamping. Upon request of the Qualified Inspector or the Division, design calculations incorporating system dynamics or experimentally obtained test data shall be furnished by the tank manufacturer to verify compliance with this Order.

(D) New air tanks not complying with this subsection shall not have a reciprocating compressor and driving unit mounted on the tank unless the supports are modified to the satisfaction of the Qualified Inspector, and the Division.

(3) All visible undercuts at butt, groove, or fillet welds must be repaired prior to issuance of the permit to operate.

(4) The employer shall notify the Division and the inspection agency before further use in the event of cracking or leaking of the air tank.

(5) If an air tank has cracked because of the compressor mounting or supports, the compressor and driving unit shall be reinstalled separately from the air tank in accordance with the requirements of the applicable Safety Orders, unless the supports are modified to the satisfaction of the Qualified Inspector and the Division. Whenever possible, the reinstallation of the compressor and driving unit shall be in accordance with the recommendations of the original assembler. The reinstallation must be acceptable to the Qualified Inspector.

(m)(1) Air piping shall be in accordance with ANSI B31.1 or B31.3.

(2) All piping from the tank to the first shut-off valve shall be Schedule 80 metallic pipe.

(3) Plastic piping systems may be used for compressed air conveyance above and below ground, when meeting all of the following requirements:

EXCEPTION: Pipe or tubing under 3/8-inch diameter need not meet these requirements.

(A) Only ductile plastic materials shall be used.

(B) Only plastic pipe, valves and fittings recommended for use by the manufacturer to convey compressed air shall be used.

(C) Plastic pipe, valves and fittings shall not be used for compressed air systems over 150 psi or temperatures over 140°F.

(D) Plastic piping systems shall be designed, installed, maintained, and operated in full accordance with the manufacturer's specifications and instructions.

(E) All plastic pipe shall be permanently marked continuously, but not to exceed 5-foot intervals, with the following information:

1. Size;

2. Manufacturer's name;

3. Pressure rating at 73°F and 140°F;

4. Material name, specification, ASTM cell classification, batch number, and the date of manufacture;

5. The words "For Compressed Air"; and

6. Either Schedule, "Sch Number:", or Standard Dimension Ratio, "SDR Number".

(F) All plastic valves and fittings shall be permanently marked with the following:

1. Size;

2. Manufacturer's name or logo;

3. Pressure rating at 73°F; and

4. Material name.

(G) Plastic valves and fitting shall be of the same manufacturer and materials as the pipe.

(H) Only joining compounds meeting or exceeding manufacturer's specifications shall be used when assembling the plastic pipe.

(I) The employer shall use pipe that meets or exceeds the test requirements listed in Appendix C, and upon request, supply the Division written laboratory certification from the manufacturer that the pipe meets or exceeds all test requirements listed in Appendix C of these orders.

(J) The pipe system components, pipe, valves, fittings, and joining compounds shall be designed for the full working pressure of the system for its design life.

(4) Plastic pipe and fittings that do not meet the requirements of subsection (m)(3) may be used in compressed air service, provided that all of the following conditions are satisfied:

(A) Pressure shall be limited to 150 psi, temperature to 120°F, size up to 2-inch diameter pipe size, and wall thickness to Schedule 40 or heavier;

(B) The piping system shall be protected from mechanical damage along its entire length by either location or actual guarding. The guarding shall be of sufficient strength to withstand any anticipated impact. It shall also be capable of containing exploding fragments; and

(C) The piping system shall be supported and secured by U bolts, conduit supports, rigid hangers or similar methods at intervals not to exceed five (5) feet.

(n) Any air tank having dished heads or conical heads the skirt (flange) and/or the knuckle radius of which does not meet the minimum ASME Code requirements shall have such heads stayed as flat surfaces in accordance with the ASME Code rules for braced and stayed flat plates. Any head dished to a radius greater than the diameter of the tank to which it is attached shall be stayed as a flat surface in accordance with the ASME Code rules for braced and stayed flat plates. No allowance shall be taken in such calculations for the curved portion of the head.

(o) All air tanks, including existing installations, having unstayed dished heads without a transition knuckle for attachment to the shell shall be permanently removed from service with the rejection mark affixed by the qualified inspector, as required in Section 462(i).

(p) The bottom dished head of an air tank operated in the vertical position shall not be dished inward but must be concave to pressure.

**Subchapter 1. Unfired Pressure Vessel Safety Orders**  
**Article 10. Safe Practices**

**Appendix C**

Acceptance Tests for Plastic Piping

The following are tests that shall be passed for acceptance of plastic piping for the conveyance of compressed air:

1. Test for impact resistance at 0°C: (32°F)

Objective: To determine if the material will withstand the energy of impact without fracturing through the complete wall thickness.

Form of test specimen: Each specimen shall be a section of pipe, of a length equal to twice the nominal size or 150 mm (6" ), whichever is greater, subject to a maximum length of 300 mm (12" ). The ends of the specimen shall be cut clean and equal to the axis of the pipe.

For "round-the-clock" testing, each specimen shall be marked with the number of longitudinal lines shown in Table 1.

Note: For pipe sizes 50 mm (2 " ) and over, specimens are subjected to impact equally spaced around the pipe; this procedure is known as "round-the-clock" testing.

Apparatus: A falling weight machine (an example of which is shown in Figure 1) shall be used and shall consist essentially of the following:

- a. A main frame which can be rigidly fixed in a true vertical position.

b. Guide rails, carried from the inside of the main frame, on side bearings which can be adjusted to keep them parallel and vertical.

c. A weighted striker that can fall freely within the guide rails and that is equipped with a hardened hemispherical striking surface 25 mm (1" ) in diameter. The striking surface shall be free from flats and/or other imperfections.

d. An appropriate set of weights which can be firmly attached to the striker to enable the combined weight to be adjusted to the values shown in Table 2.

Procedure: Adjust the total energy of the striker to the value appropriate to the pipe diameter being tested as shown in Table 2.

Condition each specimen in a water or ethylene glycol bath for at least one hour prior to the test at a temperature of 0°C (32°F) + 1°. Test individual specimens within 10 seconds of removal from the bath. allow the striker to fall freely onto the pipe specimen, which is centrally mounted on the vee block support.

Specimens from 10 mm (3/8" ) to 38 mm (1-1/2" ) (inclusive) nominal size shall be subjected to a single strike only.

For pipe size 50 mm (2" ) and above. Place the pipe on the vee block, so that one of the marked lines is uppermost. Then allow the weight striker to fall freely on the marked line on the pipe as described above. If the specimen does not fail as a result of cracking or splitting through the pipe wall, rotate the specimen until the next marked line is uppermost in the vee block, and cause a second blow to be made by the striker. Repeat the process until all the marked lines have been tested, or until a failure is recorded.

If the required sequence of impacts has not been completed within 10 seconds, interrupt the procedure and immediately recondition the specimen at a temperature of 0°C (32° F) + 1°For at least 10 minutes.

Fracturing or cracking through the complete wall thickness of the test specimen shall be a failure.

The following tests (Nos. 2 & 3) are intended to simulate a potential destructive impact. Splitting through the pipe wall or puncture is acceptable for passing results, if:

(a) No separation of one part of piping length from its mating part occurs.

(b) No separation of any material fragment from the body of the piping occurs.

2. Test for impact resistance at design pressure at 0°C (32°F) with blunt striker. Testing procedures and apparatus shall be the same as Test No. 1, except:

(a) Pressurize and maintain pipe sample at design pressure and cool to 0°C (32°F) as in Test No. 1.

(b) Energy of the striker to be twice the total energy of Table 2.

(c) Only one drop required.

3. Test for impact resistance at design pressure at 0°C (32°F) with sharp striker. Same as Test No. 2 in all cases, except with a chisel edged sharp striker (Figure 2).

4. The plastic piping systems shall be capable of sustaining without failure at least 600 psi when tested to the Standard Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings, using ASTM Designation No. D1599-86 (1986) which is herein incorporated by reference. This test shall be performed on each batch of pipe and fittings.

5. The plastic piping system shall be capable of sustaining without failure at least 460 psi when tested to the Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure using ASTM Designation No. D1598- 86 (1986), which is herein incorporated by reference, for at least 1,000 hours. This test shall be performed anytime there is a change in:

(a) material composition, compound or processing technique;

(b) design or size of joint or fitting;

(c) but, in any case not less than every 12 months.

Table 1.

Number of Lines For "Round-the-Clock" Testing

Number of Equidistant			
Normal Size mm (inches)	..	Lines to be Drawn	
50 .....	mm	(2	3
63 .....	mm	(2-1/2	4
75 .....	mm	(3	4

100 ..... mm (4 6

**Table 2.**  
**Energy of Striker**

Total Energy		Normal Size of Pipe .. of Striker	
	mm (inches .....	mm	ft. lbs.
10 .....	mm	(3/8	22
12 .....	mm	(1/2	33
19 .....	mm	(3/4	43
25 .....	mm	(1	54
38 .....	mm	(1-1/2	65
50 .....	mm	(2	76
63 .....	mm	(2-1/2	98
75 .....	mm	(3	98
100 .....	mm	(4	110

(c) Whenever an owner or user of any apparatus or equipment fails to pay the fees required under this section within 60 days after notification, said owner or user shall pay, in addition to the fees required under this section, a penalty fee equal to 100 percent of such fee. For the purpose of this section, the date of the invoice shall be considered the date of notification.

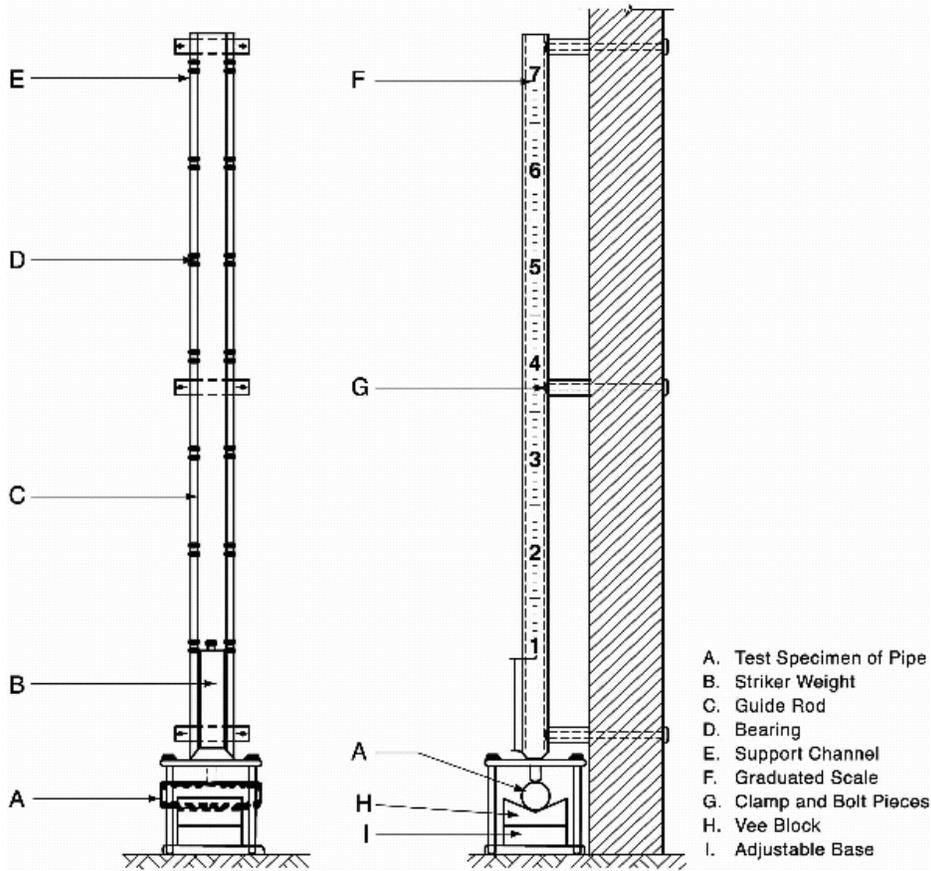


Figure 1 - Suitable Impact Testing Machine

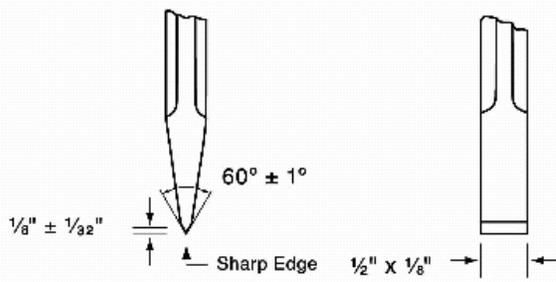


Figure 2 - Chisel Edged Sharp Striker

Image 1 (8.5" X 6") Not available for Offline Print to STP or FAX

(j) Reciprocating-type air compressors rated over 10 horsepower shall be equipped with automatic temperature-actuated shutoff mechanisms which activate when the normal operating temperature is exceeded by more than 25 percent. This requirement shall not apply to compressors equipped with fusible plugs designed to melt at a temperature at least 50 degrees below the flash point of the compressor's lubricating oil and installed in the compressor discharge lines before November 15, 1979. **MSHA 56.13010 See Above**

(k) Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. These devices shall prevent receiver tank pressure from exceeding the maximum allowable working pressure by more than 10 percent. Air receiver tanks shall also be equipped with accurate pressure gauges. **MSHA 56.13011**

**30 CFR § 56.13011**

**Air receiver tanks.**

Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. The total relieving capacity of the relief valves shall prevent pressure from exceeding the maximum allowable working pressure in a receiver tank by not more than 10 percent. Air receiver tanks also shall be equipped with indicating pressure gauges which accurately measure the pressure within the air receiver tanks.

*For use of  
Advisory  
Committee  
Only*

(1) Accumulated liquids shall be drained from the compressed air tanks **each day.** **new**

(l) Compressor air intakes shall be installed to ensure that only clean uncontaminated air enters the compressors. **new**

**6998. Hydraulic Monitor.**

(a) A safe, unobstructed working place shall be provided for the monitor operator.

(b) A positive safety latch shall be installed for securing the deflecting lever on all monitors. The deflecting lever shall be secured at all times when the monitor is not being moved by hand.

**6999. Rock Crushers.**

(a) Every rock crusher where an employee is required or permitted to be at, or near, an unguarded feed opening, shall be provided with adequate means whereby the power can be quickly disconnected in case of emergency. Such means of disconnecting the power shall be located at the crusher feed opening.

(b) A safe place shall be provided for employees at a crusher while cars or haulage vehicles are being unloaded.

(c) Adequate precautions shall be taken to prevent materials from being dumped into the crusher or crusher feeder while employees are working in them.

(d) Employees working at a crusher shall be protected from falling into the crusher by one of the following means:

(1) By adequately guarding the crusher mouth.

(2) Use of a working platform located in such position that hung-up material in the crusher can be safely dislodged while standing on the platform. The platform shall have standard guardrails and toeboards .

(3) When it is not ~~practical~~ practicable to adequately guard the crusher mouth, an approved body harness and life line shall be worn by employees working over the feed opening of a crusher. The lifeline shall be rigged and positively secured to prevent the wearer from getting any portion of their body into the crusher. The body harness and lifeline shall be used, inspected, and maintained in accordance with Section 1670 of the Construction Safety Orders.

(4) By other equally safe means.

(e) A mechanical method of keeping the crusher feed open such as a wedge on a line or hooks attached to an overhead hoist shall be provided if such equipment would reduce the hazards to employees.

(f) Before any repair work that may endanger employees is started on a crusher, the prime mover shall be shut down and rendered inoperable by disconnecting and locking out the power, blocking movement, or other feasible methods. ~~A sign prohibiting starting shall be secured to the prime mover controls.~~

#### **7000. Working Space for Machine Operators.**

##### **UNDERGROUND**

(a) Unobstructed working space shall be provided at the operating controls of every fixed machine. Such working space shall be at least 3 feet wide, and long enough to provide access to all operating controls.

(b) Adequate unobstructed working space shall be provided at the operating controls of every movable machine.

Such unobstructed working space shall be at least 3 feet wide and 6 1/2 feet in height, except when the operator works in a sitting position, in which case they shall be provided with an overhead clearance of at least 2 feet.

(c) Where the operating controls are located at the side of the machine, at least 2 feet of unobstructed space shall be maintained between the operating controls and the nearest wall or object while the machine is in operation.

(d) Boom and rocker-type mucking machines shall be equipped with a substantial device to keep them from upsetting.

#### **7001. Power Shutoff for Underground Machines.**

(a) In addition to the operating controls, a positive power shutoff shall be provided for every prime mover used in the mine.

(b) The positive power shutoff shall be located where it is readily accessible to the machine operator and, except for hand-held machines and tools, not more than 10 feet from the machine. It shall be placed on the machine when ~~practical.~~ Practicable.

~~(c) (13-20) At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.~~

## **Article 16. Drilling Operations and Jumbos**

### **§7005. Drilling Operations.**

#### **GENERAL**

(a) ~~(7-2)~~ Drilling machines shall be in good condition. The drill chucks shall be the proper size to keep the drills secured therein.

(b) Iron or steel hammers used for removing detachable bits shall be malleable or annealed, so that they will not readily chip or break while being used. **TSO 8449 MSO**

(c) It is strictly prohibited to drill in or deepen any hole that contains or may have contained explosives.

#### **SURFACE**

(d) No hole shall be drilled within 5 feet of any hole or chamber that contains or has contained explosives, and no hole shall be drilled at such an angle as to approach within 5 feet of such hole or chamber.

(e) ~~(7-13)~~ Drill holes for primary blasting shall be adequately covered or plugged to prevent injury to persons and keep materials from falling therein.

(f) ~~(7-4)~~ Men working on erected drill masts shall be safeguarded with elevated work platforms, standard railings, and toe-boards and protected by an approved safety belt and life line.

(g) ~~(7-3)~~ The drilling area shall be inspected for hazards before starting the drilling operations.

(h) ~~(7-5)~~ Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

(i) ~~(7-8)~~ When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position.

(j) ~~(7-10)~~ In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

(k) ~~(7-12)~~ While in operation, drills shall be attended at all times.

(l) ~~(7-18)~~ Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

(m) ~~(7-11)~~ The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

(n) ~~(8-2) (8-5)~~ The mandatory standards for rotary jet piercing of the U.S. Bureau of Mines for metal and nonmetallic open pit mines as published on July 31, 1969, February 25, 1970, and December 8, 1970, are adopted for control of surface rotary jet piercing hazards. I doubt California will ever see jet piercing. JRL

#### **§7006. Drilling Operation--Underground.**

##### **UNDERGROUND**

(a) No hole shall be drilled within 2 feet of any hole or chamber that contains or may contain explosives, and no hole shall be drilled at such an angle as to approach within 2 feet of such hole or chamber.

(b) Rock drilling operations shall be performed from a safe floor, platform, or staging which will provide a secure support for both the drilling machine and the operator.

#### **§7007. Jumbos--Construction and Use. Antiquated**

(a) Jumbo working platforms that are 30 inches or more in height shall be equipped with standard railings on open ends and sides, except where standard railings interfere with drilling operations, in which case they shall be provided with some other means of protection acceptable to the Division.

(b) Toeboards at least 4 inches high shall be provided around platforms of jumbos to prevent tools or other equipment from falling off.

(c) ~~(7-8)~~ Where drill steel is kept on jumbo platforms prior to or after use, suitable receptacles, such as boxes, racks, grooves, or equivalent, shall be provided for temporary storage.

(d) ~~(7-8)~~ No tools, materials, equipment, or other unattached objects shall remain on any platform while the jumbo is being moved, if any part of such protrudes beyond the width of the jumbo.

(e) ~~(7-8)~~ A safe means of access shall be provided to all jumbo platforms. Safe access may consist of a ramp, stair, or ladder constructed in compliance with the standards set forth in the General Industry Safety Orders.

(f) Where necessary, overhead protection against falling rock shall be provided at jumbo working areas.

(g) If bore holes are loaded from the jumbo, all electrical circuits to the jumbo shall be disconnected and the live ends removed to a minimum distance of 100 feet from the jumbo before explosives are brought to the heading.

(h) Warning must be given to men working below before starting to collar holes.

(i) When drill steel is hoisted by a power method, double slings with a tag line shall be used, or some other equally safe method shall be provided.

## **Article 17. Loading, Hauling, and Dumping**

### **§7010. Loading, Hauling, and Dumping--General.**

(a) ~~(9-2)~~ Equipment defects affecting safety shall be corrected before the equipment is used.

(b) ~~(9-31)~~ When traveling between work areas, the equipment shall be secured in the travel position.

(c) ~~(9-36)~~ Electrically powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

(d) ~~(9-37)~~ Mobile equipment shall not be left unattended unless the brakes are set. The wheels shall be turned into a bank or rib, or shall be blocked, when such equipment is parked on a grade.

(e) ~~(9-60)~~ Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

(f) ~~(9-64)~~ Chute loading installations shall be designed so that the men pulling chutes are not required to be in a hazardous position while loading cars.

(g) ~~(9-39)~~ Employees shall not be permitted to get on or off moving vehicles or equipment.

EXCEPTION: This does not apply to train crews when operating trains or industrial railroads.

(h) ~~(9-26)~~ Only authorized persons shall be present in areas of loading or dumping operations.

(i) ~~(14-13)~~ Industrial trucks, tractors, haulage vehicles, and earthmoving equipment shall meet the canopy, roll-over protection, and other requirements of the General Industry Safety Orders.

**§7011. Parts of Shovels, Draglines, and Hoisting Equipment Subject to Wear.**

- (a) The employer shall require that wire ropes, bearings, friction clutches, chain drives, and other parts subject to wear be inspected at adequate intervals in order that any unsafe conditions may be corrected.
- (b) The Division may require properly dated detailed reports of such inspections to be made in places of employment where there is doubt as to proper supervision over safe maintenance of hoisting equipment.
- (c) The intervals between the inspections shall be short enough to enable the employer to be reasonably certain that the crane, hoist, derrick, excavating or loading equipment will not be operated when in an unsafe condition.
- (d) ~~(9-3)~~ Mechanically or electrically operated brakes shall be inspected periodically, and necessary repairs and adjustments shall be made.

**§7012. Cranes, Draglines, Shovels, and Loading Devices.**

- (a) The control area for every crane or other lifting device, and for every power-driven shovel or loading device, shall be protected with a strong guard where there is danger from falling or flying materials.
- (b) ~~(9-11)~~ All glass in the windows of the cab shall be safety glass of a type approved by the State Department of Motor Vehicles.
- (c) The crane, excavator, or loader shall be equipped with a signaling device that may be heard above the usual noises in the pit.
- (d) When loading where there is a probability of dangerous slides, the wheels or treads of loading equipment, other than railroad shovels, shall be turned in the direction which will most facilitate escape in case of danger.
- (e) ~~(9-30)~~ Employees shall not be permitted under suspended loads or buckets.
- (f) ~~(9-27)~~ Any person desiring to go on board any shovel, crane, or dragline which is in operation shall first signal the operator of such equipment. He shall not go aboard until the operator stops the equipment and signals that it is safe to proceed.
- (g) ~~(9-5)~~ The operator of any crane, dragline, shovel, or loader shall signal other persons in the vicinity before he begins operations or moves the equipment.
- (h) The shovel, loader, dragline, or crane shall not be started to travel until it is first determined that the travel way is clear of persons and equipment.

- (i) When equipment is traveling under its own power, the operator shall so turn his cab that he has clear vision in the direction of travel.
- (j) ~~(9-25)~~ Where practicable, haulage vehicles shall be loaded in such way that the bucket or boom does not pass over the vehicle driver's position. If the bucket or boom has to pass over the driver's position, no loading shall be done until the driver is in a safe location away from his vehicle.
- (k) ~~(9-32)~~ The crane, excavator, or loader shall not be left unattended until the load or bucket is lowered to the ground.
- (l) ~~(9-61)~~ Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.
- (m) ~~(9-62)~~ Rocks too large to be handled safely shall be broken before loading.

**§7014. Private Roads.**

- (a) When building private roads, consideration shall be given to the following factors:
  - (1) Type of material to be used for road bed and surfacing.
  - (2) Type of equipment that will travel on the road.
  - (3) Size of loads to be hauled.
  - (4) Length, and percent of grades.
  - (5) Degree of curvature and visibility on turns.
- (b) Bridges shall be substantially constructed and maintained in good repair. They shall not be subjected to loads greater than they were designed to support.
- (c) Grades shall be commensurate with the safe operating limits of the equipment used.
- (d) Single lane roads with two-way traffic shall be provided with adequate turnouts where practicable. Where adequate turnouts are not practicable, a control system shall be provided to prevent vehicles from meeting on such single lane roads.
- (e) Roads used for two-way traffic on which vehicles do not travel on the right side all the way shall be posted with signs indicating the side of the road to travel.
- (f) Roads should be maintained free from holes and deep ruts. Action should be taken to keep the dust to a minimum.
- (g) ~~(9-22)~~ Mid-axle height berms or guards shall be provided on the outer bank of elevated roadways.

(h) ~~(9-54)~~ Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel **and** overturning at dumping locations.

(i) ~~(9-59)~~ Public and permanent railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

(j) When the Division considers that a serious hazard exists to employees because of traffic or haulage conditions in a mine, it may require the employer to establish a system of traffic control satisfactory to the Division.

**~~§7015. Haulage Vehicle Definition.~~**

~~Haulage vehicle as used in this article means any vehicle other than railroad cars or locomotives used to transport the product of a pit. In addition to self-propelled trucks, the term "haulage vehicle" includes tractors, trailers, and all other similar equipment used for such transportation.~~

**Move to Definitions**

**§7016. Haulage Vehicle, Construction and Maintenance. Back up alarm**

(a) ~~(9-11)~~ Every haulage vehicle shall be in compliance with the California Motor Vehicle Code except for:

- (1) Lights;
- (2) Weight limits;
- (3) Width and height;
- 4) Installation of windshields.

This article does not require the installation of windshields on haulage vehicles but if windshields are installed, they shall be in compliance with the provisions of the California Motor Vehicle Code.

(b) Equipment and accessories installed on haulage vehicle shall be so arranged as to not seriously impair the driver's vision to the front or sides.

(c) ~~(9-3)~~ All haulage vehicles, including trailers, shall be equipped with brakes or other holding device adequate to hold such vehicle with the maximum load on the maximum grade on which it is used. Brakes shall be inspected and maintained in good condition as recommended by the vehicle manufacturer. If the vehicle manufacturer's recommendations are no longer available, the required inspection, maintenance and repairs shall be performed by a qualified person.

(d) ~~(9-3)~~ The brakes on motor vehicle trailer combinations shall be so designed that failure of the trailer brakes will not affect those of the motor driven vehicle.

- (e) The use of a counter-torque device is recommended on haulage vehicles operating on grades.
- (f) Haulage vehicles operated at night shall be equipped with adequate headlights and at least one taillight in good condition.
- (g) Every self-propelled haulage vehicle shall be equipped with a warning device which can be clearly heard for a distance of 200 feet from the vehicle.
- (h) Haulage vehicles shall be provided with a safe means of access from the ground to the driver's location. Such means of access shall be maintained in good condition.
- (i) The vehicle seat shall be maintained in good repair at all times.
- (j) Liquids shall be drained from the compressed air tanks each day.
- (k) ~~(9-69)~~ Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.
- (l) ~~(9-81)~~ Trucks, shuttle cars, and front-end loaders operated on the surface shall be equipped with emergency brakes separate and independent of the regular braking system when generally available for a particular class of equipment.

**§7018. Trackless Mine Haulage--Equipment and Practices.**

**UNDERGROUND**

- (a) Every trackless haulage vehicle shall be provided with adequate power to carry its load safely up any grade over which it operates.
- (b) A safe seat shall be provided for the operator of the vehicle. The seat shall be constructed so it will prevent the operator from slipping over the back or sides of the seat.
- (c) Haulage vehicles shall be equipped with headlights and at least one taillight in good condition.

Such vehicles shall be equipped with backup lights which function automatically when the vehicle is put in reverse gear.

**§7020. ~~(9-25)~~ Canopy Guard.**

**GENERAL**

- (a) Except as provided in subsection (d) of this section every haulage vehicle that is loaded by means of any device which employs a swinging boom to load the vehicle shall be equipped with a suitable canopy guard for the driver's seat.
- (b) The canopy guard shall be strongly constructed to afford adequate protection for the driver. It shall be of sufficient width and height so as not to hamper the movement of the driver or prevent his immediate escape from the vehicle in emergency.
- (c) The canopy shall be steel plate at least three-sixteenths inch thick. It shall be substantially supported by steel members of adequate strength attached to the frame or body of the vehicle.
- (d) A canopy guard is not required on any haulage vehicle which is provided with a cab so constructed that it will afford at least as much protection as a canopy guard.

**§7021. Haulage Vehicle Operation Procedure.**

- (a) When operating vehicles, consideration shall be given to the condition of the roadway, weather, curves, grades and mechanical condition of the vehicle.

The vehicle shall not be operated at a speed which will endanger the driver or traffic.

On curves, the vehicle speed shall be limited so that it can be stopped within one-half the visible distance of the roadway.

- (b) ~~(9-23)~~ ~~(9-24)~~ Haulage vehicles shall at all time be operated under positive control. When descending grades, the vehicle shall be kept in gear.
- (c) ~~(9-5)~~ Where other warning signals are not provided, the vehicle's warning device shall be sounded before moving the haulage vehicle.
- (d) ~~(9-45)~~ The loaded haulage vehicle shall not be moved away from the shovel or loader until the load is balanced and trimmed.
- (e) Haulage vehicles shall not be driven unnecessarily while the body is in the dump position.
- (f) No workman shall be permitted under the raised body of a haulage vehicle until such body is secured in its raised position.
- (g) The hands or feet shall not be used to guide a hoist or winch cable on a haulage vehicle. When necessary to control a moving cable, the drum and sheaves shall be equipped with a device that will guide the cable to its proper position without being handled, or the employee shall be provided with a device which will enable him to guide the cable safely.
- (h) ~~(9-12)~~ Cabs of mobile equipment shall be kept free of extraneous materials.

(i) ~~(9-45)~~ Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

(j) ~~(9-58)~~ If truck spotters are used, they shall be well in the clear while trucks are backing into dumping position and dumping; lights shall be used at night to direct trucks.

(k) ~~(9-68)~~ Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

### **§7023. Industrial Railroads.**

#### **GENERAL**

(a) ~~(9-83)~~ The tracks for all industrial railroads in use in the mine or on the surface shall be kept in good condition, free of dips, bumps, or obstructions that may interfere with safe operation of haulage equipment. Surface industrial railroads and clearances shall comply with the Industrial Railroad standards of the General Industry Safety Orders.

(b) All bridges and trestles shall be substantially constructed and maintained in good repair. They shall not be subjected to loads greater than they were designed to support.

It is recommended that bridge and trestle timbers be treated with an effective preservative before being used.

(c) ~~(9-20)~~ Positive-acting stopblocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

(d) ~~(9-28)~~ Switch throws shall be installed so as to provide adequate clearance for switchmen.

### **§7024. Mine Trains--Equipment and Practice.**

(a) ~~(9-9)~~ Every locomotive shall be provided with an audible warning device capable of being heard at a distance of 200 feet. Such a warning device shall be maintained in good working condition.

Operators shall sound warning before starting trains, when trains approach crossings or other trains on adjacent tracks, and where vision is obscured.

(b) Locomotives or trains operating at night shall be equipped with front and rear lights.

(c) Locomotives shall be equipped at both ends with adequate footboards and grab irons.

(d) ~~(9-48)~~ Every locomotive shall be equipped with brakes of sufficient capacity to control the train with reasonable safety and railroad cars with braking systems shall be equipped with effective brake shoes.

(e) ~~(9-3)~~ Before a locomotive is moved, the engineer shall make certain that the brakes are in operating condition. When the locomotive is not in operation the hand brake shall be set.

(f) No locomotive shall be left unattended unless it is locked or otherwise made inoperable.

(g) ~~(9-98)~~ Locomotives and cars moved by locomotives that are coupled and uncoupled in the course of their regular operation shall be equipped with automatic couplings with extension handles.

(h) Dump cars shall be equipped with positive locking devices to prevent accidental dumping.

(i) ~~(9-97)~~ Couplings shall not be shifted or lined up on moving cars or locomotives. If the couplings are not in line, the car or locomotive shall be stopped before they are shifted. Employees shall not stand on the rail while coupling or uncoupling cars.

(j) ~~(9-47)~~ When cars are uncoupled from a train they shall be secured against accidental movement.

(k) ~~(9-45)~~ No materials shall be carried on any locomotive unless such locomotive is equipped so that the materials can be carried safely.

Materials may be carried on locomotives equipped with fixed boxes or trays or with raised edges high enough to keep the materials safely in place.

No material that extends over the side or end of a locomotive shall be carried on the locomotive.

(l) ~~(9-45)~~ The material on loaded cars shall be balanced and trimmed in order to prevent dislodging during transportation.

(m) Railroad equipment shall not be operated at a speed which will endanger employees.

(n) ~~(9-50)~~ Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

(o) ~~(9-51)~~ Persons shall not go over, under, or between cars unless the train is stopped and the motorman has been notified and the notice acknowledged.

(p) ~~(9-52)~~ Inability of a motorman to clearly recognize his brakeman's signals, when the train is under the direction of the brakeman, shall be construed by the motorman as a stop signal.

(q) ~~(9-54)~~ A bumper or other device that will effectively prevent cars from going over the end of the track shall be provided at all dump points for ore or waste.

(r) ~~(9-54)~~ Safety chains, or other equally effective devices, shall be used to keep the cars from overturning while being dumped.

#### **§7025. Mine Trains--Equipment and Practices.**

##### **UNDERGROUND new definition for shelter**

(a) Every new locomotive purchased after October 27, 1958 shall be equipped with some type of dead-man control that will shut off the power automatically when the operator leaves his compartment. Where **practical**, existing locomotives shall be equipped with such controls.

(b) Rerailing equipment shall be available and used to put derailed cars and locomotives on the track. **It is recommended** that railers and jacks be provided.

(c) Every locomotive when in motion shall continuously display a white light in the direction of travel which will provide sufficient illumination to make men or objects clearly visible at a distance of 100 feet in the direction in which the locomotive is traveling.

(d) Each train shall be equipped with a red taillight of sufficient intensity as to be clearly visible from a distance of 100 feet.

(e) A safe seat shall be provided for the operator of every locomotive. The seat shall be constructed so it will prevent the operator from accidentally slipping over the back or sides of the seat.

(f) To prevent runaway cars should a coupling part, the locomotive shall be operated on the downgrade end of the train, except:

(1) When transporting workers. (See Section 7038.)

(2) When transporting materials which cannot be pushed safely.

(3) When the construction of a locomotive is such that it seriously obstructs the operator's view of the roadway; in which case, the locomotive shall be placed ahead of the train with the seat end turned in the direction in which the locomotive is traveling.

(g) ~~(9-45)~~ Timber or similar material that extends over the side or end of a mine car shall be secured and positioned so that it will clear obstructions, especially when traveling around curves.

#### **§7026. Mechanical Haulage Refuge Stations.**

(a) ~~(9-110)~~ Refuge stations for pedestrians shall be provided at intervals not exceeding 200 feet along the haulageway on every mine level where a 30-inch passageway cannot be maintained.

(b) Each refuge station shall be not less than 4 feet long and shall afford a space at least 2 1/2 feet in width between the widest portion of the car or train running on the railroad track and the side of the refuge.

(c) Refuge stations shall be plainly marked and kept free of rubbish.

(d) Ample passing space shall be provided along haulageways where trackless haulage is used.

## **Article 18. Conveyors and Tramways**

### **GENERAL**

(a) ~~(14-1)~~ Screw conveyors 7 feet or less above floor or other working level shall be completely covered with substantial lids except that screw conveyors the top of which is 2 feet or less above the floor or other working level, or below the floor level may be guarded by standard railing guards **having toeboards of midrail** height or shall be guarded by substantial covers or gratings.

(b) All belt conveyor head pulleys, tail pulleys, single tension pulleys and dip take-up pulleys shall be so guarded that the entire sides of the pulleys are covered. The guard shall extend in the direction of the run of the belt to such a distance that a person cannot reach behind it and become caught in the nip point between the belt and pulley.

(c) Portable inclined conveyors shall have head and tail pulleys or sprockets and other power transmission equipment guarded according to the General Industry Safety Orders of the division.

(d) ~~(11-2)~~ ~~(11-13)~~ ~~(11-14)~~ Crossovers shall be provided and used where it is necessary to pass over exposed chain, belt, bucket, screw, or roller conveyors. Such crossovers shall be bridges or runways properly equipped with standard railings and toeboards, and shall have a fixed ladder, ramp, or stairway as a safe means of access.

(e) Conveyors passing over areas that are occupied or used by employees shall be so guarded as to prevent the material handled from falling on or causing injury to employees.

(f) Where workmen pass under the return strands of chain conveyors, a shallow trough or other effective means of sufficient strength to carry the weight of the broken chain shall be provided.

(g) ~~(9-14)~~ No employee shall be permitted to ride a power-driven chain, belt or bucket conveyor.

(h) ~~(9-6)~~ When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

- (i) ~~(9-7)~~ Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.
- (j) ~~(9-13)~~ Adequate backstops or brakes shall be installed on inclined-conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

#### **§7031. Conveyor Passage.**

- (a) ~~(11-9)~~ Safe passageway shall be provided along every pit conveyor where employees are required or permitted to travel in the course of their operating duties.
- (b) Conveyor tunnels constructed after April 7, 1953 shall have an unobstructed passageway at least 2 feet wide and 6 1/2 feet high.

When a tunnel constructed before April 7, 1953 is extensively repaired or rebuilt, an unobstructed passageway shall be provided as required in the foregoing paragraph of this subsection.

- (c) ~~(11-16)~~ Passageways adjacent to conveyors shall be kept free of spillage from the conveyor. Means shall be taken to minimize spillage on the passageway.

#### **§7032. Belt Conveyors in Mines.**

##### **UNDERGROUND**

- (a) Before a belt conveyor is installed in an underground mine, permission shall be secured in writing from the Division.
- (b) Conveyor belting used underground shall be of a type that is acceptable to the Division.
- (c) When application is made to install a conveyor in a mine, information regarding the following shall be submitted to the Division:
  - (1) Service for which the conveyor is intended.
  - (2) Width and length of conveyor.
  - (3) Size of passageway in which the conveyor will operate.
  - (4) Kind of automatic devices that will be provided to shut off the power should the belt stop.
  - (5) Fire protection to be provided.
  - (6) Any other information considered pertinent by the Division. **HP and Speed**

(d) When in the opinion of the Division a belt conveyor can be operated safely in a mine, permission may be granted to the applicant, specifying the conditions under which such belt conveyor shall be operated.

(e) When permission to use a belt conveyor is granted, the conditions specified are those believed necessary for the protection of workers. If experience in the operation of the belt conveyor indicates that any of the conditions are inadequate or unnecessary, the Division may revise the conditions in the light of such experience.

(f) Permission to use a belt conveyor underground may be revoked for failure to comply with the conditions specified by the Division.

### **§7035. Aerial Tramway.**

#### **GENERAL**

(a) ~~(10-8b)~~ Every aerial tramway, the operation of which requires the presence of employees at both ends of the tramway, shall be provided with direct connected telephone or other equally ready means of quick communication.

(b) ~~(10-8d)~~ No employees, except maintenance and repair men designated by the employer, shall be permitted to ride on any aerial tramway unless such tramway was designed for transportation of passengers.

(c) ~~(10-8c)~~ Tramways used for transportation of employees shall be provided with suitable stand-by power for emergency use, and a safe conveyance for employees to ride in.

(d) ~~(10-7)~~ Working areas under tramways shall be guarded by a substantial roof or other adequate protection against falling buckets or falling materials.

(e) ~~(10-8a)~~ The hoisting equipment and hoisting practices for inclined tramlines over which employees are transported shall be in compliance with the Aerial Passenger Tram Safety Orders of the Division.

(f) ~~(10-3)~~ Any hazardous defects shall be corrected before the equipment is used.

(g) ~~(10-9)~~ Men shall not ride loaded buckets.

(h) ~~(10-10)~~ Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

## **Article 20. Transportation of Workers**

**§7037. Transportation of Workers.**

**GENERAL**

- (a) When transporting employees by vehicles, the vehicles and procedures shall be in compliance with the General Industry Safety Orders of the Division.
- (b) ~~(9-33)~~ Men shall not ride in dippers, shovel buckets, forks, clamshells, or in the beds of dump trucks for the purpose of transportation.
- (c) ~~(9-40)~~ Men shall not ride on top of loaded haulage equipment.
- (d) ~~(9-41)~~ Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.
- (e) ~~(9-43)~~ Men shall not ride outside the cabs or beds of mobile equipment.
- (f) ~~(9-67)~~ Facilities used to transport men to and from work areas shall not be overcrowded.
- (g) ~~(9-85)~~ Supplies, materials, and tools other than small hand tools shall not be transported with men in man trip vehicles unless such vehicles are specifically designed to make such transportation safe.

**§7038. Transportation of Employees.**

**UNDERGROUND**

- (a) Except as provided in subsection (b) of this section, transportation of employees over mine railroads when going on or coming off shift shall be in man cars especially designed for such transportation.
- (b) Where not more than five men are going on or coming off shift, they may be transported in mine cars.
- (c) All man cars and mine cars carrying men going on or coming off shift shall be secured with safety chains to prevent such cars from running away should a coupling fail.
- (d) Every mine car used for transportation of employees shall be provided with a positive locking device that will prevent accidental dumping of the car.
- (e) A train transporting workers shall be pulled, not pushed, by the locomotive, and shall be operated at a safe speed.

(f) ~~(9-67)~~ Every man car or mine car, truck, or other vehicle used for transportation of employees shall be provided with safe and secure seats, and shall be protected on sides and ends to prevent falls from the vehicle.

Means shall be provided whereby employees can safely mount or dismount the vehicle.

(g) ~~(9-113)~~ Vehicles transporting workers shall be operated cautiously and with due regard for the safety of employees. Such vehicles shall be operated at a safe speed.

(h) ~~(9-114)~~ Employees shall not be required or permitted to get on or off a moving vehicle.

(i) ~~(9-99)~~ Supplies, materials, and tools other than small hand tools shall not be transported with men in man trip cars or vehicles. Man trips shall be operated independently of ore and supply trips.

(j) ~~(9-116)~~ During shift changes, the movement of rock or material trains shall be limited to areas where such trains could not present a hazard to men coming on or going off shift.

(k) ~~(9-117)~~ Men shall not ride between cars or on top of loaded cars.

## **Article 21. Mine Ladders and Travelways**

### **§7040. ~~(11-3)~~ ~~(11-5)~~ ~~(11-6)~~. Ladders.**

Ladders used in surface operations shall be constructed, installed, and maintained in conformance with provisions of the General Industry Safety Orders.

### **§7041. ~~(11-3)~~ ~~(11-5)~~. Construction of Wooden Ladders for Underground Use.**

#### **UNDERGROUND**

(a) Wooden ladders shall be substantially constructed of sound lumber of strength equivalent to No. 1 Select Douglas Fir of the following dimensions:

(1) Side rails shall be not less than 2 inches by 4 inches nominal, in cross section.

(2) Ladder steps shall be clear, straight-grained, and **absolutely** free of knots.

(3) Ladder steps shall be not less than 1 inch by 4 inches nominal, in cross section.

- (b) The distance between the tops of the steps of a ladder shall not exceed 14 inches and shall not vary more than 1 inch in any one ladderway.
- (c) Ladders shall be constructed so there is at least 10 inches clear space between the side rails.
- (d) Ladder steps shall be securely fastened to the side rails with nails or other equivalent fastenings, and shall be secured against pulling loose by one or more of the following methods:
- (1) Mortised in the side rails so as to be flush with the surface, provided this is done without unduly weakening the side rails.
  - (2) Fastened to the surface of the side rails with filler pieces between the ends of the steps. Filler pieces shall be the same width as the side rail and the same thickness as the ladder steps.
  - (3) Fastened on the surface of the side rails with continuous wooden strips nailed over the ends of the steps for the full length of the ladder.
  - (4) Any combination of the above methods which in the opinion of the Division will provide equivalent protection.
- (e) Nails and other metal fasteners used in ladders that are exposed to corrosive water or corrosive mine atmosphere shall be made of metal that is resistant to corrosion of the type to which they are exposed.

**§7042. (11-3). Construction of Metal Ladders for Underground Use.**

- (a) Metal ladders shall be substantially constructed. Side rails shall have at least equal strength as that of No. 1 Select Douglas Fir, 2 inches by 4 inches in cross section.
- (b) Steps shall be secured to the side rails in such manner as to prevent them from coming loose.
- (c) Round ladder steps shall be at least 1-inch outside diameter. The steps of metal ladders shall be smooth and free of ribs or projections. WHY?
- (d) The distance between the tops of the steps of a ladder shall not exceed 14 inches and shall not vary more than 1 inch in any one ladderway.
- (e) Ladders shall be constructed so there is at least 10 inches clear space between the side rails.
- (f) Metal ladders and ladder fasteners for use where exposed to corrosive waters or corrosive mine atmosphere shall be constructed of materials that are resistant to corrosion of the type to which they are exposed.

**§7043. ~~(11-3)~~. Construction of Flexible Ladders for Underground Use.**

- (a) Flexible ladders shall have sides made of chain, connecting links, wire rope, or fiber rope.
- (b) Each side of a flexible ladder shall have a tensile strength not less than that of 1-inch best Manila rope. If chain is used, the links shall be made of stock not less than three-eighths inch.
- (c) There shall be at least 12 inches of clear space between the sides of a flexible ladder.
- (d) Each step of a flexible ladder shall be made of stiff material and shall be strong enough to safely support a weight of 300 pounds at the center of the step without deflection?. The distance between the tops of the steps of a ladder shall not exceed 14 inches.
- (e) The steps shall be fastened to the sides in such manner that they will be held securely in place without damage to the sides of the ladder.

**§7044. ~~(11-1)~~. Manways and Ladder Installations.**

- (a) Every mine shall have at least one means of outlet for the miners by means of ladders, stairways, or runway from all active workings of the mine to the surface.
- (b) ~~(11-55)~~ No ladder or stair need be provided in a passageway if the slope is less than 20 degrees from the horizontal and the footing is such that men can walk safely.
- (c) Every ladderway having an inclination of more than 60 degrees from the horizontal, and where the distance between the top and bottom of the ladderway is more than 30 feet, shall have substantial platforms at intervals of not more than 20 feet. If possible, the sections of the ladders shall be staggered at each platform so that no section shall be directly in line with the section above or below it.
- (d) The ladder opening in any platform shall be large enough to permit ready passage of rescue men wearing breathing apparatus, and in no case shall such opening be less than 24 inches by 24 inches.
- (e) Distance from the step to the nearest permanent object on the climbing side of the ladder shall not be less than 24 inches.

There shall be a clear width of at least 12 inches from the center line of the ladder on each side across the front of the ladder.

- (f) ~~(11-5)~~ The front side of the step of a ladder shall in no case be less than 4 inches from any obstruction.

- (g) ~~(11-6)~~ Ladders shall project at least 3 feet above every platform in the ladderway, and at least 3 feet above the collar of the shaft, winze, or raise, unless convenient and secure handholds are fixed at such places.
- (h) ~~(11-5)~~ All ladders shall be securely fastened.
- (i) Under no circumstances shall any ladder be installed in such manner that it leans backwards from the vertical.
- (j) In all shafts which are in the process of sinking or enlarging, a fixed ladder, stair, or ramp shall be provided to within such distance from the bottom of the shaft as will secure it from the danger of blasting.
- Access shall be provided from the bottom of the shaft to the bottom of the fixed ladder, stair, or ramp. Such access may be by means of an extension ladder or flexible ladder or by a **handline or chain.**
- (k) Ladders, stairways, and ramps shall be installed at such distance from power and light wires that a person on them cannot accidentally contact an electric conductor.
- (l) Every shaft shall be provided with a continuous means of egress from the bottom of such shaft to the nearest active mine level. Such means of egress may be by stairs or fixed ladders or ramps, or by a combination of the above.
- (m) ~~(11-3)~~ Any manway through which employees are required or permitted to pass shall be kept in good repair to allow ready passage.
- (n) ~~(11-36)~~ Trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept operable so that they are easily opened.

#### **§7046. Travelways.**

##### **GENERAL**

- (a) Where practicable, walkways shall be separate and apart from railway or vehicle roads.
- (b) Walkways shall be kept free from stumbling hazards.
- (c) Handrail, cable guard, fence, or other suitable barrier shall be installed along permanent walkways where there is danger of falling into excavations.
- (d) ~~(11-1)~~ ~~(11-16)~~ Safe means of access shall be provided and maintained to all working places as required by the General Industry Safety Orders.

(e) ~~(11-12)~~ Openings above, below, or near travelways through which men or materials may fall shall be protected by railings, barriers, or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

(f) ~~(11-2)~~ ~~(11-16)~~ ~~(11-36)~~ Unless otherwise stated in the Mine Safety Orders, crossovers, walkways, ramps, stairways, railings, and toeboards shall be constructed, installed, and maintained in conformance with the General Industry Safety Orders.

**§7048. ~~(11-27)~~. Scaffolds.**

(a) Scaffolds and working platforms shall be of substantial construction and provided with guardrails and maintained in good condition. Floor boards shall be laid properly and the scaffolds and working platform shall not be overloaded. Working platforms shall be provided with toeboards when necessary. Scaffolds shall be in conformance with the Construction Safety Orders.

**§7050. ~~(9-107)~~. Stopes.**

**UNDERGROUND**

(a) Floors shall be provided in every stope where needed for the safety of employees.

(b) In stopes timbered with square sets those portions of the working floors that are in use shall be closely and securely lagged.

(c) An adequate work floor shall be provided in narrow stopes that are too steep to permit safe footing.

**§7051. ~~(11-12)~~. Winzes, Raises, and Openings.**

(a) Winzes or other openings in the floor of mine workings shall be guarded so that persons will not fall into them.

(b) ~~(11-12)~~ Manways intersecting overhead workings through which material is dropped shall be closed to the passage of persons whenever material is dropped through such working.

(c) ~~(11-1)~~ Every raise while under construction shall be provided with a safe means of access from the bottom to the face at all times when employees are working in the raise.

Such means of access shall be as follows:

(1) For slopes up to 20 degrees, a walkway may be used where there is safe footing.

If footing is ~~slipping~~ slippery or otherwise insecure, a rope, chain, or other aid to climbing shall be provided.

- (2) For slopes from 20 degrees to 45 degrees, chains, or ladders shall be provided.
- (3) For slopes greater than 45 degrees, ladders shall be provided.
- (4) Other means that will afford at least equal safety.

**§7052. ~~(9-103).~~ Chutes and Ore Passes.**

- (a) Chutes and ore passes shall be guarded.
- (b) Employees shall be protected against falling into the chute by one or more of the following methods:
  - (1) A grizzly with openings between the bars of not more than 10 inches in the least dimension.
  - (2) Use of an approved **safety belt** and life line tied sufficiently short to prevent the wearer from going through the grizzly opening where such opening is greater than 10 inches in the least dimension. In no case shall grizzly bars be more than 30 inches apart.
  - (3) By other equally safe means acceptable to the Division.
- (c) Active chutes and ore passes shall be kept in good repair so that material will not spill into a manway.
- (d) Chute gates shall be maintained in safe and easily operable condition.
- (e) To protect the hands and arms of trammers and train crews, a safe clearance of not less than 6 inches shall be maintained between any part of a chute and the top of every car that is operated under such chute.
- (f) ~~(9-106)~~ Ample warning shall be given to men who may be affected by the draw **of material** or otherwise exposed to danger from chute-pulling operations.
- (g) ~~(9-107)~~ Men shall not stand on broken rock or ore over draw points if there is danger that the chute will be pulled. Suitable platforms or safety lines shall be provided when work must be done in such areas.

**Article 22. Fire Prevention and Control**

**§7055. Fire Prevention and Control.**

- (1) At least a minimum one and one-half thick covering of noncombustible materials such as gunite, shotcrete, or concrete. ~~plaster, asbestos,~~
- (2) If gypsum wallboard is used the minimum thickness used shall be 5/8" and all joints shall be taped.
- (3) If fire resistant paint is used, the directions provided by the manufacturer shall be followed.
- (4) Any material used shall delay combustion by at least one hour. All coatings shall be applied in a manner acceptable to the Division.



## GENERAL

(a) No person shall smoke or use an open flame:

- (1) ~~(4-1a)~~ Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used; or **Fuel in use on equipment?**
- (2) ~~(4-1b)~~ Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire; or
- (3) ~~(4-1c)~~ Within an unsafe distance of any area where smoking or the use of an open flame may cause a fire or an explosion.

(b) ~~(4-2)~~ Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

(c) ~~(4-4)~~ Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the ~~Bureau of Mines~~. MSHA. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

(d) ~~(4-8)~~ Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

(e) ~~(4-9)~~ All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

(f) ~~(4-14)~~ Solvents with flash points lower than 100 Fahrenheit (38 Centigrade) shall not be used for cleaning. **Conflict with TSO**

(g) ~~(4-15)~~ Solvents shall not be used near an open flame or other ignition source, or near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point.

(h) ~~(4-20)~~ Battery-charging stations shall be located in well-ventilated areas.

(i) ~~(4-21)~~ Equipment powered by internal combustion engines (except diesel engines) where the fuel tank is an integral part of the equipment, shall be shut off and stopped before being fueled. **UNDERGROUND???**

(j) ~~(4-22)~~ Each mine shall have available or be provided with suitable fire-fighting equipment adequate for the size of the mine.

(k) ~~(4-23)~~ Firefighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected **periodically**. Records shall be kept of such inspections.

(l) ~~(4-29)~~ When welding or cutting near combustible materials, suitable precaution shall be taken to ensure that smoldering metal or sparks do not result in fire.

(m) ~~(4-33)~~ Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

(n) ~~(4-40)~~ Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons endangered by a fire.

(o) ~~(18-12)~~ Emergency telephone numbers shall be posted at appropriate telephones.

(p) ~~(4-19)~~ Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

#### **§7056. Surface Structures over or Near Mines.**

The provisions of T8-7056 of Part 6, T-24, are incorporated herein as a part of these regulations and reads as follows:

#### **UNDERGROUND**

T8-7056. Surface Structures Over or Near Mine Openings.

In addition to the provisions of Part 2, the following shall apply to all mine construction.

- (a) Change houses, timber framing sheds, storage sheds, or piles of combustible materials shall not be placed or permitted to remain within 100 feet of any mine opening, shaft house, hoist house, explosives magazine, or ventilating fan.
- (b) Every building and structure within 100 feet of any mine opening shall be constructed of noncombustible materials or shall be of not less than one-hour fire-resistive construction, except that wooden headframes and headframes with built-in wooden bins for dumping the shaft conveyance may be erected and used over mine shafts.
- (c) A fire door shall be installed at the collar of every shaft over which a wooden headframe has been erected.
- (d) A fire door shall be installed at every mine opening connected to a surface building or snowshed. Such fire door shall be installed as near to the surface as is practical, and shall be so arranged that it will close automatically in case of fire.
- (e) At all times when men are working in a mine and combustible structures are within 100 feet of a mine opening, a man shall be on duty outside the mine and near the mine opening.

**§7057. Mine Exit Protection.**

- (a) Each mine required to maintain an escape exit shall protect underground employees against the hazard of all exits becoming impassable because of fire or fire gases by one or more of the following methods:
  - (1) By fireproofing the main shaft and shaft stations where there is a fire hazard sufficient to interrupt use of the main shaft hoist for rescue purposes.
  - (2) By maintaining a connecting passageway between working levels of such mine and an adjoining mine which has a safe access to the surface.
  - (3) By mechanical control of the air currents that will permit good air to be supplied through any shaft or escapeway by reversal of air currents.
  - (4) By installation of fire doors and ventilation doors satisfactory to the Division.
  - (5) If none of the foregoing methods can be made applicable to a particular mine, such mine may be required by the Division to install a hoist in an escape exit and keep it in a usable condition.

**§7058. Fire Doors and Fire Bulkheads.**

- (a) If the Division considers that a serious fire hazard exists at a mine, fire doors or fire bulkheads shall be installed so as to prevent smoke and gases from endangering the men. Such doors may also be used for mine ventilation.
- (b) Fire doors shall be constructed of steel and shall be set in steel or concrete walls so constructed that fire on one side cannot pass to the other side when the door is closed.
- (c) Fire doors shall fit closely so they can be readily made gas tight when closed. They shall be provided with suitable latches or devices so they can be readily opened from either side without the use of tools, but cannot be opened by a reversal of the air current.
- (d) Fire doors shall be tested each month and maintained in good working order.
- (e) Where practical, fire bulkheads shall be installed in solid rock away from timbers and stoped-out areas. Fire bulkheads shall be of noncombustible construction if located within 100 feet of mine timbers or other combustible materials.
- (f) Fire bulkheads shall be installed in such manner that fire, smoke, and gases on one side of the bulkhead cannot pass to the other side.

NOTE: In order to provide for sampling air or gas behind the bulkhead, in case fire or other emergency makes such sampling desirable, it **is recommended** that a metal pipe be installed through the bulkhead. Such pipe should be not less than 1-inch inside diameter and provided with a cap or gate-type valve on the outer end.

#### **§7060. Fire Prevention--Underground.**

- (a) ~~(4-9)~~ All electrical equipment which might communicate fire to adjacent flammable material shall be of a type which will confine the heat and flames within the equipment, or it shall be so located and installed that flammable material will not be exposed.
- (b) If the Division considers that a serious fire hazard exists at mine openings or underground stations, it may require that underground employees be protected by one or more of the following methods:
  - (1) By making fire resistant the mine openings for a distance of 50 feet from the surface.
  - (2) By making fire resistant underground stations and adjoining portions of the shaft.
  - (3) By making fire resistant underground buildings or enclosures used to house machinery, or as lunchrooms or places of assembly for men.

It **is recommended** that the main shafts and haulageways be provided with **fireproof** sections at regular intervals.

(c) In mines where serious fire hazards exist, the division may require fire inspection of timbered areas after the crews have left the working places at the end of the shift.

#### **§7061. Heating Devices Underground.**

(a) ~~(4-58)~~ Fire for space heating shall not be permitted underground. Torches, acetylene lamps, and candles shall not be left unattended in any mine in the vicinity of wood or other flammable material.

(b) Electric heaters underground shall be of a type in which the heating elements do not become hot enough to ignite combustible materials.

(c) Acetylene taken underground shall be in cylinders and shall be limited to necessary quantities. ~~24 hours?~~ It shall be stored in a well-ventilated, fire-resistant location.

Empty cylinders shall be removed from the mine without unnecessary delay.

(d) ~~(4-65)~~ The following precautions shall be taken when welding equipment, blow torches, or other heat-producing devices or materials are used in a mine:

(1) All flammable materials within a radius of 10 feet shall be made wet with water before hot work is begun and again after hot work is finished.

(2) Any flammable materials at a greater distance than 10 feet upon which sparks or hot metal can fall shall be made wet with water before hot work is begun and again after hot work is finished.

(3) Before hot work is commenced in a shaft, a noncombustible barrier shall be installed to prevent sparks from falling below.

(4) A fire extinguisher or water hose ready for use shall be at the operation until the hot work is finished.

(5) The area where hot work was done shall be inspected for smoldering fires between one and two hours after hot work is finished.

#### **§7062. Mine Housekeeping.**

(a) Combustible rubbish shall be promptly removed from the mine.

(b) All oily rags or waste shall be deposited in covered metal receptacles. The contents shall be sent to the surface every week, and also when the receptacle is full.

(c) Old timber, waste timber, scraps, and chips shall not be permitted to accumulate underground, but shall be removed from the mine as soon as practical.

EXCEPTION: Old timber, waste timber, wood scraps, and chips in stopes may be left in the mine if buried in filling material.

(d) Active manways, shafts, and winzes shall be kept clear of loose rocks and other obstructions.

**§7063. (4-22). Fire Fighting Equipment.**

(a) One or more fire extinguishers of a type suitable for use underground shall be provided at all locations where electrical equipment is in service in the mine.

Carbon tetrachloride fire extinguishers shall not be permitted in a mine because of danger to men who may breathe the vapor.

(b) Where a fire hazard exists near an underground magazine or an explosives distributing station, fire extinguishers or water hydrants and hose shall be provided for use in fighting fire outside the magazine. They shall not be used on burning explosives nor in fighting a fire in a magazine.

(c) Fire extinguishers of a type suitable for use on oil fires shall be at every storage place for oil or grease in the mine.

(d) Every mine with a fire hazard as outlined below shall be protected against fire in accordance with the provisions of subsection (e) of this section:

(1) Mines in which the main working shaft is timbered and such timber is not protected against fire by being made fire resistant or by being constantly wet.

(2) Mines in which stations are in a combustible condition.

(3) Mines with workings considered by the Division to constitute a local fire hazard of more than normal proportions.

(e) Mines required by subsection (d) of this section to be protected against fire shall be provided with water and equipment for fighting fires as follows:

(1) A supply of water so distributed that a stream of water can be made readily available at any mine station at which a fire hazard exists and throughout all combustible portions of the shaft. "Readily available" means that all necessary piping, valves, and hose connections must be in place and a supply of hose sufficient for the need kept conveniently near such hose connections. Attention is called to the advisability of having connections for hose so placed that a stream of water can be directed upon any station from above and below the station in the event of a fire at the station.

- (2) Hose shall be kept at the mine entrances, on each working level, and at such other places as may be required by the Division.
- (3) The threads and couplings for hose for fighting fire shall be of standard sizes so that hose coupling of a given size may be readily connected to a pipe coupling of like size.
- (4) Fire pails and a 50-gallon drum or tank of water shall be located in every section of the mine where timber is framed and where other fire fighting equipment is not available.
- (5) Where the water supply is inadequate or cannot be practicably applied, special fire fighting equipment and protection may be required by the Division.
- (6) All equipment intended solely for fire fighting purposes shall be tested or carefully inspected at monthly intervals and defective equipment repaired or replaced immediately. All hand chemical fire extinguishers of the soda-acid type shall be discharged, inspected, and refilled every 12 months, and the date of last refilling marked on a tag attached to the extinguisher. Special care must be taken to keep the nozzles of chemical fire extinguishers free from corrosion. See Subchapter 3, Title 19, CAC for additional servicing requirements.
- (7) Special provision shall be made to protect fire extinguishers whose effectiveness is destroyed by cold.
- (8) The location of each fire extinguisher shall be marked conspicuously so that it may be easily found in an emergency.

**§7064. (4-46). Combustible Liquids and Gases--Surface Storage.**

**UNDERGROUND**

(a) Combustible liquids and gases shall be stored at least 100 feet from the following:

- (1) Mine openings
- (2) Buildings and snow sheds connected to mine openings
- (3) Ventilation fan houses
- (4) Hoist houses
- (5) Explosive magazines

The storage place shall be located where contents of leaking containers cannot run over the surface to any point within 100 feet of the above-mentioned places and structures.

NOTE: Certain petroleum gases, such as butane and propane, are compressed to liquid form in pressure tanks. When a tank containing liquefied petroleum gases leaks or is ruptured, the

contents vaporize in the atmosphere. These vapors are heavier than air and will flow downhill over the surface of the ground much like water until the vapors are diffused. For this reason tanks containing liquefied petroleum gases must be stored at locations which are in compliance with the provisions of this section.

**§7065. ~~(4-54)~~. Fuels, Lubricants, and Rope Dressings--Underground Storage and Handling.**

(a) Oils, greases, and rope dressings taken underground shall be transported and stored in closed metal containers that will not permit the contents to leak or spill.

(b) Rope dressings shall not be stored in the mine.

(c) The underground storage place for oils and greases shall be located in a remote place where there will be the least danger to men in the mine should a fire occur.

Where **practical**, the storage place shall be at least 25 feet from any timbers. Where it is necessary to store oils or greases nearer than this distance to mine timbers, such timbers shall be made fire resistant.

Should the amount of oil or grease stored on any **1** level exceed 60 gallons, it shall be stored in a manner acceptable to the Division.

(d) The storage place shall be so arranged that the contents of leaking containers cannot run from the storage place.

(e) Adequate drip pans shall be provided at the storage places of oils, greases, and rope dressings.

(f) Leaking containers or fittings shall be promptly repaired or replaced.

(g) Spillage and leakage shall be promptly cleaned up and sent to the surface.

(h) No combustible materials shall be permitted in any oil or grease storage place.

(i) ~~(4-52)~~ Gasoline shall not be taken, stored, or used under--ground except in permissible flame safety lamps. **Gasoline is not used in flame safety lamps**

(j) ~~(4-53)~~ The use of liquified petroleum gases shall be limited to maintenance work. **Quantity??**

**Article 25. Engines-Internal Combustion**

**§7068. Internal-Combustion Engines Near Mine Openings.**

**UNDERGROUND**

No internal-combustion engine shall be permitted on the surface within 50 feet of any mine opening.

EXCEPTION: This does not apply to self-propelled vehicles which are not operated as stationary equipment. Exhaust and fire hazards

#### **§7069. Engines Prohibited Underground.**

No fuel-burning or internal-combustion engine, other than diesels as allowed in Section 7070 of these Orders, shall be permitted to operate in any mine.

#### **§7070. Permit to Use Diesel Engines Underground.**

(a) No diesel engine shall be permitted in an underground mine unless a permit to use diesel engines underground has first been secured from the Division of Industrial Safety.

(b) Application for such permit shall be made in writing to the Division of Industrial Safety, and shall include the following information:

##### **Conform to TSOs**

(1) Service for which diesel engines are intended.

(2) Location in mine where engines are to be operated.

(3) Aggregate brake horsepower of all diesel engines to be operated in the mine.

(4) Plans for ventilation of the mine.

(5) Any other information considered pertinent by the Division.

(c) When in the opinion of the Division diesel engines can be operated safely in the mine, a permit may be issued to the applicants specifying the conditions under which the diesel engines must be operated.

(d) When a permit is issued the conditions specified are those believed necessary for the protection of workers. If experience in the operation of the diesel engine indicates that any of the conditions are inadequate or unnecessary, the Division may revise the conditions in the light of such experience.

(e) The permit to use diesel engines underground may be revoked for failure to comply with conditions of the permit.

(f) The following is a list of conditions under which diesel powered equipment will be permitted to operate in underground mines:

(1) Before any diesel engine is permitted underground, the employer shall make sure that it is in good operating condition.

(2) Every diesel engine, which is operated underground, shall be checked daily by a mechanic who is skilled in the operation and maintenance of diesel engines. The diesels shall be maintained in good operating condition.

(3) The exhaust of each diesel shall be passed through a water bath or approved catalytic conditioner prior to its discharge into the atmosphere. Conditioners shall be kept in proper operating condition at all times when equipment is in use underground.

(4) Diesel exhaust gas shall not be directed towards diesel operators and shall be deflected so that persons alongside will not encounter exhaust gas at breathing level.

(5) The diesel fuel shall not contain in excess of ~~.5% of sulphur~~ 0.0015 % (15 ppm) of sulfur.

(6) Each diesel unit shall be equipped with a fire extinguisher suitable for control of oil fires.

(7) Before any diesel engine is permitted underground, the mine shall be provided with a mechanically produced and positively controlled system of ventilation.

(8) The main fan shall be installed on the surface and shall be of a type that readily permits the air current to be reversed in direction.

(9) A continuous flow of fresh air shall be maintained in the mine as long as any diesel equipment is operating therein.

(10) The flow of fresh air in any air course shall never be less than 100 cubic feet of air per minute per brake horsepower of the aggregate diesel equipment operating in such air course, plus 200 cubic feet of air per minute for each employee therein.

(11) Positive instructions shall be issued to all workmen that all diesel equipment underground shall be shut down immediately should the air flow stop, and shall remain shut down until the air flow is resumed.

(12) A **dated** daily record shall be kept of the condition of the diesels and the amount of ventilation provided. The record shall show:

(A) Condition of each diesel engine

(B) Total horsepower of diesel equipment that operates in the mine

(C) Quantity of air flowing in the air course

(D) Locations at which the air measurements were taken in relation to position of the diesel engines

(E) Name and title of the person who made the measurements

(13) The record shall be signed by the person who made the measurements. A signed copy shall be kept in the office at the mine, and this copy shall be available for inspection by engineers of the Division of Industrial Safety.

(14) Daily air quality tests shall be conducted for nitrogen dioxide and carbon monoxide. Results of such tests shall be kept with the daily diesel engine records. Diesels shall be shut down or ventilation increased if contaminant levels exceed ~~safe~~ threshold limit values.

#### **§7071. Fueling Diesel Engines Underground.**

(a) Diesel engines shall not be fueled underground where it is ~~practical~~ practicable to fuel them on the surface.

(b) When fueled underground the engine shall be taken to the fuel storage place, if ~~practical~~ practicable, and the fuel pumped directly from the storage container to the engine fuel tank.

(c) ~~(4-54)~~ When the engine must be fueled away from the fuel storage place, the fuel shall be transported in closed metal containers that will not permit the contents to leak or spill should the container be overturned.

(d) The engine shall be shut down during fueling operations.

(e) Precautions shall be taken to prevent spilling during fueling operations. Spilled fuel shall be promptly cleaned up and removed.

(f) The use of compressed air to force fuel from a container is prohibited.

(g) ~~(4-1)~~ No fire, smoking, open lights, or other source of ignition shall be permitted near fueling operations.

NOTE: See Section 7065 for orders pertaining to storage of fuels and lubricants.

### **Article 26. Emergency Plan**

#### **§7074. ~~(4-50)~~. Emergency Plan.**

##### **UNDERGROUND**

(a) The operator of every mine which employs men underground or is required by these Orders to provide an escape exit shall prepare a general plan of action for use in time of emergency.

- (b) The plan shall outline the duties and responsibilities of each mine official and key man so that each will know what is expected of him should a fire, explosion, or other emergency occur.
- (c) The plan shall be posted conspicuously on the mine safety bulletin board and in the mine office.
- (d) All officials and key men shall be thoroughly instructed in their duties so as to avoid contradictory orders and confusion at a time when promptly and efficient action is needed.
- (e) Workmen, both surface and underground, shall be informed of the plan, and each man shall be told what is expected of him in case of explosion, fire, or other emergency.

NOTE: See Section 7065 for orders pertaining to storage of fuels and lubricants.

**§7075. (4-51). Emergency Alarm System.**

- (a) An emergency alarm system adequate to give warning to all employees underground shall be installed and maintained in good working order at all mines.
- (b) Where compressed air is available at all times that an employee is in the mine, it is recommended that a stench method of warning be used. Where compressed air is not available, some other warning system acceptable to the Division shall be used.
- (c) Warning shall be given immediately to all persons underground upon occurrence of fire or other emergency in or near the mine.

**§7076. (4-50) (11-53). Fire and Safety Diagram.**

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- (a) A diagram of the mine shall be provided showing the location of:
  - (1) Principal levels
  - (2) Shafts
  - (3) Tunnels
  - (4) Manways
  - (5) Escape routes
  - (6) Fire doors

(7) Fire extinguishers

(8) Water and air lines available for fighting fire

(9) Telephones

(10) Refuge stations

(11) Ventilation doors

(12) Direction of air flow

(b) The diagram shall be brought up to date at least once every six months. It need not show boundary lines, outlines of ore bodies, or other details not essential for the safety of employees.

(c) Easily legible copies of the fire and safety diagram shall be kept posted on the surface near the mine entrance most frequently used by the men and at every working station in the mine.

**§7077. ~~(11-53)~~. Maps.**

(a) The operator of every mine shall make and maintain, or cause to be made and maintained, a clear and accurate map, showing all the workings of such mine. All underground workings shall be surveyed and mapped before they are allowed to become inaccessible.

(b) Mine maps shall be brought up to date at least once every six months.

(c) The mine maps shall be available near the mine for inspection by the Division.

**Article 27. Escapeways and Refuge Stations**

**§7080. Escapeways and Refuge Stations.**

**UNDERGROUND**

(a) ~~(11-50)~~ Every mine shall have two separate escapeways to the surface which are so positioned that damage to one shall not lessen the effectiveness of the other, or a method of refuge shall be provided when only one opening to the surface is possible.

(b) The escape exit shall be maintained within reasonable distance of the ~~toping~~ stopping areas of the mine.

When the distance between the escape exit and any stope is computed by the following formula and the answer is one or more, the escape exit shall be extended in the direction of such stope until it is ~~reasonable~~ reasonably close.

*For use of  
Advisory  
Committee  
Only*

$$\frac{T}{1000} + \frac{S}{300} = D$$

Insert "new" Formula

$$\frac{T}{1000} + \frac{S}{300} = D$$

~~1000-300~~

T = distance in feet of horizontal travel.

S = distance in feet of vertical and inclined travel.

D = symbol for total distance of travel.

For the purpose of this formula, an incline of less than 20 degrees from the horizontal will be considered as a horizontal passageway.

(c) ~~(11-51a)~~ Escape exits shall be maintained in good condition at all times so as to provide a ready means of escape for employees in case of emergency.

(d) ~~(11-51b)~~ All underground passageways and shaft stations shall be signed and marked by arrows pointing the way to and through the escape exit in a manner to expedite escape.

(e) The surface outlets from escape exits shall be not less than 100 feet from the exit most frequently used by the men.

The surface outlet of no two exits shall be covered by one building or by connected buildings.

(f) Where the use of a series or raises is contemplated for an emergency exit, the mine management is strongly advised to select the position of the raises so as to have them in line with one another, so that hoisting equipment can be installed if advisable at some future time.

In summary:

1. Every mine shall have at least two separate escapeways **from** the lowest working levels. Acceptance of one escapeway during development of a second escapeway and during exploration and development is to be applied in the "narrowest sense."
2. In mines with only one escapeway (those developing a second escapeway or in exploration or development), miners must have access to a refuge chamber.
3. In mines with two escapeways, miners must have access to a refuge chamber they can reach within 30 minutes after leaving their workplace if they cannot reach the surface within one hour through both escapeways using normal means of travel.
4. Miners working in any mine area which is not provided two separate escapeways must be provided a refuge chamber they can access within thirty minutes using normal means of travel.

**§7081. Refuge Stations.**

- (a) When the Division deems it necessary for the protection of employees, it may require that refuge stations be provided and maintained at such places within the mine as the Division may direct.
- (b) Where feasible, the refuge station shall be located where it has two exits to the surface.
- (c) ~~(11-52d)~~ The refuge station shall be provided with a water line, compressed air line, and telephone connection through each exit to the surface. The air lines and water lines shall be equipped with suitable valves which can be readily operated without the use of a tool.
- (d) ~~(11-52a-e)~~ Each refuge station shall be provided with fire doors so it can be isolated from other parts of the mine.
- (e) ~~(11-52b)~~ Refuge chambers shall be large enough to accommodate readily the normal number of men in the particular area of the mine.
- (f) ~~(11-54)~~ Telephone or other voice communication shall be provided between the surface and refuge chambers and such systems shall be independent of the mine power supply.

**Article 30. Rescue Stations and Equipment Underground**

**§7083. Mine Rescue Stations.**

- (a) ~~(4-67)~~ Every mine at which more than fifty (50) men work underground at one time shall be provided with a mine rescue station located at or near the mine, or shall be a member of a cooperative mine rescue station located no greater distance from the member mine than can be covered by the most convenient means of transportation in 2 hours during any season of the year.
- (b) At each mine in which the Division considers there is a serious hazard from mine fires or mine gases, the Division may require the installation of a mine rescue station, with apparatus and equipment as specified in Section 7084.
- (c) ~~(4-70)~~ Smaller mines having 10 to 50 men underground at one time shall join a cooperative mine rescue station or shall have one man for each 10 underground employees or fraction thereof trained annually in the use of breathing apparatus.

It is recommended that small mines, regardless of size, affiliate with a cooperative mine rescue station wherever practical. Where it is not practical, each mine should have some man in its organization who is trained and qualified in the use of breathing apparatus, to accompany mine rescue crews into the mine in case of emergency. This man should be familiar with the mine workings, mine ventilation, water lines, electrical circuits, and underground hoists.

(d) Each rescue station shall be in the immediate charge of a competent and responsible man. The man in charge need not be employed exclusively at the rescue station, but his employment shall be arranged so that he, or a competent and responsible substitute, shall be promptly available in case of need.

(e) Telephone, or other equally rapid means of communication, shall be maintained between the residence of the man in charge and the rescue station and every mine affiliated with the rescue station.

**§7084. ~~(4-67)~~ (4-69). Mine Rescue Equipment and Supplies.**

(a) Except as provided in subsection (b) of this section, each mine rescue station shall be provided with the following respiratory equipment, supplies, and spare parts:

- (1) Ten sets of permissible self-contained two-hour oxygen breathing apparatus.
- (2) Sufficient spare parts to assemble one complete breathing apparatus in good working order.
- (3) One high-pressure oxygen pump for recharging oxygen bottles.
- (4) An emergency supply of oxygen and regenerator charges sufficient to keep 10 sets of breathing apparatus running for 10 hours.
- (5) One signal line 1200 feet long and 1 reel for the signal line.
- (6) Ten permissible electric cap lamps and charger.
- (7) Necessary gas detection and ventilation instruments.

(b) On a showing that equal protection will be afforded to employees, the Division may permit mine rescue stations to be equipped with other types of permissible breathing apparatus and supplies than specified in subsection (a) of this section.

Permission to deviate from the provisions of subsection (a) must be in writing. Application to deviate must state the type of permissible breathing apparatus the applicant desires to use.

(c) Breathing apparatus shall be maintained in good working condition and ready for use. It shall be inspected at least once each month and any necessary repairs and adjustments shall be promptly made.

(d) The man in charge of the rescue station shall make a monthly report on a form prescribed by the Division. The report shall state the condition of the apparatus and equipment, and shall contain a record of the men trained during the month.

Copies of the monthly report shall be furnished to each member of a cooperative rescue station and to the Division of Industrial Safety.

**§7085. ~~(4-67) (4-69)~~ Mine Rescue Training and Procedure.**

(a) Each mine required by Section 7083 (a) to have a mine rescue station or to be a member of a cooperative mine rescue station shall have at least 10 men trained annually in the use of permissible breathing apparatus as recommended by the U.S. Bureau of Mines.

A mine which is a member of a cooperative mine rescue station and which has fewer than 50 men underground at one time shall have trained annually in the use of breathing apparatus at least 1 man for each 10 underground employees or fraction thereof.

(b) At mines that are required to have men who are trained in the use of permissible breathing apparatus, at least 5 men shall practice with the apparatus each month, said practice to include work in an irrespirable atmosphere for at least 30 minutes. Five other men shall be trained the following month. Additional men should be trained. Where it is desirable to do so, 10 men may be trained every 2 months, instead of training 5 men each month.

All men designated to take this training shall be given a careful physical examination, and no man physically unfit for the work shall be allowed to take the training.

(c) Where practical, not more than 50 percent of the regular mine rescue crew shall be regularly employed underground at one time.

**§7086. ~~(4-70)~~ Use of Mine Rescue Equipment.**

(a) As used in these Orders, "breathing apparatus" means a device which supplies the wearer with oxygen or air under low pressure for breathing purposes. By use of this device, the wearer carries his air with him and is independent of the atmosphere around him.

"Gas mask" is a device which is equipped with a canister containing chemicals. The wearer draws his air through the chemicals, which remove small amounts of poisonous gases by filtering or chemical action. As the gas mask does not provide oxygen for the wearer, it cannot be worn safely in an atmosphere containing a high concentration of gases or so low in oxygen that a flame safety lamp will not burn.

There are many types of gas mask canisters which are permissible for use as protection against certain gases or combinations of gases. However, there is only one type of canister that affords protection against carbon monoxide, the poisonous gas which is always present during mine fires and after mine explosions. This is the Type N canister, which is easily recognizable because of its red color.

No gas mask shall be used in a mine unless such gas mask is of a type designated as "permissible" by the U. S. Bureau of Mines and used only with a permissible Type N canister.

(b) No man shall be permitted to wear breathing apparatus in irrespirable mine air unless he is physically fit and has had the required training.

(c) Every rescue crew shall be composed of at least five men. A crew composed of six men is preferable.

(d) No breathing apparatus shall be used in irrespirable mine air unless such apparatus is of a type designated as "permissible" by the U.S. Bureau of Mines.

(e) Each apparatus shall be carefully inspected and tested before it is worn in irrespirable air.

The test shall be sufficient in scope to assure that the apparatus is air tight, and that its various parts are in good condition, functioning properly, and in safe condition to wear.

(f) Except in extreme emergency, only a full rescue crew of not less than five men shall be permitted to wear breathing apparatus in irrespirable air in any mine during a mine fire or for recovery work following a mine explosion.

(g) Except in extreme emergency, no rescue crew shall be permitted to wear breathing apparatus in irrespirable air unless a fully equipped reserve rescue crew is standing by, ready for service, in the most advanced fresh air station.

(h) Communication shall be maintained between the reserve rescue crew and the rescue crew in irrespirable air by means of a signal line.

(i) Care shall be used that the rescue crew does not proceed farther from its fresh air base than it can return safely to such base.

It is recommended that, except in extreme emergency, the rescue crew does not travel farther than 1,000 feet from its fresh air base over a level, unobstructed traveling way where visibility is good. Where necessary to climb ladders or other obstructions, or travel in dense smoke, the distance traveled should be shortened accordingly.

(j) Breathing apparatus should not be used to explore inactive mines or parts of mines because of the many dangers in addition to irrespirable air. Instead, it is recommended that a temporary ventilation system be installed and the exploration be made in fresh air.

If such exploration is undertaken, it shall be done only with a full rescue crew of not less than five men, with a second full rescue crew acting as a reserve in fresh air. Such crews shall be equipped with permissible breathing apparatus. Gas masks shall not be used for such exploration.

(k) Every rescue crew equipped with permissible gas masks shall be provided with a permissible flame safety lamp in good condition.

(l) No rescue crew using gas masks shall remain in an atmosphere where the permissible flame safety lamp will not burn.

## **Article 31. Air Quality, Radiation, and Ventilation**

### **§7090. Environmental Controls.**

#### **GENERAL**

(a) ~~(5-1a)~~ The exposure to airborne contaminants of a person working in a mine shall not exceed, on the basis of a time-weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the most recent edition of the Conference's publication entitled "Threshold Limit Values of Airborne Contaminants." Excursions above the listed threshold limit values shall not be of a greater magnitude than is characterized as permissible by the Conference. This paragraph (a) does not apply to airborne contaminants given a "C" designation by the Conference--for example, nitrogen dioxide.

(b) ~~(5-1b)~~ Employees shall be withdrawn from areas in which there is a concentration of an airborne contaminant given a "C" designation by the Conference which exceeds the threshold limit value (ceiling "C" limit) listed for that contaminant.

(c) General Industry Safety Orders for control of Dust, Fumes, Mists, Vapors, and Gases shall be minimum standards for mines.

(d) (5-2) Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

(e) (5-5) Respirators shall not be substituted for environmental control measures. However, where environmental controls have not been developed or when necessary by nature of the work involved (for example, welding, sandblasting, lead burning), a person may work for reasonable periods of time in concentrations of airborne contaminants which exceed ceiling "C" limits or the limit of permissible excursions referred to in (a) and (b), if such person wears a respiratory protective device approved by the Bureau of Mines as protection against the particular hazards involved.

(f) ~~(20-5)~~ Carbon tetrachloride shall not be used unless under strict environmental controls.

(g) ~~(20-9)~~ Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

### **§7091. ~~(5-37)~~ ~~(5-42)~~. Underground Radiation Hazards.**

The mandatory radiation standards of the Mine Safety and Health Administration for Metal and Non-Metallic Underground Mines, published July 31, 1969, February 25, 1970, and December 8, 1970, are adopted for control of underground radiation hazards.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**§7092. ~~(5-3)~~. Dust Control While Drilling.**

**SURFACE**

When drilling holes with machines in rock or other dust-producing material, such dust shall be controlled as required by the General Industry Safety Orders.

**§7093. ~~(5-3)~~. Dust--Rock Drilling.**

**UNDERGROUND**

(a) For the purpose of these Orders "rock drilling" means drilling, cutting, chipping, channeling, or broaching rock by means of machinery.

"Wet drilling" means the continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

(b) Rock drilling in underground mines is prohibited unless the dust is controlled by wet drilling or other means acceptable to the Division.

(c) Rock drilling machines purchased and used for wet drilling after the effective date of these Orders shall be equipped with a combination air throttle and water valve, so designed that the air cannot be turned on without turning on the water, and the water cannot be turned off without turning off the air.

(d) During wet drilling, the water flow shall be maintained continuously whenever the drill is in operation, including the period of collaring or starting the hole.

(e) Water for wet drilling shall be supplied to the drill in adequate quantities at a pressure of at least 40 pounds per square inch.

(f) Should the water supply or pressure for wet drilling become inadequate, such drilling shall be stopped immediately.

**§7094. ~~(5-1)~~. Dust--Mucking and Transferring Rock.**

(a) The muck pile shall be wet down before mucking begins and shall be kept wet during the entire mucking operation to control the dust.

It is recommended that a continuous spray of water be maintained on muck piles where mucking machines are being operated.

(b) Water sprinklers shall be installed and used on all chutes from which dusty rock is taken, or other equally effective means acceptable to the Division shall be used to prevent harmful accumulations of dust in the atmosphere.

(c) Whenever a sprinkling device is installed at a chute, it shall be so placed that it can be operated by the workmen who operate the chute gates.

The spray shall be directed into the chute and away from the operator's position at the chute.

(d) To prevent spillage from loaded cars and trackless haulage vehicles from adding to the mine dust, the loaded car or vehicle shall not be moved away from the loading spot until the load has been trimmed and leveled so as to prevent spillage.

(e) Effective means shall be used to control the dust in manways, haulageways and other parts of the mine.

It is recommended that dust on haulageways be controlled with water, treating with calcium chloride, or other equally effective means.

In areas of water scarcity, it is recommended that water for dust control be treated with a wetting agent to increase its efficiency.

**§7095. ~~(5-1)~~ Dust, Smoke, and Gases After Primary Blasting.**

(a) Except as provided in subsection (b) of this section, no primary blasting shall be done in a mine during the working shift, except where the ventilating currents are arranged so that dust, smoke, and gases from the blast go out of the mine without circulating through any active working place.

(b) Where it is necessary to do primary blasting during the working shift and the ventilating currents pass from the blast area through active mine workings, all employees shall be removed from such workings to the fresh air side of the blast area before the shots are fired.

(c) After a blast, employees shall not be required or permitted to return to their working places until the atmosphere of such places is reasonably free of smoke, dust, and gases from the blast.

**§7096. ~~(5-1)~~ Dust, Smoke, and Gases from Secondary Blasting.**

- (a) In order to protect employees from harmful dust, smoke, and gases from secondary blasting, such blasting shall not be done unnecessarily during the working shift.
- (b) At permanent locations, such as bulldozing chambers, main grizzlies, draw points, and other control points where blasting is done throughout the working shift in the regular course of the work, employees shall be protected by one or more of the following, as necessary:
- (1) A ventilation system that carries dust, smoke, and gases directly into the return air without circulation through any active working place.
  - (2) A system of water sprays that will blanket the area with a fine spray or mist during blasting, and long enough thereafter that the dust, smoke, and gases are allayed.
  - (3) Removal of employees from all areas of contamination until the atmosphere is reasonably free of dust, smoke, and gases.
- (c) When blasting a chute that is equipped with water sprays, it is recommended that the sprays be turned on before the shot is fired.
- (d) After a secondary blast has been fired, employees shall not be required or permitted to return to the blast area until the atmosphere is reasonably free of dust, smoke, and gases from the blast.
- (e) If the amount of explosive used or the frequency of secondary blasting is such that serious contamination of active working places is apt to occur, employees in such places shall be removed to the fresh air side of the blast area.

Such employees shall not be required or permitted to return to their working places until the atmosphere is reasonably free of dust, smoke, or gases.

**§7098. Ventilation.**

**UNDERGROUND MINE VENTILATION**

- (a) The operator of every mine shall cause a good and sufficient current of fresh air to be circulated through every working place in the mine.
- (b) The quantity of fresh air circulated through each working place shall be at least 200 cubic feet per minute for each person.
- (c) Where workings are of such size or shape that air does not circulate satisfactorily in the vicinity of the workers, auxiliary ventilation shall be used.
- (d) If the quantity of fresh air required by subsection (b) of this section is not sufficient to prevent harmful accumulations of dust, fumes, vapors, or gases, enough additional fresh air shall be provided to remove and prevent such accumulations.

(e) Men shall not be permitted, except in extreme emergencies, to work in a place where the oxygen content of the air is less than 19 1/2 percent by volume (dry basis).

(f) No man, unless he is wearing permissible, self-contained breathing apparatus, shall be permitted to work in a **place where a flame safety lamp will not burn.**

(g) ~~(5-28)~~ Unventilated areas shall be sealed or ~~barricaded~~ provided with barriers and posted against entry.

### **§7099. Mechanical Ventilation.**

(a) When the Division considers it necessary for the protection of employees, mechanically produced and positively controlled air currents shall be provided.

(b) For maximum accessibility and to isolate them from underground hazards, the main fan or fans shall be installed on the surface, unless permission in writing is secured from the Division for their underground installation.

Fans shall be so arranged that the mine entrances can be used for rescue or other purposes.

(c) For the protection of employees, the main fan or fans shall be installed so that the ventilating current can be quickly reversed in direction.

(d) Auxiliary fans underground shall be located so as to provide the best air available to the working place. Recirculation of air by auxiliary fans shall be avoided as far as practical.

(e) ~~(5-22)~~ All surface fans, casings, and air ducts shall be constructed wholly of noncombustible materials.

(f) Every fan house and every building within 50 feet of a fan house shall be constructed wholly of noncombustible material, or shall be made fire resistant by the use of gunite, cement plaster, metal sheathing, or by other equally effective means.

(g) Compressed air that does not contain smoke, harmful gases, or excessive oil may be used for ventilating purposes.

(h) Where underground fans are operated by electricity, all combustible material in the immediate vicinity shall be removed or made fire resistant.

## **Article 32. Gases in Mines**

### **§7102. Dangerous Accumulation of Gases.**

- (a) When the air in any part of a mine is known to contain, or is suspected of containing, a dangerous accumulation of gas, it shall be tested before anyone is allowed to work therein.
- (b) For the purpose of these Orders, a dangerous accumulation of gas is any gas, except flammable gas, in a concentration greater than listed in the General Industry Safety Orders as the maximum allowable concentration for such gas.  
  
A dangerous accumulation of flammable gas is any mixture of flammable gas and air which exceeds 20 percent of its lower explosive limit.
- (c) If an accumulation of gas is sufficient to endanger persons away from its immediate vicinity, such persons shall be promptly taken out of the danger area until the gas is removed.
- (d) When it is necessary to move an accumulation of gas, provision shall be made for the safety of employees in the area through which the gas is to be moved. Accumulations of gas shall be moved under the direction of a competent person.
- (e) No one shall be permitted to work or be in a dangerous accumulation of gas unless permissible respiratory equipment adequate for employee protection is worn.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**§7103. (21-1). Gassy Mine Classification.**

- (a) A mine shall be deemed Gassy, and thereafter operated as a Gassy mine, if:
  - (1) ~~(21-1b)~~ Flammable gas emanating from the orebody or the strata surrounding the orebody has been ignited in the mine; or
  - (2) ~~(21-1c)~~ A concentration of 0.25 percent or more, by air analysis, of flammable gas emanating only from the orebody or the strata surrounding the orebody has been detected not less than 12 inches from the back, face, or ribs in any open workings; or
  - (3) ~~(21-1d)~~ The mine is connected to a Gassy mine; or
  - (4) ~~(21-1a)~~ The Division may designate any mine as Gassy if history or past experience indicates that flammable gas in hazardous concentrations is likely to be encountered in such mine.

**§7104. Tests for Gases.**

- (a) Tests for flammable gases shall be made with a permissible methane detector or by chemical analysis.

Note: To be of most value in active mines, it is necessary that the percent of gas present be quickly and accurately determined. Because of the time required to collect and analyze air

samples, and the relative insensitivity of the flame safety lamp, it is strongly recommended that a permissible methane detector be used for testing.

(b) Tests for any gas other than flammable gas shall be made by chemical analysis or by use of a testing device designed to detect the particular gas for which the test is being made, and to measure its concentration.

(c) When the air in any part of a mine is known to contain or is suspected of containing dangerous or explosive gas, it shall be tested by means acceptable to the Division of Industrial Safety before employees are allowed to work therein. These tests shall be made by an individual who has been certified by the Division to make them.

Every person requesting certification as a gas tester shall submit a completed application form to the Division. Upon submission of an application for certification as a gas tester, the Division shall collect the amount of \$15.00 for examination fee which is non-refundable. Renewal fees are \$5.00 annually.

Note: See Section 6967 (b) for Labor Code excerpts.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code

#### **§7105. Mechanical and Electrical Equipment for Gassy Mines.**

(a) Before installing mechanical equipment in a Gassy mine, consideration shall be given to the use of power which will not be a source of ignition in a gaseous atmosphere.

Where practical, locomotives, material hoists, scraper hoists, auxiliary fans, and other equipment in the mine should be driven by compressed air.

(b) Before installing or using any electrical equipment in a Gassy mine, the Division of Industrial Safety shall be advised of actual conditions. Such installations or operations shall be made according to specific orders to be issued by the Division for the particular location.

#### **§7106. ~~(21-2)-(21-100)~~. Gassy Mine Operation.**

Gassy mines shall be operated in accordance with all mandatory U.S. Bureau of Mines Health and Safety Standards for Metal and Nonmetallic Underground Gassy Mines, published July 31, 1969, February 25, 1970, and December 8, 1970.

### **Article 35. Mine Shafts**

**NOTE: The principal hazards of all shaft work are falls of persons; falling materials, including rock from operating skips and skip pockets; and skips in adjoining compartments which may strike workers or materials being handled.**

**NOTE: The hazards of falling persons and falling materials decrease as the incline of the shaft grows flatter, but a fall in a 20 degree shaft may cause painful or even serious injury.**

**§7110. Shaft Guarding.**

(a) ~~(19-100)~~ Every shaft shall be guarded at the top and at every shaft station.

(b) Guards for shafts shall conform to the following standards;

(1) The guards shall be substantially constructed, preferably, of solid materials, to keep objects from falling into the shaft. If solid materials are not used, openings in the guard shall not exceed one-half inch.

(2) The guards shall be securely fastened in place and, except when necessarily opened, the gates shall be kept securely closed.

(3) The guards and gates shall be at least 42 inches high and shall fit as closely to the floor as feasible.

(4) Any alternate means of guarding which will afford at least equal protection to employees and is acceptable to the division.

(c) The guards for all shafts shall be kept closed except when necessarily opened to:

(1) Load or unload the shaft conveyance.

(2) Make repairs to shaft.

(3) Perform other operations that cannot be performed with the guard in place.

At all times when a guard is removed, the employer shall provide other effective means to prevent men or materials from falling into the shaft.

(d) When a bucket or skip is used for hoisting, means shall be provided that will prevent material from falling into the shaft while being dumped.

(e) ~~(19-105)~~ All stations, levels, and skip pockets shall have a passageway around the working shaft where it is necessary for employees to cross through the shaft.

(f) Entering or crossing through a shaft, except to ascend or descend or for the purpose of inspecting or effecting repairs, is prohibited.

(g) In inclined shafts where the dip exceeds 45 degrees from the horizontal and men are hoisted in skips, the space between the hoisting compartments at each level station shall be closed by lining boards; and an iron bar or pipe of approximately 1-inch diameter shall be placed overhead above the divider in order to give men an easy and secure overhead handhold while walking on the divider.

(h) ~~(19-101)~~ Positive stopblocks or a detail switch shall be installed on all tracks leading to a shaft collar or ~~landing~~, landing.

#### **§7111. Shaft Work, Maintenance, and Repair--General.**

(a) ~~(19-107)~~ Before maintenance or repair work is begun in a shaft, the person in charge of such work shall inform the hoistman of the nature of the work to be done.

(b) ~~(19-108)~~ Signs marked "Men Working in Shaft" shall be hung on the signal device in the hoist room and on or near the hoist brake during the time men are at work in a shaft compartment. The sign shall not be removed until the shaft men have notified the hoist operator that they are in the clear.

(c) When men are working in any compartment of a shaft, the shaft conveyance in any adjoining compartment shall not be operated except in an emergency or as directed by the shaft repair crew.

The hoisting conveyance of any adjoining compartment shall be spotted at the working place to prevent workers from falling into such compartment.

(d) All planks, timbers, bulkheads, and other materials used in repair work shall be removed to a safe place before regular hoisting operations are resumed.

They shall not be placed in a manway compartment in such manner as to impede safe and ready passage through the shaft.

(e) Wherever practical, maintenance work shall be carried on from the hoisting conveyance used in the shaft.

(f) If maintenance work is carried on from the top of the conveyance, a substantial platform or other safe footing securely fastened to the conveyance shall be provided for the workers.

In vertical shafts, an auxiliary bonnet shall be secured to the hoisting rope as closely above such platform as is practical for the work being done.

(g) ~~(15-5)~~ Unless protected by other means acceptable to the Division, approved safety belts shall be provided employees while working:

(1) In or over shafts or winzes inclined more than 45 degrees from the horizontal.

(2) In any portion of any shaft where, because of slippery footing or other local conditions, a serious fall may result.

**§7112. Shaft Work--Major Repair.**

(a) To prevent injury to men and keep materials from falling down the shaft while extensive repair work is carried on, the following precautions shall be taken:

(1) A substantially constructed bulkhead shall be secured in place in the compartment where the repair operations are carried on, and as close below where the men are working as is practical.

(2) ~~(19-77)~~ When the shaft conveyance is lowered to the working place, it shall be stopped at least 15 feet above the working place and shall be held there until a further signal is given by the repair crew.

**§7113. ~~(19-110)~~ Protection Against Falling Materials.**

(a) When a bucket or skip is used for hoisting while sinking a new shaft or deepening a shaft already in operation, workers in the shaft shall be protected against falling rocks and materials by one or both of the following means:

(1) Trap doors shall be installed at the shaft collar over openings in pentices *a heavy duty bulkhead in a shaft to protect workers at the bottom of a shaft (may be unexcavated rock) NOT IN DEFINITIONS* and bulkheads, and under dumping points in the shaft for buckets and skips. Such trap doors shall be substantially constructed and so arranged that they can be readily and easily opened and closed.

It is recommended that trap doors at the collar be operated by compressed air and that the controls be located convenient to the hoistman.

(2) Some other equally effective means acceptable to the Division.

**§7114. (19-110). Deepening an Operating Shaft.**

(a) No hoisting or other work shall be permitted in the upper part of the shaft while men are in the lower part, unless the men are protected by one or more of the following means:

(1) By leaving a rock pentice\* at the bottom of the shaft that is to be deepened. The depth of such pentice\* shall be not less than one and one-half times the least dimension of the shaft.

(2) By installing a substantial bulkhead at the bottom of the shaft to be deepened.

Such bulkhead shall consist of not less than 2 layers of heavy timbers placed with the layers at right angles to each other, and shall be covered with loose rock to a depth of not less than 15 feet.

(b) Any opening through the pentice\* or bulkhead shall be not larger than is necessary to accommodate the sinking operations, and shall not be located under the hoisting compartments of the shaft being deepened.

**§7115. Special Power-Driven Shaft Equipment.**

Before special power-driven mechanical equipment is used in a shaft for sinking or enlarging operations, the mine operator shall notify the Division in writing of the provisions made for the safety of employees.

If considered necessary by the Division, additional safeguards shall be provided.

This section applies to shaft boring machines, shaft drill jumbos, shaft mucking devices, prime movers, and other mechanical appurtenances used in connection with the operation of such equipment.

**§7116. Hoisting While Sinking or Enlarging Shaft.**

(a) In order to protect men working below the shaft conveyance, only first-class hoists shall be used to hoist or lower men or materials through any shaft or winze which is being deepened or enlarged.

This is not intended to prohibit the material hoist from auxiliary use, such as lifting equipment from the hoist conveyance, raising timbers into place, and similar work, when such use is confined to the immediate area of the working place. When a material hoist is used, no one shall be permitted under the suspended load.

(b) ~~(19-77)~~ When the shaft conveyance is lowered to the working place, it shall be stopped at least 15 feet above the working place and shall be held there until a further signal is given by the shaft workers.

**§7117. ~~(11-55)~~ Manway Compartment.**

Every mine shaft, winze, or raise used for hoisting, and through which men are required or permitted to climb, shall be wide enough to accommodate a ladder, stairway, or ramp at a safe distance from the moving conveyance.

**§7118. (3-20). Shaft Safety Pillars.**

No ~~stopping~~ ~~stopping~~ shall be done within 20 feet of a shaft that is regularly used for hoisting men or is used as the main passageway for men entering or leaving the mine. In no case shall stopping be done so as to endanger the shaft. *Stopping is material used to control ventilation flow. Stopping is the removal of ore material from a vein. STOPPING would endanger Shaft Safety Pillars, and is the desired word in this case.*

## **Article 36. Hoisting Equipment**

### **§7120. Hoisting Equipment for Materials.**

#### **GENERAL**

Hoisting equipment for materials shall comply with the General Industry Safety Orders.

### **§7121. Power-Driven Material Hoists.**

- (a) Material hoists shall not be used to hoist or lower men.
- (b) Material hoists shall be installed in a safe location where falling materials from the load cannot endanger either the hoist or hoistman.
- (c) Provision shall be made to prevent a pile-up of rope on the drum from overflowing the drum flange.

It is recommended that vertical roller be installed at each end of the drum to guide the incoming rope.

- (d) Hands or feet shall not be used to guide the rope onto the drum. A mechanical guide may be used for this purpose, provided it is of a type that can be used safely.
- (e) A substantial screen or other suitable guard shall be installed in front of each scraper hoist to protect the operator in event of a broken rope.

### **§7122. Whims and Windlasses.**

Whims and windlasses shall be provided with a reliable device to prevent accidental lowering of the bucket.

### **§7123. Hoists.**

- (a) In addition to the regular operating controls, every hoist shall be provided with adequate means for disconnecting the power from the hoist.

(b) The means for disconnecting the power shall be located where it can be easily and safely manipulated by the hoist operator at his operating station.

(c) Power shall be disconnected from the hoist when:

(1) Movement of the hoist would endanger men working on or about the hoist or equipment moved by the hoist.

(2) The hoist is left unattended.

(d) ~~(19-1)~~ Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

(e) ~~(19-2)~~ Hoists shall be anchored securely.

(f) ~~(19-6)~~ Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

#### **§7124. Hoists at Shafts with Only One Exit.**

At any mine which is entered by a shaft inclined at an angle more than 20 degrees from the horizontal, the hoist shall be a first-class hoist that complies with the standards set forth in Section 7126.

#### **§7125. Hoist for Hoisting and Lowering Men.**

Only a first-class hoist shall be used for hoisting or lowering men.

#### **§7126. First-Class Hoists.**

(a) ~~(19-3)~~ Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

(b) The hoist shall be ~~provide~~ provided with ample power to hoist the fully loaded and unbalanced shaft conveyance from the lowest point in the shaft.

(c) ~~(19-4)~~ The hoist shall be equipped with 2 independent and separate braking systems, either of which shall be capable of holding 150 percent of the weight of the fully loaded and unbalanced shaft conveyance at any point in the shaft.

Such brakes shall be so arranged that the failure of one will not interfere with the proper operation of the other. One such braking system shall operate directly on the hoist drum.

(d) Brakes and other control devices shall be arranged and maintained so that they can be easily and safely manipulated by the hoistman at his operating station.

(e) No brake required by this section is acceptable if its operation depends on engaging a jaw clutch, multiple-tooth clutch, or similar device.

(f) ~~(19-5)~~ ~~(19-65)~~ The clutch and one brake on every hoist drum shall be so arranged that the brake must be applied before the drum can be unclutched, and the clutch must be engaged before the brake can be released.

(g) The clutch of every hoist drum shall be provided with means to prevent it being accidentally engaged or released.

(h) ~~(19-9)~~ Every hoist shall be provided with an indicator that will accurately show at any moment the position of the conveyance in the shaft.

It is recommended that the indicator be of a type that is operated by the hoist drum through a system of gears.

Belt-driven indicators are not acceptable because of the danger of the belt slipping or breaking.

(i) The hoist drums shall be provided with flanges that extend at least three diameters of the hoisting rope radially beyond the last layer of rope when all of the rope is coiled on the drum.

(j) Bolts and other fittings of the hoist shall be made secure by suitable locking devices.

(k) ~~(19-120)~~ The hoist shall be maintained in good operating condition. Parts that are defective, broken, cracked, or dangerously worn shall be repaired or replaced without delay.

(l) The hoist drum and head sheave shall be so aligned that the head sheave is at a right angle to the centerline of the hoist drum.

(m) The distance between the hoist drum and the nearest fixed sheave shall be not less than 15 feet for each foot of drum width.

(n) Each hoist drum and head sheave where men are hoisted or lowered shall have a minimum diameter according to the type of rope used, as given below:

6-strand 7-wire rope--42 times rope diameter

6-strand 19-wire rope--30 times rope diameter

6-strand 37-wire rope--18 times rope diameter

8-strand 19-wire rope--21 times rope diameter

(o) The hoistings **hoisting** rope shall be securely fastened to the hoist drum with at least four cable clips, or equivalent, and shall have at least three full wraps of cable on the drum when the hoisting conveyance is at its greatest depth.

(p) Only a first-class hoist shall be used for hoisting or lowering men.

(q) ~~(19-7)~~ Man hoists shall be provided with devices to prevent overtravel and overspeed.

**§7128. Design of Headframes.**

(a) The headframe shall be so designed and constructed that it will resist a pull in the direction of the hoisting engine greater than the breaking strength of the hoisting rope employed.

(b) There shall be at least 15 feet of unobstructed hoistway clearance between the bottom of the head sheave and the top of the shaft conveyance or top connection for the hoisting rope, whichever is higher, when the bottom of such conveyance is at the top landing.

(c) ~~(19-38)~~ Every head sheave shall be provided with a platform for inspection and maintenance. Such platform shall be conveniently located, shall be of adequate size for men to work from safely, and shall be equipped with standard railings and toeboards.

(d) Safe access shall be provided to the head sheave platforms.

(e) The headframe, sheaves, bearings, and all accessories shall be maintained in safe and usable condition.

**§7129. (19-120). Shaft Conveyances--General.**

(a) Every shaft conveyance shall be constructed of steel or other metal of equivalent strength acceptable to the Division.

(b) Safety dogs or catches shall be substantially constructed of steel. They shall be kept well oiled and in good working condition.

(c) At least once each work day, the weight on the hoisting rope shall be relieved for activating and inspecting the safety dogs.

When deemed necessary by the Division of Industrial Safety, drop tests may be required in the presence of a representative of the Division.

(d) Should the safety dogs or catches fail to function properly while being tested, the shaft conveyance shall be removed from service until the safety dogs or catches have been put into satisfactory working condition.

**§7130. Shaft Guides.**

(a) All shaft guides shall be Select Douglas Fir or equivalent, and shall be large enough in cross section to absorb the shock of stopping the fall of a shaft conveyance when gripped by the safety dogs or catches.

(b) Shaft guides shall be securely fastened in place with bolts or lag screws. Lag screws shall be screwed and not driven into place.

**§7131. Shaft Tracks.**

(a) The tracks for the shaft conveyance in inclined shafts shall be made of steel or other metal of equal strength.

EXCEPTION: Wooden rails or skids may be used with a bucket when enlarging or deepening a shaft.

(b) Rails shall be well aligned and securely fastened in place.

(c) The connecting ends of rails shall be fastened together by use of splice bars or welds.

(d) Rail joints shall be supported adequately to prevent bending. It is recommended that rail joints be staggered for better stability.

(e) The track shall be maintained in good condition. Repairs, when needed, shall be made without unnecessary delay.

**§7132. Conveyances for Hoisting or Lowering Men in Vertical Shafts.**

(a) ~~(19-49)~~ Except when using a bucket for sinking or repairing a shaft, every shaft conveyance in which employees are required or permitted to ride shall be provided with a man-deck for use of employees.

(b) ~~(19-45)~~ Every conveyance used for hoisting or lowering men in a vertical shaft shall be covered by a bonnet to protect persons riding therein.

(c) ~~(19-45)~~ The bonnet shall be constructed of mild steel plate at least three-sixteenths-inch thick, or equivalent, which shall slope toward each side and shall be so arranged that they may be readily pushed upward to afford egress to persons in the conveyance.

(d) ~~(19-50c)~~ The man-deck of every shaft conveyance shall be provided with side casings at least 5 feet high, the gates of which must be at least four and 4 1/2 feet high.

(e) Side casings and doors shall be substantially constructed of metal at least one-sixteenth-inch thick or of wire netting composed of wires at least one-sixteenth inch in diameter, with maximum openings not more than one-half inch.

(f) To prevent accidental opening while the shaft conveyance is in motion, doors shall be equipped with safety catches or other devices satisfactory to the Division.

The doors of the shaft conveyance shall be so arranged that they cannot be opened outward.

(g) Conveyances in vertical shafts shall have at least 1-inch clearance from all timbers and other objects in the shaft except guides for the conveyance.

(h) Every shaft conveyance in which employees are required or permitted to ride shall travel in guides and be equipped with safety dogs or catches of standard design to hold the fully loaded conveyance should the hoisting rope fail.

(i) ~~(19-50a)~~ Every hoisting bucket used in a shaft more than 50 feet deep shall be provided with a crosshead that travels upon guides and is equipped with safety dogs or catches of standard design. The height of the crosshead shall be not less than its width.

(j) ~~(19-50b)~~ Buckets used to hoist men during shaft sinking operation shall have devices to prevent accidental dumping.

### **§7133. Conveyances for Hoisting or Lowering Men in Inclined Shafts.**

NOTE: The chief hazards of hoisting and lowering men in inclined shafts are derailing the shaft conveyance, breaking the hoisting cable, falling rock or materials, and striking against fixed objects.

(a) Every shaft conveyance shall be provided with shaft guides or other satisfactory means to prevent derailment of the conveyance.

(b) Every shaft conveyance shall be equipped with a device to stop the conveyance should the hoisting rope fail.

(c) ~~(19-45)~~ Conveyances in shafts with a slope greater than 45 degrees from the horizontal shall be provided with bonnets constructed in accordance with the provisions of Section 7132(c).

(d) To prevent employees from being caught between the moving shaft conveyance and the shaft walls, chute lips, timbers, or other obstructions, one (1) or more of the following precautions shall be taken:

(1) At least 2 feet of overhead clearance shall be provided between men on the shaft conveyances in their riding position and the nearest shaft wall, chute lip, timber, or other obstruction.

At least 1 foot of clearance shall be provided between men on the shaft conveyance in their riding position and the nearest obstruction at the side of the shaft conveyance.

- (2) The shaft conveyance shall be enclosed in such manner that men riding thereon cannot come in contact with obstructions along the shaft.
- (3) The shaft conveyance shall be of such size and construction that men ride entirely inside the conveyance.
- (4) Use of alternate means which will afford equivalent protection is acceptable to the Division.

**§7135. (19-21). Hoisting Ropes--Safety Factor and Inspections.**

(a) Every hoisting rope used on a mechanically driven hoist shall be made of steel or alloy steel. The rope center may be fiber.

(b) Hoisting ropes shall be of adequate size to handle the intended load and shall have the following safety factors:

Length of rope	Minimum safety factor of new rope	Minimum safety factor when rope must be discarded
500 feet or less	8	6.4
500 to 1000 feet	7	5.8
1000 to 2000 feet	6	5.0
2000 feet and more	5	4.3

(c) The safety factor of a new rope shall be calculated by dividing the breaking strength of the rope as rated by the manufacturer by the sum of the maximum load to be hoisted, plus the total weight of the rope in the shaft when fully let out.

(d) ~~(19-128)~~ No rope shall be used for hoisting or lowering men:

- (1) If there are six broken wires in one strand of a rope lay.
- (2) If the wires on the crown are worn to 65 percent of their original diameter.
- (3) If more than 3 wires have been reduced by wear more than 30 percent in cross section are broken in 1 strand of a rope lay.
- (4) If marked corrosion appears.
- (5) If minimum safety factor falls below that specified in subsection (b) of this section.

(e) ~~(19-120)~~ At least once every three months, every hoisting rope used for hoisting or lowering men shall be carefully inspected by a competent man designated for that purpose:

Such inspection shall consist of:

- (1) Carefully examining the exterior of the rope throughout its entire length.
- (2) Cutting off a section from the load end of the rope at a point not less than 5 feet above the highest part of the rope connection to the conveyance.
- (f) The interior of the section of hoisting rope cut off in compliance with subsection (e) of this section shall be carefully examined for fatigue, wear, corrosion, or breaks.
- (g) ~~(19-120)~~ If, upon inspection, any hoisting rope is found to be below any requirement set forth in this section, it shall forthwith be removed from service as a hoisting rope.
- (h) Serious damage may be caused to the hoisting rope by shaft accidents, such as pulling the shaft conveyance into the sheave, piling up rope on a stopped conveyance, or by kinking or running over the rope when the conveyance is derailed.

In event of an accident which may have caused damage to the hoisting rope, such rope shall not be used to hoist or lower men until it has been inspected by a competent man and found to be safe.

**§7136. ~~(19-120)~~ Hoisting Rope Maintenance.**

- (a) No hoisting rope shall be allowed to drag or rub on any part of the hoistway, but shall be supported by rollers or guide pulleys located so as to prevent dragging or rubbing.
- (b) Spliced hoisting ropes shall not be used in mines except as provided for in Section 7137 of these Orders.
- (c) Every hoisting rope shall be kept well lubricated at all times.
- (d) In all shafts containing acid water or a corrosive atmosphere, an acid-resistant preservative shall be used regularly on the hoisting rope, or a corrosion-resistant rope shall be used.

**§7137. ~~(19-24)~~ Hoisting Rope--Method of Attaching to Conveyance.**

(a) The hoisting rope shall be attached to the shaft conveyance by one of the following methods:

- (1) Thimble With Clip or Clamp Method. The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load and bending the end back so that it is parallel to the long or "live" end of the rope and fastening the two parts of the rope together with clips or clamps.

The "U" bolt of each clip shall encircle the short or "dead" end of the rope, and the distance between clips shall not be less than the figures given in the table below.

The following number of clips shall be used for various diameters of 6-strand 19-wire plow steel ropes. (Follow manufacturer's recommendations for other kinds of wire rope.)

Diameter of rope (inches)	Number of clips	Space between clips (inches)
3/4	4	4-1/2
7/8	4	5-1/4
1 - 0	5	6-0
1-1/8	6	6-3/4
1-1/4	7	7-1/2
1-1/2	8	9-3/4
1-5/8	8	9-3/4
1-3/4	8	10-1/2
2-0	8	12-0

Note:  
Table in  
Title 8  
has  
several  
misprints

Where clamps other than "U" bolts are used, the manufacturer's recommendations shall be used.

For all wire ropes less than three-fourths inch in diameter, at least four clips shall be used.

When clips or clamps are installed on a hoisting rope, they shall be carefully tightened. A full load shall then be applied to the rope and the clips or clamps retightened under load before the rope is put into service.

During the first few days, the clips or clamps shall be inspected at frequent intervals and retightened as necessary.

(2) Zinc Socketing Method. For wire ropes over 1 1/4 inches in diameter, it is recommended that the zinc socketing method be used. If used, the work shall be done by a person experienced in this kind of work.

Babbit metal or lead for socketing wire ropes is prohibited.

(3) Thimble and Splice Method. The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load, bending it back and fastening the "dead" end to the "live" line by splicing in such a manner as to develop the maximum efficiency possible for the particular rope size.

Such splice shall be made only by a workman skilled in wire rope splicing.

**§7138. Attaching Hoisting Cable to Hoisting Conveyance--Safety Hook.**

(a) ~~(19-75)~~ No open hook shall be used with a shaft conveyance in hoisting, but some form of safety hook or shackle shall be used.

(b) In all shafts where men are hoisted or lowered, an emergency sling double clevis pin, or other attachment acceptable to the Division shall be used from the cable to the conveyance, so that should the clevis pin break, the emergency attachment will prevent the conveyance from falling.

**§7139. Hoist Signal System.**

(a) ~~(19-90)~~ Every shaft shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level and all other levels from which hoisting is done.

(b) ~~(19-92)~~ Every shaft in which hoisting is done shall be provided with an emergency signal system that can be operated from the shaft conveyance at any point in the shaft.

(c) Special care shall be taken to keep all signaling apparatus in good order, and necessary precautions shall be taken to prevent electric signal and telephone wires from coming into contact with other electric conductors, whether insulated or not.

**§7140. ~~(19-90)~~ Dual Signaling System.**

(a) Every shaft in which men are hoisted or lowered shall be provided with a dual electrical system for shaft signaling.

(b) When a dual method of signaling is employed, one shall be a bell system to signal for movement of the shaft conveyance. It shall be used for no other purpose.

The second method shall be used to call for the shaft conveyance and may also be used for other communications, except to signal for movement of the shaft conveyance. This method shall consist of a system of telephones with buzzers or horns loud enough to be heard clearly.

(c) ~~(19-92)~~ The control for the signal for movement of the shaft conveyance shall be located at the shaft, within easy reach of a person in the shaft conveyance.

(d) The control for the signal used to call for the shaft conveyance shall be in a convenient location well away from the shaft.

(e) ~~(19-10)~~ Hoist controls shall be placed or hosed so that the noise from machinery or other sources will not prevent hoist men from hearing signals.

**§7141. ~~(19-94)~~ Hoisting Signal Code.**

(a) When using signals for hoisting or lowering, the following system or code shall be used:

Signals Between Mine and Hoistman--

- 2-1 bells, to hoist rock.
- 1 bell, to stop if in motion.
- 1-2-1 bells, to release skip.
- 2 bells, to lower.
- 3-1 bells, man on; run slowly; men to be hoisted.
- 3-2 bells, man on; run slowly; men to be lowered.
- 7 bells and repeat, accident. Follow this signal with station signal.
- 3-3-1 bells, hoist cautiously.
- 3-3-2 bells, lower cautiously.
- 3-2-1 bells, ready to blast.

After receiving the signal "ready to blast," the hoistman shall give his signal when he is ready to hoist. The hoistman's signal "ready to hoist" is to raise the shaft conveyance 2 feet and lower it again.

(b) When a signal system is used to call for the shaft conveyance, the following code shall be used:

1-2 bells, collar of shaft	2--1-2 bells, 20th level
1-3 bells, 1st level	2--1-3 bells, 21st level
1-4 bells, 2d level	2--1-4 bells, 22d level
1-5 bells, 3d level	2--1-5 bells, 23d level
2-1 bells, 4th level	2--2-1 bells, 24th level
2-2 bells, 5th level	2--2-2 bells, 25th level
2-3 bells, 6th level	2--2-3 bells, 26th level
2-4 bells, 7th level	2--2-4 bells, 27th level
2-5 bells, 8th level	2--2-5 bells, 28th level
4-1 bells, 9th level	2--4-1 bells, 29th level
4-2 bells, 10th level	2--4-2 bells, 30th level
4-3 bells, 11th level	2--4-3 bells, 31st level
4-4 bells, 12th level	2--4-4 bells, 32d level
4-5 bells, 13th level	2--4-5 bells, 33d level
5-1 bells, 14th level	2--5-1 bells, 34th level
5-2 bells, 15th level	2--5-2 bells, 35th level
5-3 bells, 16th level	2--5-3 bells, 36th level
5-4 bells, 17th level	2--5-4 bells, 37th level
5-5 bells, 18th level	2--5-5 bells, 38th level
6-1 bells, 19th level	2--6-1 bells, 39th level

(c) ~~(19-94)~~ Easily legible copies of the hoisting signals shall be posted in a convenient location at the collar of the shaft, at each shaft station, and in the hoist room.

Note: When there are two or more shafts with hoists in the same mining operations, similarly identified levels shall have the same signal code number.

(d) ~~(19-96)~~ Any person responsible for receiving or giving signals for cages, skips, and man trips when men or materials are being transported shall be familiar with the posted signaling code.

**§7142. ~~(19-94)~~ Station Signal Boards.**

There shall be placed at each station a signboard on which shall be displayed the number of the level and the method for calling the shaft conveyance.

**§7143. Lubricating Sheaves, Rollers, and Hoisting Equipment.**

(a) The hoistman shall be informed immediately before lubricating or oiling operations are commenced, and again when such operations are finished.

(b) ~~(19-107)~~ The hoist shall not be operated or moved while the sheaves, rollers, or other hoisting equipment are being lubricated, except as directed by the oiler.

**Article 37. Hoisting Practices**

**§7146. Loading Men on Shaft Conveyance.**

(a) The person in charge of the mine shall determine the maximum number of people allowed to ride in the shaft conveyance at one time.

(b) Legible signs stating the number of persons allowed to ride in the shaft conveyance at one time shall be posted conspicuously at the shaft collar and on each shaft station where employees board the shaft conveyance.

(c) ~~(19-69)~~ Some responsible person or persons shall be designated to supervise the loading of the shaft conveyance while the shift is being hoisted or lowered.

Such person or persons shall see that the men board the conveyance in an orderly fashion, that the posted maximum number of men allowed on the conveyance at one time is not exceeded, and that the proper hoisting signals are used.

(d) ~~(19-50)~~ It is forbidden to place boards across the top of a bucket or skip and permit men or materials to ride thereon. If boards are used, they shall be placed inside and at least 30 inches below the lip of the bucket or skip.

(e) Men shall be provided with a safe means for getting in and out of the shaft conveyance.

Where it is necessary for men to climb up or down inside the shaft conveyance for a distance of more than 4 feet, a ladder or some other device acceptable to the Division shall be kept in such conveyance while men are being hoisted or lowered.

(f) ~~(19-71)~~ Men shall not be permitted to ride on the bail or edge of the shaft conveyance.

(g) ~~(19-70)~~ The gates of the man-deck shall be closed and latched before a signal is given to move the shaft conveyance.

(h) No smoking or open-flame lights shall be permitted in the shaft conveyance while the shift is being hoisted or lowered.

(i) Crowding or scuffling of men in the vicinity of a shaft is strictly prohibited.

**§7147. Hoisting and Lowering Men--General Safe Practices.**

(a) The safe rate of speed for the shaft conveyance shall be fixed by the employer for each shaft, and shall not be exceeded when hoisting or lowering men.

A notice of such speed limitation shall be posted in a conspicuous place near the hoist.

(b) When hoisting or lowering men with a bucket, the speed shall not exceed 200 feet per minute except in case of apprehended **perceived?** danger.

(c) At the beginning of each shift, the shaft conveyance shall make one full trip up and down each hoisting compartment before men are hoisted or lowered.

Such trips before carrying men shall also be made by the hoist conveyance in each hoisting compartment after repair work has been performed in the shaft and after the hoist has not been operated for a period of one hour or more.

(d) When the shaft conveyance has been released to the hoistman, it shall not be left at a landing but shall be hung up at least 10 feet above the shaft collar or level.

(e) A careful watch shall be kept over all hoisting equipment. A daily inspection shall be made of all such equipment and a report of any defect shall be made to the person in charge.

(f) Only authorized visitors and employees shall be permitted in the hoist room.

(g) When men are being hoisted in a skip or bucket, means shall be taken to prevent the lip of the skip from catching on the shaft timbers should the conveyance dip downward.

(h) ~~(19-69)~~ It is forbidden to get on or off a shaft conveyance while it is in motion.

(i) Hoisting or lowering men by animal power or by motor vehicles is prohibited.

(j) ~~(19-71)~~ Men shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

(k) ~~(19-73)~~ Rock or supplies shall not be hoisted in the same shaft as men during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

**§7148. Hoisting Tools and Materials.**

(a) (19-80) All timbers, tools, and other materials that are longer than the shaft conveyance in which they are being hoisted or lowered shall be securely lashed to the cable at their upper ends, or otherwise secured, so they will safely ride up or down the shaft without catching on timbers, rocks, or other obstructions.

(b) Other material shall be secured to the shaft conveyance or enclosed in such manner that it cannot fall from the conveyance or catch on obstructions along the shaft.

(c) ~~(19-79)~~ Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

**§7149. Hoistmen Required to Be on Duty.**

(a) A qualified hoistman shall be in immediate charge of the hoist at all times when men are being hoisted or lowered.

Should any of the hoistman's duties be delegated to a learner, they shall be performed under the direct personal supervision of the qualified hoistman.

(b) At all times the shift is being hoisted or lowered, a man who is familiar with the operation of the hoist shall be present beside the hoistman, and be on the alert to assume immediate control of the hoist in the event that the hoistman should become incapacitated.

The standby man need not be a fully qualified hoistman, but shall be familiar with the operation of the hoist.

This subsection does not apply where the hoist is equipped with control devices that will automatically stop the hoist and apply the brake when the shaft conveyance reaches designated points at the top and bottom of the shaft.

(c) ~~(19-55)~~ A hoistman shall be on duty, within hearing of the hoist signal, as long as any man remains in a mine into which he has been lowered. He shall not at any time be more than 300 feet from his hoist.

(d) The hoistman shall not be permitted to engage in conversation while hoisting or lowering men.

**§7150. ~~(19-58)~~ Qualified Hoistman.**

- (a) At every mine where men are hoisted or lowered, there shall be one or more qualified hoistmen who shall operate the hoist while men are being hoisted or lowered.
  - (b) Qualified hoistmen shall be not less than 21 years of age and shall be able to speak and read English readily.
  - (c) Every qualified hoistman shall be familiar with the details and workings of mine hoists and must be experienced in their operation.
  - (d) Men who wish to become qualified hoistmen, but who have not had practical experience in hoisting and lowering men and material, must operate a hoist handling material a sufficient length of time under instruction of an experienced qualified hoistman until the employer considers the learner competent to hoist and lower men.
  - (e) Every qualified hoistman shall be given a thorough physical examination at least once a year by a physician licensed to practice medicine in California. The physician shall complete an examination form prescribed by the Division and send it to the employer after signing, detaching, and delivering the lower part to the applicant for posting in the hoist house.
- No man shall be permitted to hoist or lower men until he has successfully passed the physical examination.
- (f) The Division may require hoistmen who handle materials only to pass the prescribed physical examination where improper operation of the hoist might endanger an employee.

## **Article 40. Inspections**

### **§7160. ~~(3-22)~~. Daily Inspections.**

- (a) At least twice during each working shift, an inspection shall be made of every part of the mine where an employee is working or required to be in the course of his duties.

One such inspection shall be made during the early part of the work shift and another inspection shall be made during the latter part of the workshift.

Such inspections shall be made by a shift boss or other mine official, who must be at least 21 years of age, and able to speak, read, and write English.

- (b) The employee who makes the inspection shall watch for unsafe conditions and practices that may cause injury to employees. Immediate hazards such as missed holes, dangerous accumulations of gases, and unguarded chutes shall be corrected without unnecessary delay.
- (c) If any dangerous or questionable ground is found in the roof or sides, it shall promptly be made safe by one or more of the following means:

- (1) Scaling or blasting down
- (2) Supporting
- (3) Backfilling
- (4) Erect **barriers** with warning signs to prevent entrance to the dangerous area.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**§7161. ~~(19-120)~~. Shaft Inspection.**

Each shaft in which men or materials are hoisted or lowered shall be inspected each week by a man who is competent to make such inspection.

The man making the inspection shall list on a form prescribed by the Division all unsafe conditions found in the shaft and corrective measures necessary to make the shaft safe.

The weekly shaft report shall be signed by the man who made the inspection. The weekly shaft inspection report shall be kept at the mine office for two years, and shall be available for examination by representatives of the Division.

**§7162. ~~(11-51a)~~. Monthly Inspections.**

(a) Some competent person or persons shall make an inspection at least once each month of all active workings of the mine and appliances in the mine, and shall report any unsafe conditions to the employer, who shall take immediate steps to remedy the same.

(b) The entire escape exit shall be inspected at least once each month for rock falls, fire hazards, deterioration of ladders, timbers, and other equipment necessary to maintain an adequate escapeway.

If any condition is found in an escape exit making it inadequate for an escapeway, repairs shall be commenced immediately and completed with reasonable diligence.

A written report shall be made of the escape exit inspection. The report shall list all hazardous conditions found in the escape exit. It shall be signed by the person or persons who made the inspection, and shall be kept at the mine office for two years, during which period it shall be available for examination by representatives of the Division.

NOTE: If desired, the general mine inspection and escape exit inspection required by subsections (a) and (b) may be combined with the safety committee inspection required by Section 6964.

## **Article 41. Telephones**

### **§7164. Telephone System.**

#### **UNDERGROUND**

(a) A telephone system shall be installed and maintained in good working condition in every mine which:

(1) Has reached a depth of 500 feet.

(2) Is entered by an audit or tunnel in which mining or development work is being done at a distance more than 1,000 feet from the entrance.

(b) The telephone system shall be equipped with telephones on the surface and at each working level 100 feet or more below the surface.

(c) Mines opened by a shaft having an inclination of less than 20 degrees from the horizontal shall be considered, for the purpose of this Order, to be mines opened by tunnels or adits.

### **§7165. Emergency Telephone.**

At every mine with an escape exit required by these Orders, telephone communication for emergency purposes shall be provided between the underground telephone stations and the principal surface telephone station, by way of the escape exit, provided, however, that other equally rapid means of communication may be used between surface stations.

Such emergency system shall be in addition to the telephone system required by Section 7164.

### **§7166. Telephones for Shaft Work.**

When a shaft-sinking or shaft-deepening operation reaches a depth of 100 feet below the shaft-sinking hoist, a telephone system shall be installed for communication between the shaft crew and the hoistman.

It is recommended that a portable type of telephone be provided for the shaft crew so that it can be kept near their working place during working hours.

## **Article 45. Protection Against Water**

**§7175. ~~(20-10)~~. Retaining Dams.**

**GENERAL**

(a) If failure of a water or silt retaining dam will create a hazard, it shall be of substantial construction and inspected at regular intervals.

(b) ~~(20-10)~~ No restraining dam shall be installed in any mine where the rupture of such dam would imperil the safety of men in said mine or other mine until the Division has given its approval for the construction of said dam.

**§7176. ~~(20-10)~~. Protection Against Water.**

**UNDERGROUND**

(a) No mine working shall be allowed to approach within 16 feet of any part of a winze, stope, or other opening in which there is a known or suspected dangerous accumulation of water.

(b) Notice shall be given to the Division in writing before starting to advance a mine working toward another mine working that is suspected of being filled with water.

(c) A bore hole shall be drilled at least 18 feet ahead of the face when in the vicinity of mine workings suspected of containing a dangerous accumulation of water.

When the exact location of such working is not known, additional bore holes at least 18 feet deep shall be drilled in other directions.

(d) In every mine where there is danger of a sudden inburst of water, additional raises, drifts, bulkheads, or other workings shall be constructed as are necessary in the opinion of the Division to insure the escape of workmen.

(e) No underground mine working shall be allowed to approach within 50 feet of any stream, pond, or other body of water on the surface.

**Article 46. Dangerous Excavations at Underground Mines**

**§7178. Dangerous Excavations.**

(a) ~~(20-20)~~ Access to unattended mine openings shall be restricted by gates or doors, or the openings shall be fenced and posted.

(b) ~~(20-21)~~ Every dangerous surface excavation in which work has been discontinued, including any tunnel, mine shaft, pit, well, septic tank, cesspool, or other abandoned excavation, shall be

securely covered over, fenced, or otherwise effectively guarded and appropriate danger notices shall be posted.

(c) ~~(20-21)~~ All dangerous inactive or abandoned underground mine workings shall be securely covered over, fenced, or otherwise effectively guarded to prevent entrance of employees into such workings.

Where the method of guarding does not positively prevent entrance into the dangerous workings, such entrance shall be plainly marked with legible signs warning unauthorized employees to keep out.

(d) ~~(20-31)~~ In areas where dangerous accumulations of water, gas, mud, or fire atmosphere could be encountered, employees shall be removed to safe places before blasting.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

## **Article 47. Electrical Equipment and Practices**

### **§7180. Electrical Equipment and Installations.**

#### **GENERAL**

The provisions of T8-7180 of Part 6, T-24, are incorporated herein as a part of these regulations and reads as follows:

T8-7180. Electrical Equipment and Installations.

In addition to the provisions of Part 2, the following shall apply to all mine construction. All electrical wiring and equipment shall be installed and maintained in compliance with the Electrical Safety Orders for underground and Part 3, T-24, CAC for surface buildings.

### **§7181. Trailing Electrical Power Cables--General.**

(a) Trailing electric power cables shall be used only in continuous lengths except when connections are made with a connector or splice box of approved design.

(b) Branch circuits shall not be installed on trailing electric power cables.

(c) Vehicles shall not be driven over electric power cables unless such cables are protected from mechanical injury and the vehicles prevented from coming in contact with cables.

- (d) Where a trailing electric power cable passes over an industrial railway track or vehicular road, it shall be securely supported by poles, horses, or other means so as to provide a safe clearance between the cable and any equipment used on the railway or vehicular road.
- (e) Trailing electric power cables shall be connected to mobile equipment in such manner that tension will not be transmitted to the joints or terminals screws of the fittings. This shall be accomplished by a special fitting designed for such purpose, or by other equally effective means.
- (f) Cable tongs, cable hooks, or slings with insulated handles shall be used when handling energized trailing electric power cables.
- (g) Noncurrent-carrying metal parts of portable equipment using trailing electric cables shall be grounded by means of a grounding conductor run with the circuit conductors in cable assemblies or flexible cords; this conductor may be uninsulated but if an individual covering is provided for this conductor, it shall be finished to show a green color.

**§7182. Trailing Electric Power Cables, Maintenance and Repair.**

- (a) Trailing electric power cables shall be maintained in good repair.
- (b) Conductors of trailing electric power cables shall be so spliced or joined as to be mechanically and electrically secured without solder and unless an approved splicing device is used, shall then be soldered with a fusible metal or alloy or brazed or welded. All splices and joints and free ends of conductors shall be covered with an insulation equivalent to that on the conductors.
- (c) When the jackets of trailing electric power cables have been cut or damaged so that their insulation protection is substantially reduced, or when the conductors of such cables have been sliced, the jackets shall be repaired and vulcanized so that the repaired section will have insulating properties equivalent to the original electric cable cover.

**§7183. Federal Electrical Standards.**

- (a) Except as provided herein, the Bureau of Mines Mandatory Electricity Standards published July 31, 1969, February 25, 1970 and December 8, 1970 are adopted as part of these orders and read as follows:

EXCEPTION: In no case shall the minimum requirements be less than those established in the Electrical Safety Orders, T-8, CAC and Part 3, T-24, CAC.

**GENERAL**

- (1) ~~(12-1)~~ Circuits shall be protected against excessive overload by fuses or circuit breakers of the correct type and capacity.
- (2) ~~(12-2)~~ Electric equipment and circuits shall be provided with switches or other controls. Such switches or controls shall be of approved design and construction and shall be properly installed.
- (3) ~~(12-3)~~ Individual overload protection and short circuit protection shall be provided for the trailing cables of mobile equipment.
- (4) ~~(12-7)~~ Trailing cables and power-cable connections to junction boxes shall not be made or broken while energized.
- (5) ~~(12-11)~~ High-potential transmission cables shall be covered, insulated, or placed to prevent contact with low-potential circuits.
- (6) ~~(12-14)~~ Shovel trailing cables shall not be moved with the shovel dipper unless cable slings or sleds are used.
- (7) ~~(12-16)~~ Electrical equipment shall be deenergized before work is done on such equipment. Switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Such locks, or preventative devices shall be removed only by the persons who installed them or by authorized personnel.
- (8) ~~(12-17)~~ Power circuits shall be deenergized before work is done on such circuits unless hotline tools are used. Suitable warning signs shall be posted by the individuals who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventative devices shall be removed only by the person who installed them or by authorized personnel.
- (9) ~~(12-18)~~ All switches, automatic cutouts, or other control devices shall be located or marked as to clearly indicate the equipment controlled by them, and switches (excepting magnetic switches) shall indicate whether they are open or closed.
- (10) ~~(12-20)~~ Dry wooden platforms, insulating mats, or other electrically-nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, noncurrent-carrying parts of the power switches to be operated may be used.
- (11) ~~(12-21)~~ Suitable danger signs shall be posted at all major electrical installations.
- (12) ~~(12-23)~~ Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.

- (13) ~~(12-25)~~ All metal enclosing or encasing electrical circuits shall be grounded or provided with equivalent protection. This requirement does not apply to battery-operated equipment.
- (14) ~~(12-26)~~ Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.
- (15) ~~(12-27)~~ Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.
- (16) ~~(12-28)~~ Continuity and resistance of grounding systems shall be tested immediately after installation.
- (17) ~~(12-30)~~ When a potentially dangerous condition is found it shall be corrected before equipment or wiring is energized.
- (18) ~~(12-33)~~ Hand-held electric tools shall not be operated at high potential voltages.
- (19) ~~(12-36)~~ Fuses shall not be removed or replaced by hand in an energized circuit, and they shall not otherwise be removed or replaced in an energized circuit unless equipment and techniques especially designed to prevent electric shock are provided and used for such purpose.
- (20) ~~(12-37)~~ Fuse tongs or hot line tools shall be used when fuses are removed or replaced in high-potential circuits.
- (21) ~~(12-40)~~ Operating controls shall be installed so that they can be operated without danger of contact with energized conductors.
- (22) ~~(12-41)~~ Switches and starting boxes shall be of safe design and capacity.
- (23) ~~(12-45)~~ Overhead high-potential powerlines lines shall be installed as specified by the Electrical Safety Orders and Part 3, T-24, CAC.
- (24) ~~(12-47)~~ Guy wires of poles supporting high-potential conductors shall be equipped with insulators installed near the pole end.
- (25) ~~(12-48)~~ Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting powerlines, they shall be installed as specified by the Electrical Safety Orders and Part 3, T-24, CAC.
- (26) ~~(4-10)~~ Power wires and cables shall be adequately insulated. Flexible cords and cables shall not be used as a substitute for fixed wiring and shall be adequately protected when subject to physical damage.
- (27) ~~(4-11)~~ Abandoned electrical circuits shall be de-energized and isolated so that they cannot become energized inadvertently.

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(28) ~~(12-65)~~ Powerlines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

(29) ~~(12-66)~~ Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

(30) ~~(12-67)~~ Transformers shall be totally enclosed, located on poles or shall be enclosed in compliance with the Electrical Safety Orders.

(31) ~~(12-68)~~ Transformer enclosures shall be kept locked against unauthorized entry.

(32) Provisions for preventing accidents due to overhead high-voltage lines shall be in conformance with the High-Voltage Electrical Safety Orders, Article 86, which reads:

Article 86. Provisions for Preventing Accidents Due to Proximity of Overhead Lines

2946. Provisions for Preventing Accidents Due to Proximity to Overhead Lines.

(a) General. No person, firm, or corporation, or agent of same, shall require or permit any employee to perform any function in proximity to energize high-voltage lines; to enter upon any land, building, or other premises and thereto engage in any excavation, demolition, construction, repair, or other operation; or to erect, install, operate, or store in or upon such premises any tools, machinery, equipment, materials, or structures (including scaffolding, house moving, well drilling, pile driving, or hoisting equipment) unless and until danger from accidental contact with said high-voltage lines has been effectively guarded against.

(b) Clearances or Safeguards Required. Except where electrical distribution and transmission lines have been deenergized and visibly grounded or effective barriers have been erected to prevent physical and arcing contacts with the high-voltage lines, the following provisions shall be met:

(1) Over Lines. The operation, erection, or handling of tools, machinery, apparatus, supplies, or materials, or any part thereof, over energized high-voltage lines shall be prohibited.

(2) Equipment and Materials in Use. The operation, erection, or handling of tools, machinery equipment, apparatus, materials, or supplies, or any part thereof within the minimum clearances from energized lines set forth in Table X shall be prohibited.

Table X  
Required Clearances from Overhead High-Voltage Lines

<i>Nominal Voltage (Phase to Phase)</i>	<i>Minimum Required Clearance (Feet)</i>
750- 50,000.....	10
Over 50,000-75,000.....	11
Over 75,000-125,000.....	13
Over 125,000-175,000.....	15
Over 175,000-250,000.....	17
Over 250,000-370,000.....	21

Over 370,000-550,000..... 27  
 Over 550,000-1,000,000..... 42

(3) Transportation or Transit. The transportation or transit of any tool, machinery, equipment, or apparatus, or the moving of any house or other building in proximity to overhead high-voltage lines shall be expressly prohibited if at any time during such transportation or transit such tool, machinery, equipment, apparatus, or building or any part thereof, can come closer to high-voltage lines than the minimum clearances set forth in Table Y.

Except where the boom of boom-type equipment is lowered and no load is imposed thereon, the equipment in transit shall conform to the minimum required clearances set forth in Table X.

Table Y

Required Clearances from Energized High-Voltage Conductors (While in Transit)

<i>Nominal Voltage (Phase to Phase)</i>	<i>Minimum Required Clearance (Feet)</i>
750- 50,000.....	6
Over 50,000-345,000.....	10
Over 345,000-750,000.....	16
Over 750,000-1,000,000.....	20

(4) Storage. The storage of tools, machinery, equipment, supplies, materials, or apparatus under, by, or near energized high-voltage lines is hereby expressly prohibited if at any time during such handling or other manipulation it is possible to bring such tools, machinery, equipment, supplies, materials, or apparatus, or any part thereof, within the minimum required clearances from high-voltage lines as set forth in Table X.

(c) The specified clearance shall not be reduced by movement due to any strains impressed (by attachments or otherwise) upon the structures supporting the high-voltage line or upon any equipment, fixtures, or attachments thereon.

(d) Insulated cage-type boom guards, boom stops, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the required clearances set forth in Table X.

(e) Any overhead conductor shall be considered to be energized unless and until the person owning or operating such line verifies that the line is not energized, and the line is visibly grounded at the work site.

2947. Warning Signs Required. The owner, agent, or employer responsible for the operations of equipment shall post and maintain in plain view of the operator and driver on each crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver, or similar apparatus, a durable warning sign legible at 12 feet reading: "UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN 10 FEET OF HIGH-VOLTAGE LINES OF 50,000 VOLTS OR LESS."

In addition to the above wording, the following statement in small lettering shall be provided on the warning sign: "For Minimum Clearances Of High-Voltage Lines In Excess of 50,000 Volts. See Article 86, Title 8, High-Voltage Electrical Safety Orders."

2948. Notification to the Operators of High-Voltage Lines and  
Responsibility for Safeguards.

When any operations are to be performed, tools, or materials handled, or equipment is to be moved or operated within the specified clearances of any energized high-voltage lines, the person or persons responsible for the work to be done shall promptly notify the operator of the high-voltage line of the work to be performed and shall be responsible for the completion of the safety measures as required by Order 2946(b) before proceeding with any work which would impair the aforesaid clearance.

2949. Special Exemptions.

The provisions of the foregoing Orders 2946 through 2948 shall not apply to the construction, reconstruction, maintenance, or operation of any energized high-voltage overhead lines or their supporting structure or appurtenances by qualified electrical workers, nor to work performed in proximity to high-voltage lines by qualified persons using approved equipment and work procedures.

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(33) ~~(12-80)~~ Trolley wires and bare power conductors shall be guarded at man-trip loading and unloading points, and at shaft stations. Open unguarded trolley wires shall be placed not less than 9 feet above the track, or not less than 6 inches outside of the rail and not less than 7 feet above the rail.

(34) ~~(12-82)~~ Powerlines shall be well separated or insulated from waterlines, telephone lines, and air lines.

(35) ~~(12-85)~~ Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

NOTE: Authority cited: Section 6500, Labor Code.

### **Article 50. Explosives**

**NOTE: Article 50 (Explosives) has been moved to another location in Title 8.**

#### **§7200. Minors.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7201. ~~(6-90).~~ Training.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7202. ~~(6-92).~~ Deteriorated Explosives.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7203. Explosives for Blasting.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7204. Water Gels.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7205. Black Powder Blasting.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7206. Explosives for Underground Use.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7207. ~~(6-123)~~(6-124). Electric Detonation of Explosives During Lightning and Dust Storms.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7208. ~~(6-52)~~ Smoking and Open Flames.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**Article 51. Storage of Explosives**

**NOTE: Article 51 (Storage of Explosives) has been moved to another location in Title 8.**

**§7210. Storage--General Requirements.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**§7211. ~~(6-20)~~ Quantity and Distances Table for the Storage of Explosives--Class A.**

NOTE

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7212. Quantity and Distance Table for Storage of Explosives--Class B Distances in Feet When Storage Is Unbarricaded.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7213. First-Class Magazines.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7214. ~~(6-27)~~ Second-Class Magazines.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7215. ~~(6-20)~~ Storage Within First-Class Magazines.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7216. Makeup or Primer House for Blasting Operations.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7217. Storage of Explosives Underground.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**Article 52. Transportation of Explosives**

**NOTE: Article 52 (Transportation of Explosives) has been moved to another location in Title 8.**

**\$7220. General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7221. Surface Transportation.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7222. Transportation of Explosives--Underground-- General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7223. Transportation of Explosives--Hoisting or Lowering.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7224. Rail Transportation of Explosives--Underground.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7225. Transportation of Explosives--Underground-- Special Trackless Vehicles.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7226. Transportation of Explosives--Manual.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7227. Transportation of Explosives--Air and Water.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**Article 53. Handling and Use of Explosives--Blasting Operations**

**NOTE: Article 53 (Handling and Use of Explosives) has been moved to another location in Title 8.**

**\$7230. General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7231. ~~(6-100)~~ . Tamping Poles and Devices.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7232. Loading Explosives--General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7233. Loading and Blasting Near and Under Power Lines.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7234. Pneumatic Loading of Explosives and Blasting Agents.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7235. ~~(6-160)~~ ~~(6-175)~~. Firing of Explosives.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7236. Secondary Blasting.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7237. Misfires.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7240. Coyote Hole Blasting.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7241. ~~(6-112)~~ . Use of Safety Fuse--General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7242. ~~(6-109)~~ Safety Fuse Storage.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7243. Making Capped Fuses and Primers.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7244. Blasting with Safety Fuse--Hazards of Blasting with Safety Fuse.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7250. Firing with Electricity--General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7251. Firing Switches.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7252. Auxiliary Switches.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7253. Permanent and Temporary Leading Wires.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7254. Blasting Procedure with Power and Light Circuits.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7255. Blasting with Batteries, Blasting Devices, and Blasting Machines.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7256. Electric Blasting in Proximity with Radio Transmitters.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**Article 54. Mixing Blasting Agents**

**NOTE: Article 54 (Mixing Blasting Agents) has been moved to another location in Title 8.**

**\$7260. General.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7261. Mixing of Blasting Agents--Location.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7262. Buildings.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7263. Mix Room Equipment.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7264. Composition.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7265. Blasting Agent Storage.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7266. Transportation of Blasting Agents.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7267. On-Site Mixed Water Gels and Blasting Agents.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**Article 55. Licensing of Blasters**

**NOTE: Article 55 (Licensing of Blasters) has been moved to another location in Title 8.**

**\$7275. Competency of Blasters.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7276. Blaster's License--Qualifications.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7277. Blaster's License--Application and Examination.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7278. Expiration and Renewal.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7279. Custody of Blaster's License.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7280. Blasting Accident Reports and Procedures.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7281. Suspension--Blaster's License.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7282. Labor Code Excerpts.**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7283. Blaster's License Fees.**

[Appendix A](#)

[Appendix B](#)

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7283. Blaster's License Fees, Appendix A**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**\$7283. Blaster's License Fees, Appendix B**

**NOTE**

Authority cited: Sections 142.3 and 7997, Labor Code. Reference: Sections 142.3 and 7997, Labor Code.

**End of Subchapter 17. Mine Safety Orders**