

Chapter Ind 3

MINES, PITS AND QUARRIES

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QUARRIES AND PITS, Ch. Ind. 2, **History**: 1-2-56; Ind 2.01 to Ind 2.20, inclusive, were repealed, and Ind 2.01 to Ind 2.09, inclusive, and Ind 2.11 to Ind 2.14, inclusive, were created, Register, April, 1958, No. 28, eff. 5-1-58; Ch. Ind 2 was repealed, Register, April, 1972, No. 196, eff. 5-1-72.

MINES, Ch. Ind 3, **History**: 1-2-56; r., Register, April, 1972, No. 196, effective 5-1-72.

MINES, PITS AND QUARRIES, Ch. Ind 3, **History**: Recreated, Register, April, 1972, No. 196, effective 5-1-72.

Ind 3.01 Scope. The provisions of this code shall apply to all openings or excavations in earth for the purpose of extracting minerals or other products, and equipment related to processing and/or manufacturing of ores, aggregates, cements, lime, clay, and silica sands.

Note: The following rules are based on those of Title 30—Mineral Resources, Chapter 1—Bureau of Mines, Department of the Interior, published in the Federal Register, Volume 34, No. 145, July 31, 1969.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.02 Definitions. (1) **ABANDONED MINE.** All work has stopped on the mine premises and an office with a responsible person in charge is no longer maintained at the mine.

(2) **ABANDONED WORKINGS.** Deserted mine areas in which further work is not intended.

(3) **ACTIVE WORKINGS.** Areas at, in, or around a mine or plant where men work or travel.

(4) **ADVISORY.** A recommended safe practice as opposed to a mandatory rule. See Appendix A.

(5) **APPROVED.** Tested or accepted by the department of industry, labor and human relations for a specific purpose.

Note: The department may accept nationally recognized standards.

(6) **AUTHORIZED PERSON.** A person approved or assigned by management to perform a specific type of duty or duties or to be at a specific location.

(7) **AUXILIARY FAN.** A fan used to deliver air to a working place off the main airstream; generally used with ventilation tubing.

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(8) BARRICADED. A means to prevent the passage of persons, vehicles, or flying material.

(9) BERM. A pile or mound of material capable of restraining a vehicle.

(10) 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.

(11) COMBUSTIBLE. Capable of being ignited and consumed by fire.

(12) COMPANY OFFICIAL. A member of the company supervisory or technical staff.

(13) COMPETENT PERSON. A person having abilities and experience that fully qualify him to perform the duty to which he is assigned.

(14) DEPARTMENT. The department of industry, labor and human relations.

(15) DISTRIBUTION BOX. A portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line; each cable circuit being connected through individual overcurrent protective devices.

(16) ELECTRIC GROUNDING. To connect with the ground to make the earth part of the circuit.

(17) EMPLOYEE. A person who works for wages or salary in the service of an employer.

(18) EMPLOYER. A person or organization which hires one or more persons to work for wages or salary.

(19) ESCAPEWAY. A passageway by which persons may leave if the ordinary exit is obstructed.

(20) EXPLOSIVE. Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion. Explosives include, but are not limited to black powder, dynamite, nitroglycerin, fulminate, ammonium nitrate when mixed with a hydrocarbon, and/or other blasting agents.

(21) FACE OR BANK. That part of any mine, pit, or quarry where excavating is progressing or was last done.

(22) FLAMMABLE. Capable of being easily ignited and of burning rapidly.

(23) FLASH POINT. The minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

(24) HIGHWAY. Any public street, public alley, or public road.

(25) HIGH POTENTIAL. More than 650 volts.

(26) HOIST. A power-driven windlass or drum used for raising ore, rock, or other material from a mine, and for lowering or raising men and material.

(27) LAY. The distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

- (28) **LOW POTENTIAL.** 650 volts or less.
- (29) **MAIN FAN.** A fan that controls the entire airflow of the mine, or the airflow of one of the major air circuits.
- (30) **MAJOR ELECTRICAL INSTALLATION.** An assemblage of stationary electrical equipment for the generation, transmission, distribution, or conversion of electrical power.
- (31) **MAN TRIP.** A trip on which men are transported to and from a work area.
- (32) **MILL.** Includes any ore mill, sampling works, concentrator, and any crushing, grinding, screening, or other preparation plant used at, and in connection with, an excavation, mine, pit, or quarry.
- (33) **MINE.** An opening or excavation in earth for the purpose of extracting minerals or other products.
- (34) **MINE OPENING.** Any opening or entrance from the surface into the mine.
- (35) **OVERBURDEN.** Material of any nature, consolidated or unconsolidated, that overlies a deposit of useful products or ores that are to be mined.
- (36) **PERMISSIBLE.** A machine, material, apparatus, or device which has been investigated, tested, and approved by the department, and is maintained in permissible condition.
- (37) **PIT.** See Mine.
- (38) **POTABLE.** Fit for drinking.
- (39) **QUARRY.** See Mine.
- (40) **REVERSE-CURRENT PROTECTION.** A method or device used on direct-current circuits or equipment to prevent the flow of current in a reverse direction.
- (41) **ROLL PROTECTION.** A framework, safety canopy, or similar protection for the operator when equipment overturns.
- (42) **SAFETY CAN.** An approved container, of not over 5 gallon capacity, having a spring-closing lid and spout cover.
- (43) **SAFETY SWITCH.** A sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.
- (44) **SCALING.** A removal of insecure material from a face or high wall.
- (45) **SECONDARY SAFETY CONNECTION.** A second connection between a conveyance and rope, intended to prevent the conveyance from running away or falling in the event the primary connection fails.
- (46) **SHAFT.** A vertical or inclined shaft; a slope, incline, or winze.
- (47) **SIGNS.** A means of communication conspicuously posted, legible, having contrasting background, and legend composed of block letters.
- (48) **SUBSTANTIAL CONSTRUCTION.** Construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, and usage to which it will be subjected.

(49) **SUITABLE.** That which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

(50) **TRAVELWAY.** A passage, walk, or way regularly used and designated for persons to go from one place to another.

(51) **TRIP LIGHT.** A light displayed on the opposite end of a train from the locomotive or engine.

(52) **WET DRILLING.** The continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

(53) **WORKING PLACE.** Any place in or about a mine, pit, or quarry where work is being performed.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.03 Ground control.

SURFACE ONLY

(1) Standards acceptable to the department for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with prudent engineering design, the nature of the ground and the kind of material and mineral mined, and the insuring of safe working conditions according to the degree of slope. Mining methods shall be selected which will insure wall and bank stability, including benching as necessary to obtain a safe overall slope.

(2) 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.

(3) To insure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

(4) Safe means for scaling pit banks shall be provided. Where power shovels are used for scaling, banks shall be limited to heights that can be scaled with the shovel buckets. Exposed bank areas shall be scaled before any other work is performed in the exposed bank area.

(5) Men shall not work near or under dangerous banks. Overhanging banks shall be taken down immediately and other unsafe ground conditions shall be corrected promptly, or the areas shall be barricaded and posted with warning signs.

(6) Men shall approach loose rock and areas to be scaled from above and shall scale from a safe location.

(7) Baffleboards, screens, cribbing, or other suitable means shall be provided to prevent movement of material into cuts developed into steep hillsides.

(8) The supervisor, or a competent person designated by him, shall examine working areas and faces for unsafe conditions at least at the beginning of each shift and after blasting. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

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

(10) Banks, benches, and terrain sloping into the working areas shall be examined after every rain, freeze, or thaw before men work in such areas.

(11) Large boulders requiring secondary blasting should be in a safe location before they are drilled or broken.

(12) Men shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank.

(13) Rock-bolt installations, where used, shall be in accordance with recommendations of the department.

UNDERGROUND ONLY

(20) Ground support shall be used if the operating experience of the mine, or any particular area of the mine, indicates that it is required. If it is required, support, including timbering, rock bolted reinforcing, or other methods shall be consistent with the nature of the ground and the mining method used.

(21) Men shall be trained in the proper methods of testing for, taking down, and supporting loose ground.

(22) Advisory.

(23) A scaling bar at least 6 feet in length and blunt on one end shall be provided at each working face.

(24) Picks or other short tools that would place the user in danger of falling rock shall not be used for barring down.

(25) Timbers shall be blocked tightly.

(26) Damaged timbers which create a hazardous condition shall be repaired promptly. Dislodged timber shall be replaced promptly.

(27) Temporary ground support shall be installed as needed.

(28) When necessary, permanent or temporary ground support shall be installed near enough to the bottom of the shaft during shaft sinking to prevent falls of rocks from the sides of the shaft.

(29) Advisory.

(30) Advisory.

(31) Rock-bolting materials shall meet the applicable standards of the department.

(32) Advisory.

(33) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.04 Fire prevention and control.

GENERAL—SURFACE AND UNDERGROUND

(1) No person shall smoke or use an open flame where oil, grease, flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used, nor within an unsafe distance of any area or place where such practices may cause a fire or explosion.

(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.

(3) Areas surrounding flammable-liquid-storage tanks and electric substations and transformers shall be kept free from grass (dry), weeds, underbrush, and other combustible materials for at least 25 feet in all directions.

(4) Flammable liquids shall be stored in accordance with standards of the department. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

(5) Advisory.

(6) Advisory.

(7) Means shall be provided to confine, remove, control, or drain away spilled or flowing flammable liquids.

(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.

(9) All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

(10) Power wires and cables shall be adequately insulated where they pass through doors or walls or where they present a fire hazard.

(11) Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

(12) Combustible materials, grease, lubricants, or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

(13) Materials, such as oily waste and rags, which are subject to spontaneous combustion shall be placed in tightly covered metal containers until disposed of properly.

(14) Solvents with flash points lower than 100° F. (38° C.) shall not be used for cleaning.

(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.

(16) Drip pans shall be provided to catch leakage or spillage when oil or flammable liquids are dispensed in a place or manner which may create a hazard.

(17) Floors around drip pans shall be covered with sand or other suitable noncombustible material and such sand or material should be replaced as necessary.

(18) Oxygen cylinders shall not be stored near oil or grease.

(19) Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

(20) Battery-charging stations shall be located in well-ventilated areas.

(21) Internal combustion engines, except diesels, shall be shut off and stopped before being fueled.

(22) Each mine shall have available or be provided with suitable fire fighting equipment adequate for the size of the mine.

(23) Fire fighting equipment located on mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected periodically. Records shall be kept of such inspections.

(24) Fire extinguishers shall be:

(a) Of the appropriate type for the particular fire hazard involved.

(b) Adequate in number and size for the particular fire hazard involved.

(c) Replaced immediately with fully charged extinguishers after any discharge is made from the extinguisher.

(d) Inspected, tested, and maintained at regular intervals according to the manufacturer's recommendations.

(e) Approved by the Underwriters' Laboratories, Inc., or other competent testing agency acceptable to the department.

(25) Fire hydrants shall be:

(a) Of a standard type to fit the hose equipment of local fire departments. Adapters should be provided if necessary.

(b) Provided with readily available wrenches or keys to open the valves.

(26) Water pipes, valves, outlets, hydrants, and hoses designated for fire fighting purposes shall be inspected and tested every 3 months.

(27) Suitable fire extinguishers shall be provided on self-propelled mobile equipment with enclosed cabs.

(28) Suitable fire extinguishers shall be an integral part of portable cutting and welding equipment.

(29) When welding or cutting near combustible materials, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire.

(30) Employees shall be trained in the use of fire fighting equipment.

(31) Advisory.

(32) All employees shall be instructed on current escape and evacuation plans, fire alarm signals, and applicable procedures to be followed in case of fire.

(33) Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

(34) Belt-conveyors in locations where fire would create a hazard to personnel shall be provided with safety switches to stop the drive pulley automatically in the event of excessive slippage.

SURFACE ONLY—MINES

(40) Fire-alarm systems adequate to warn all employees shall be provided and maintained in operating condition.

(41) Two exits shall be provided where men work or congregate.

(42) Timber or other combustible materials in excess of one day's supply shall not be stored within 100 feet of mine ventilation fans or mine openings, except where physical conditions do not permit.

(43) Advisory.

(44) Areas surrounding main fan installations and other mine openings shall be kept free from grass, weeds, underbrush, and other combustible materials for a distance of 25 feet in all directions.

(45) Advisory.

(46) Gasoline, diesel fuel, liquefied petroleum gases, and other flammable liquids when not buried, shall not be stored within 100 feet of the following:

(a) Mine openings.

(b) Buildings or snowsheds connected to mine openings.

(c) Fan installations or housings.

(d) Hoist houses.

(50) Specific escape and evacuation plans shall be established and kept current. Escape routes shall be marked plainly.

(51) Fire-alarm systems adequate to warn all employees shall be provided and maintained in operating condition.

(52) Gasoline shall not be taken, stored, or used underground.

(53) The use of liquid petroleum gases shall comply with the provisions of Wis. Admin. Code, chapter Ind 9, Liquefied Petroleum Gases.

(54) Oil, grease, or diesel fuel stored underground shall be kept in suitable tightly sealed containers in fire-resistant areas, at safe distances from explosives' magazines, electrical installations, and shaft stations.

(55) Transformer stations, pump rooms, compressor rooms, and similar installations shall be in noncombustible areas.

(56) Oil or fuel storage areas shall not be located in main ventilation airways.

(57) Trailing cables shall be fire-resistant.

(58) Fires shall not be built underground; open-flame torches and candles shall not be left underground.

(59) Welding or cutting shall be done in fire-resistant locations whenever possible. When welding or cutting near combustible materials, the surrounding areas shall be wet down thoroughly before and after the work is done, and a fire patrol of the area shall be maintained afterward for at least 8 hours.

(60) Advisory.

(61) Advisory.

(62) Advisory.

(63) Advisory.

(64) Advisory.

(65) Noncombustible barriers shall be installed below welding or burning operations in or over a shaft, raise, or winze.

(66) Advisory.

(67) A mine rescue station equipped with at least 10 sets of approved and properly maintained 2-hour self-contained breathing apparatus, adequate supplies, and spare parts shall be maintained at mines employing 75 or more men underground or, in lieu thereof, the mine should be affiliated with a central mine rescue station.

(68) Advisory.

(69) Approved mine rescue apparatus shall be properly maintained for immediate use. The equipment shall be tested semiannually and records kept of the tests.

(70) Advisory.

(71) Advisory.

(72) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.05 Air quality, ventilation, and radiation.

GENERAL—SURFACE AND UNDERGROUND

(1) Where airborne concentrations of dust, gas, mist, and fumes are encountered which exceed allowable threshold limit values, and persons are exposed to such concentrations, control measures shall be adopted to maintain concentrations below such threshold limit values. (See Wis. Adm. Code, chapter Ind 20—Dusts, Fumes, Vapors and Gases.)

(2) Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures. Special care shall be used in reentering dewatered and abandoned areas.

(3) Holes shall be collared and drilled wet, or other efficient dust control measures shall be used when drilling nonwater-soluble materials. Efficient dust control measures shall be used when drilling water-soluble materials.

(4) Advisory.

(5) Department approved respirators shall be worn for protection against short-term exposures to concentrations of substances in excess of threshold limit values. Where a concentration of a substance is encountered for which a respirator has not been approved by the department, respirators developed and tested by an agency or organization acceptable to the department shall be used. Where an approved or acceptable respirator is not available no person shall enter or be exposed to concentrations in excess of threshold limit values. Except as provided in this section, use of respirators shall not be substituted for regular control measures.

SURFACE ONLY

(10) Atmospheres where persons work (including equipment cabs) shall contain:

(a) At least 20% oxygen.

(b) Not more than 0.005 percent carbon monoxide, 0.5 percent carbon dioxide, and 5 parts per million nitrogen dioxide or other threshold limit values for these gases adopted by the American Conference of Governmental Industrial Hygienists. (See Wis. Adm. Code, chapter Ind 20—Dusts, Fumes, Vapors and Gases.)

(c) No harmful quantities of other gases, fumes, or mists as determined by threshold limit values established by the American Conference of Governmental Industrial Hygienists. (See Wis. Adm. Code, chapter Ind 20—Dusts, Fumes, Vapors and Gases.)

UNDERGROUND ONLY

(15) Atmospheres in all active areas shall contain at least 20% oxygen.

(16) Atmospheres in all active areas shall contain:

(a) Not more than 0.005 percent carbon monoxide, 0.5 percent carbon dioxide, and 5 parts per million nitrogen dioxide, or other threshold limit values for these gases adopted by the American Conference of Governmental Industrial Hygienists. (See Wis. Adm. Code, chapter Ind 20—Dusts, Fumes, Vapors and Gases.)

(b) No harmful quantities of other gases, fumes, or mists as determined by threshold limit values established by the American Conference of Governmental Industrial Hygienists. (See Wis. Adm. Code, chapter Ind 20—Dusts, Fumes, Vapors and Gases.)

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.06 Ventilation and radiation.

VENTILATION UNDERGROUND ONLY

(1) Mines shall be provided with mechanically induced primary ventilation.

(4) Advisory.

(5) Precautions shall be taken to insure that mine intake air is

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below the 8-hour weighted average allowable threshold limit of contaminants. (Reference subsection Ind 3.05 (1).)

(6) Main fans shall be inspected and maintained properly.

(7) Instruments shall be provided to test the mine atmosphere quantitatively for carbon monoxide, nitrogen dioxide, and other noxious gases that occur in the mine. Tests should be conducted as frequently as necessary to assure that the required quality of air is maintained.

(8) Advisory.

(9) Unventilated areas shall be sealed or barricaded and posted against entry.

(10) Advisory.

(11) Advisory.

(12) Internal combustion engines other than department approved diesels shall not be used underground and such approved diesels shall be operated in an approved manner and maintained in approved condition.

(22) Fan housings and air ducts connecting main fans to underground openings shall be fire-resistant.

(27) Flame safety lamps or other suitable devices shall be used to test for acute oxygen deficiency.

RADIATION UNDERGROUND ONLY

(37) Mine atmospheres shall be sampled to determine if hazardous atmosphere concentrations of radon daughters are present. Where potentially hazardous atmospheric concentrations are found, or known sources of radon exist, each active work area shall be sampled as often as necessary by a qualified person.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.07 Drilling.

SURFACE ONLY

(1) Equipment shall be inspected each shift by an authorized individual. Equipment defects affecting safety should be reported.

(2) Equipment defects affecting safety shall be corrected before the equipment is used.

(3) The drilling area shall be inspected for hazards before starting the drilling operations.

(4) Men shall not be on the mast while the drill is in operation.

(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.

(6) Advisory.

(7) Advisory.

(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.

(9) Advisory.

(10) In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

(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.

(12) While in operation, drills shall be attended at all times.

(13) Drill holes large enough to constitute a hazard shall be covered or guarded.

(14) Advisory.

(15) Advisory.

(16) Advisory.

(17) Advisory.

(18) Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

(19) Advisory.

UNDERGROUND ONLY

(25) Advisory.

(26) Advisory.

(27) Advisory.

(28) Advisory.

(29) Advisory.

(30) Advisory.

(31) Advisory.

(32) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.08 Rotary jet piercing.

SURFACE ONLY

(1) Jet drills shall be provided with:

(a) A system to pressurize operators' cabs.

(b) A protective cover over the oxygen flow indicator.

(2) Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of 1-inch inside diameter or larger.

(3) A suitable means of protection shall be provided for the employe when lighting the burner.

(4) With equipment requiring refueling at locations other than fueling stations, a system for fueling from the ground without spill shall be provided.

(5) Men shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.09 Loading, hauling, dumping.

GENERAL—SURFACE AND UNDERGROUND

(1) Advisory.

(2) Equipment defects affecting safety shall be corrected before the equipment is used.

(3) Powered mobile equipment shall be provided with adequate brakes.

(4) Powered mobile haulage equipment shall be provided with audible warning devices. Lights shall be provided on both ends.

(5) Advisory.

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- (6) Advisory.
- (7) Advisory.
- (8) Advisory.
- (9) Operators shall sound warning before starting trains, when trains approach crossings or other trains on adjacent tracks, and where vision is obscured.
- (10) Advisory.
- (11) Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.
- (12) Cabs of mobile equipment shall be kept free of extraneous materials.
- (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.
- (14) No person shall be permitted to ride a power-driven chain, belt, or bucket conveyor, unless the belt is specifically designed for the transportation of persons.
- (15) Advisory.
- (16) Advisory.
- (17) Advisory.
- (18) Advisory.
- (19) Advisory.
- (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.
- (21) Advisory.
- (22) Berms or guards shall be provided on the outer banks of elevated roadways.
- (23) Trackless haulage equipment shall be operated under power control at all times.
- (24) Mobile equipment operators shall have full control of the equipment while it is in motion.
- (25) Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.
- (26) Advisory.
- (27) When an operator is present, men shall notify him before getting on or off equipment.
- (28) Switch throws shall be installed so as to provide adequate clearance for switchmen.
- (29) Advisory.
- (30) Men shall not work or pass under the buckets or booms of loaders in operation.
- (31) When traveling between work areas, the equipment shall be secured in the travel position.
- (32) Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.
- (33) Men shall not ride in dippers, buckets, forks, clamshells, or in the beds of dump trucks for the purpose of transportation.
- (34) Advisory.
- (35) Advisory.

(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.

(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.

(38) Advisory.

(39) Men shall not get on or off moving equipment, except that trainmen may get on or off of slowly moving trains.

(40) Men shall not ride on top of loaded haulage equipment.

(41) Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

(42) Advisory.

(43) Men shall not ride outside the cabs and beds of mobile equipment.

(44) Advisory.

(45) Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

(46) Advisory.

(47) Parked railcars, unless held effectively by brakes, shall be blocked securely.

(48) Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

(49) Advisory.

(50) Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

(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.

(52) Advisory.

(53) Advisory.

(54) Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

(55) Advisory.

(56) Where necessary, bumper blocks or the equivalent shall be provided at all track dead ends.

(57) Advisory.

(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.

(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.

(60) Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

(61) Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

(62) Rocks too large to be handled safely shall be broken before loading.

(63) Advisory.

(64) Chute-loading installations shall be designed so that men pulling chutes are not required to be in hazardous positions while loading cars or trucks.

(65) Advisory.

(66) Advisory.

(67) Facilities used to transport men to and from work areas shall not be overcrowded.

(68) Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

(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.

(70) Advisory.

SURFACE ONLY

(81) Trucks, shuttle cars, and front-end loaders shall be equipped with emergency brakes separate and independent of the regular braking system.

(82) Advisory.

(83) Where possible at least 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide a 30-inch clearance shall be marked conspicuously.

(84) Advisory.

(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.

(86) Advisory.

UNDERGROUND ONLY

(96) Advisory.

(97) Trains shall be brought to a complete stop, then moved very slowly when coupling or uncoupling cars manually. Couplers shall not be handled while train is in motion.

(98) Makeshift couplings shall not be used.

(99) Advisory.

(100) Advisory.

(101) Steps shall be provided for rocker-type loading machines and operators shall stand on the step when operating the machine.

(102) When a signalman is used during slushing operations he shall be positioned in a safe place.

(103) Collars of open draw holes shall be kept free of muck and material.

(104) Advisory.

(105) Advisory.

(106) Ample warning shall be given to men who may be affected by the draw or otherwise exposed to danger from chute-pulling operations.

(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.

(108) Advisory.

(109) Advisory.

(110) Shelter holes shall be provided to insure the safety of men along haulageways where continuous clearance of at least 30 inches from the farthest projection of moving equipment on at least one side of the haulageway cannot be maintained.

(111) Advisory.

(112) Trip lights or approved reflectors shall be used on the rear of pulled trips and on the front of pushed trips.

(113) Man trips shall be operated at speeds consistent with the condition of tracks and equipment used.

(114) Where man trips are used, discharge and boarding points shall be designated. Men shall not board or leave moving man-trip cars.

(115) Advisory.

(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.

(117) Men shall not ride between cars. Men shall not ride on top of loaded cars unless authorized to do so.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.10 Aerial tramways.

SURFACE ONLY

(1) Advisory.

(2) Advisory.

(3) Any hazardous defects shall be corrected before the equipment is used.

(4) Advisory.

(5) Advisory.

(6) Advisory.

(7) Guard nets or suitable protection shall be provided where tramways pass over roadways, walkways, and buildings.

(8) Advisory.

(9) Men shall not ride loaded buckets.

(10) Aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.11 Travelways and escapeways.

TRAVELWAYS

GENERAL—SURFACE AND UNDERGROUND

(1) Safe means of access shall be provided and maintained to all working places.

(2) Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails 42 inches high and maintained in good condition. Where necessary, toeboards shall be provided.

(3) Ladders shall be of substantial construction and maintained in good condition.

(4) Portable straight ladders shall be provided with nonslip bases, should be placed against a safe backing, and set on secure footing.

(5) Fixed ladders shall be anchored securely and installed to provide at least 6 inches of toe clearance.

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(6) Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

(7) Wooden members of ladders shall not be painted.

(8) Ladderways, stairways, walkways, and ramps shall be kept free of loose rock and extraneous materials.

(9) Railed walkways shall be provided wherever persons are regularly required to walk alongside conveyor belts. Inclined railed walkways shall be nonskid or provided with cleats.

(10) Vertical clearance above stairsteps shall be a minimum of 7 feet.

(11) Advisory.

(12) Openings above, below, or near travelways through which men or materials may fall shall be protected by railing, barriers, or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

(13) Crossovers shall be provided where it is necessary to cross conveyors.

(14) Moving conveyors shall be crossed only at designated crossover points.

(15) Advisory.

(16) Regularly used walkways and travelways shall be cleared of snow and ice or sanded or salted.

(17) Advisory.

SURFACE ONLY

(25) Advisory.

(26) Advisory.

(27) Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floorboards shall be laid properly and the scaffolds and working platforms shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

UNDERGROUND ONLY

(35) Advisory.

(36) Self-closing trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept openable from both sides.

(37) Advisory.

(38) Warning shall be given and acknowledged before entering a manway above or below where men are working.

(39) Advisory.

(40) Designated travelways steeper than 30° from the horizontal shall be provided with ladders or stairways.

(41) Advisory.

ESCAPEWAYS

UNDERGROUND ONLY

(42) Every mine shall have 2 separate properly maintained 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.

(51) Escape routes shall be:

(a) Inspected at regular intervals and maintained in safe, travel-able condition.

(b) Marked with conspicuous and easily read direction signs that clearly indicate the ways of escape.

(52) Refuge areas shall be:

(a) Of fire-resistant construction, preferably in untimbered areas of the mine.

(b) Large enough to accommodate readily the normal number of men in the particular area of the mine.

(53) Mine maps shall be posted and available showing applicable items such as: escape routes, directions of principal airflow, locations of telephones, fire doors, ventilation doors. Mine maps shall be brought up to date as necessary.

(55) Designated escapeways inclined more than 30 degrees from the horizontal shall be equipped with stairways, ladders, cleated walkways, or emergency hoisting facilities.

(56) Emergency hoisting facilities shall conform to the extent possible to safety requirements for other man hoists, shall be adequate to remove the men from the mine with a minimum of delay, be maintained in ready condition, and be tested at least every 30 days; records shall be kept of these tests.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.12 Electricity.

GENERAL—SURFACE AND UNDERGROUND

(1) Circuits shall be protected against excessive overload by fuses or circuit breakers of the correct type and capacity.

(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) Individual overload protection or short-circuit protection shall be provided for the trailing cables of mobile equipment.

(4) Power wires and cables shall have adequate current-carrying capacity and shall be protected from mechanical injury. (Refer to Wisconsin Electrical Code.)

(5) Advisory.

(6) Distribution boxes shall be provided with disconnect switches.

(7) Trailing cable and power-cable connections to junction boxes shall not be made or broken under load. This rule shall not apply where potential is 120 volts or less.

(8) Power wires and cables shall be insulated adequately where they pass in or out of electrical compartments.

(9) Advisory.

(10) Telephone and low-potential electric signal wires shall be protected from contacting energized powerlines.

(11) High-potential transmission cables shall be covered, insulated, or placed according to acceptable electrical codes to prevent contact with low-potential circuits.

(12) Advisory.

(13) Splices in power cables, including ground conductor, where provided, shall be:

(a) Mechanically strong with adequate electrical conductivity.

- (b) Effectively insulated and sealed to exclude moisture.
- (c) Provided with mechanical protection and electrical conductivity as near as possible to that of the original.
- (14) Shovel trailing cables shall not be moved with the shovel dipper unless cable slings or sleds are used.
- (15) Energized high-potential cables shall be handled with insulated hooks or tongs.
- (16) Electrical equipment shall be deenergized before work is done on such equipment. Switches shall be locked out and suitable warning signs posted by the individuals who are to do the work; locks shall be removed only by the persons who installed them.
- (17) Power circuits shall be deenergized before work is done on such circuits unless hot-line tools are used. Switches shall be locked out and suitable warning signs posted by the individuals who are to do the work; locks shall be removed only by the persons who installed them.
- (18) Principal power switches shall be labeled to show which units they control, unless identification can be made readily by location.
- (19) Advisory.
- (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 keep at the same potential as the grounded metal noncurrent carrying parts of the power switches to be operated, may be used.
- (21) Suitable danger signs shall be posted at all major electrical installations.
- (22) Advisory.
- (23) Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.
- (24) Advisory.
- (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.
- (26) Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.
- (27) Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.
- (28) Continuity and resistance of grounding systems shall be tested immediately after installation.
- (29) Advisory.
- (30) When a potentially dangerous condition is found it shall be corrected before equipment or wiring is energized.
- (31) Advisory.
- (32) Inspection and cover plates on electrical equipment shall be kept in place at all times except during testing or repairs.
- (33) Hand-held electric tools shall not be operated at high-potential voltages.
- (34) Portable extension lights and other lights that may present a shock or burn hazard shall be guarded.
- (35) Lamp sockets exposed to the weather shall be of a weather-proof type.

(36) Circuits shall be deenergized before fuses are removed or replaced. Fuses shall not be removed or replaced by hand in any energized circuit and they shall not otherwise be removed or replaced in an emergency circuit unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

(37) Fuse tongs or hot-line tools shall be used when fuses are removed or replaced in high-potential circuits.

(38) Advisory.

(39) Advisory.

(40) Operating controls shall be installed so that they can be operated without danger of contact with energized conductors.

(41) Switches and starting boxes shall be of safe design and capacity.

(42) Advisory.

(43) Equipment with booms or masts which are not properly protected shall not be operated where the booms or masts can come within 8 feet of an energized overhead power line.

(44) Advisory.

(45) Overhead high-potential power lines shall be installed as specified by the Wisconsin Electrical Code.

(46) Electrical power lines; overhead contact:

(a) Cranes, derricks, hoists, power shovels, drag lines, well and post hole drilling equipment, excavators, pile drivers, and similar equipment, any part of which is capable of vertical, lateral, or swinging motion, shall not be operated within 6 feet of electrical lines unless such lines are deenergized and grounded.

(b) Electrical lines referred to herein are defined as operating at 750 volts or more to ground or between conductors.

(c) The provisions of this section shall not apply to work done in the erection, maintenance, or operation of electric power lines or communication facilities or lines located in proximity to electrical lines. (Also see provisions of Wis. Adm. Code, chapter Ind 1, Safety.)

(47) Guy wires of poles supporting high-potential conductors shall be equipped with insulators installed near the pole end.

(48) Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting power lines, they shall be installed as specified by the Wisconsin Electrical Code.

(49) Advisory.

(50) Advisory.

(51) Advisory.

(52) Advisory.

(53) Advisory.

(54) Advisory.

SURFACE ONLY

(65) Power lines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

(66) Where metallic tools or equipment can come in contact with trolley wires or bare power lines, the lines shall be guarded or deenergized.

(67) Transformers shall be totally closed, or shall be placed at least 8 feet above the ground, or installed in a transformer house, or sur-

rounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

(68) Transformer enclosures shall be kept locked against unauthorized entry.

(69) Advisory.

(70) Advisory.

UNDERGROUND ONLY

(80) Trolley wires and bare power conductors shall be guarded at man-trip loading and unloading points and at shaft stations. Where such trolley wires and bare conductors are less than 7 feet above the rail, they shall be guarded at all points where men work or pass regularly beneath.

(81) Advisory.

(82) Power lines shall be well separated or insulated from water-lines, telephone lines, and air lines.

(83) Advisory.

(84) Advisory.

(85) Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

(86) Advisory.

(87) Advisory.

(88) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.13 Compressed air and boilers.

GENERAL—SURFACE AND UNDERGROUND

(1) All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with Wis. Adm. Code, chapter Ind 41-42, Boiler and Unfired Pressure Vessel.

COMPRESSED AIR

(10) Air compressors shall be equipped with automatic temperature-activated shut-off mechanisms set for 400° F., or with fusible plugs installed in the compressor discharge lines as near the compressors as possible. Fusible plugs should melt at temperatures 50° less than the flash points of the lubricating oils.

(11) Compressors and compressed-air receivers shall be equipped with automatic pressure-release valves, pressure gauges, and drain valves. (See Wis. Adm. Code, chapter Ind 41-42, Boiler and Unfired Pressure Vessel.)

(12) Advisory.

(13) Compressed-air receivers shall be drained of moisture and oil at least once each operating shift.

(14) Compressed-air receivers shall have inspection openings which should be manholes when the tanks are over 36 inches in diameter.

(15) Compressed-air receivers and other pressure vessels shall be inspected internally at least once a year by qualified inspectors; records of such inspections shall be kept.

(16) Advisory.

(17) Advisory.

(18) Safety devices on compressed-air systems shall be checked at the beginning of each shift.

(19) Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

(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.

(21) Safety chains or suitable safety devices shall be used at connections to machines of high pressure hose lines of one inch inside diameter or larger, and between high pressure hose lines of one inch inside diameter or larger, where a connection failure would create a hazard.

BOILERS

(30) Boilers shall be equipped with guarded, well-maintained water gauges and pressure gauges placed so that they can be observed easily. Water gauges and pipe passages to the gauges shall be kept clean and free of scale and rust.

(31) Boilers shall be equipped with automatic pressure-relief valves; valves shall be tested each shift.

(32) Boiler installations shall be provided with safety devices, meeting the requirements of Wis. Adm. Code, chapter Ind 41-42, Boiler and Unfired Pressure Vessel, to protect against hazards of flame outs, fuel interruptions, and low-water level.

(33) Blowoff valves shall be piped outside the building and shall have outlets so located or protected that persons passing by, near, or under them will not be scalded. (See Wis. Adm. Code, chapter Ind 41-42, Boiler and Unfired Pressure Vessel.)

(34) Boilers shall be inspected internally at least once a year by licensed inspectors; records of such inspections shall be kept. (See Wis. Adm. Code, chapter Ind 41-42, Boiler and Unfired Pressure Vessel.)

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.14 Use of Equipment.

GUARDS

GENERAL—SURFACE AND UNDERGROUND

(1) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons, shall be guarded.

(2) Power transmission belts shall be guarded if the action from a broken belt would be hazardous to persons.

(3) Guards at conveyor drive, head, and tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(4) Openings where conveyors pass through walls or floors shall be guarded.

(5) Protruding setscrews on revolving parts shall be guarded.

(6) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

(7) Guards shall be sufficiently strong and maintained to provide the required protection.

(8) Stationary grinding machines other than special bit grinders shall be equipped with:

(a) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel.

(b) Adjustable tool rests set as close as practical to the wheel.

(c) Safety washers.

(9) Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

(10) Hand-held 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 friction or other equivalent safety devices.

(11) Guards or shields shall be provided in areas where flying or falling materials present a hazard.

(12) Industrial vehicles such as forklift trucks, front-end loaders, and bulldozers shall be provided with roll protection when necessary to protect the operator.

(13) Forklift trucks, front-end loaders, and bulldozers shall be provided with substantial canopies when necessary to protect the operator from falling material.

(14) Face shields and goggles, in good condition, shall be worn when operating a grinding wheel. Eye protection devices shall comply with subject provisions of Wis. Adm. Code, chapter Ind 1, Safety.

METHODS AND PROCEDURES

GENERAL—SURFACE AND UNDERGROUND

(25) Machinery and equipment shall be maintained properly.

(26) Unsafe machinery and equipment shall be removed from service immediately.

(27) Machinery and equipment shall be operated only by authorized and experienced persons.

(28) Adequate clearance shall be provided at machinery and equipment installations.

(29) Repairs or maintenance shall not be performed on machinery until the power is off and the machinery or equipment is blocked against motion, except where controlled motion is necessary.

(30) Advisory.

(31) Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

(32) Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow moving machinery and equipment especially designed for hand feeding.

(33) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(34) Belt dressing shall not be applied manually while belts are in motion unless an aerosol-type dressing is used.

(35) Machinery and equipment shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

(36) Advisory.

SURFACE ONLY

(45) Welding operations shall be shielded and well ventilated.

UNDERGROUND ONLY

(55) Welding operations shall be shielded and well ventilated.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.15 Personal Protection.

GENERAL—SURFACE AND UNDERGROUND

(1) Adequate first-aid materials, including stretchers and blankets, shall be provided at places convenient to all working areas. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.

(2) No person shall be permitted to work in or around a mine, pit, quarry or plant unless he wears:

(a) An approved hard hat, and

(b) Suitable protective footwear, and

(c) Approved eye protection. (See subject provisions of Wis. Adm. Code, chapter Ind 1, Safety.)

(6) Advisory.

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

(8) Snug-fitting clothing shall be worn around moving machinery and equipment.

(9) Protective gloves shall be worn by employes handling materials which may cause injury.

(10) Gloves shall not be worn where they could create a hazard by becoming entwined or caught in moving parts of machinery.

(11) Finger rings shall not be worn while working in or around a mine or plant.

(12) Employes shall not be exposed to noise greater than the permissible levels shown in Table 1 of the "Occupational Noise Exposure" Code. See provisions of Chapter Ind 11. (For example, at noise levels of 90 dbA the allowable exposure is not more than 8 hours.)

(13) Advisory.

SURFACE ONLY

(20) Life jackets or belts shall be worn where there is danger of falling into water. This rule shall apply to underground also.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.16 Materials storage and handling.

GENERAL—SURFACE AND UNDERGROUND

(1) Materials shall be stored and stacked in a manner which minimizes stumbling or fall-of-material hazards.

(2) Advisory.

(3) Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

(4) Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

(5) Compressed and liquid gas cylinders shall be secured in a safe manner.

(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.

(7) Hitches and slings used to hoist materials shall be designed and used properly for the particular material handled.

(9) Operators of equipment shall not suspend or move loads over workmen.

(10) Materials shall not be dropped from an elevation unless the drop area is guarded or sufficient warning is given.

(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.

(12) Substances that react violently or liberate dangerous fumes when mixed shall be stored in such a manner that they cannot come in contact with each other.

(13) Only men wearing protective equipment shall stand near pots or ladles when molten material is being handled; warning should be given before a pour is made or the pot is moved.

(14) Operator-carrying overhead cranes shall be provided with:

(a) Bumpers at each end of each rail.

(b) Automatic switches to halt uptravel of the blocks before they strike the hoist.

(c) Effective audible warning signals within easy reach of the operator.

(d) A means to lockout the disconnect switch.

(15) No person shall work from or travel on the bridge of an overhead crane unless the bridge is provided with substantial footwalks with toeboards and railings the length of the bridge.

(16) Forklift trucks shall be moved with the load in a low position and shall descend ramps with the load behind.

UNDERGROUND ONLY

(35) Chairs shall be used to land shaft conveyances when heavy supplies or equipment are being handled.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.17 Illumination.

SURFACE ONLY

(1) 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 working areas.

(2) Active outdoor work areas shall have illumination of at least 5 footcandles. Special seeing tasks shall have illumination of at least 20 footcandles.

UNDERGROUND ONLY

(10) Individual lamps shall be carried for illumination by all persons underground.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

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Ind 3.18 Safety programs.

GENERAL—SURFACE AND UNDERGROUND

(1) The employer shall establish a definite effective program and continually functioning safety program and make every attempt to prevent accidents and increase safety. Employees shall actively participate in the safety program.

(2) Advisory.

(3) Serious accidents shall be investigated to determine the cause and the means of preventing recurrence. Records of those investigations shall be kept and the information shall be made available to the employes.

(4) Company safety regulations pertinent to the various operations shall be published or posted for employe information.

(5) Advisory.

(6) New employes shall be indoctrinated in applicable safety rules and safe work procedures.

(7) Inexperienced employes shall be assigned to work with experienced men until such employes have acquired the necessary skills to perform their duties safely.

(8) Each working place shall be visited by a supervisor or a designated person at least once each shift and more frequently as necessary to insure that work is being done in a safe manner.

(9) An authorized person shall be in charge at all times when men are working.

(10) Selected supervisors shall be trained in first aid. First-aid training shall be made available to all employes.

(11) All supervisors and employes shall be trained in accident prevention.

(12) Emergency telephone numbers shall be posted at appropriate locations.

(13) Where telephone service is not available, emergency communications shall be provided to the nearest point of assistance.

(14) Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons. The sheriff shall be notified when work is commenced in pits and quarries.

SURFACE ONLY

(20) No employe 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.

UNDERGROUND ONLY

(25) No employe 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 his cries for help can be heard or he can be seen.

(26) Operations shall not be resumed in a mine following a mine disaster until such mine has been inspected and the mine is found to be in a safe condition to resume operations.

(27) An accurate record of the men going in and out of the mine shall be kept on the surface.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

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Ind 3.19 Man Hoisting

Note: The hoisting standards in this section apply to those hoists and appurtenances used for hoisting men. However, where men may be endangered by hoists and appurtenances used solely for handling ore, rock, and materials, the appropriate standards shall be applied.

HOISTS

(1) Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

(2) Hoists shall be anchored securely.

(3) Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

(4) Any hoist used to hoist men shall be equipped with a brake or brakes which shall be capable of holding its fully loaded cage, skip, or bucket at any point in the shaft.

(5) The operating mechanism of the clutch of every man-hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

(6) Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

(7) Man hoists shall be provided with devices to prevent overtravel and overspeed.

(8) Friction hoists shall be provided with synchronizing mechanisms that recalibrate the overtravel devices and position indicators to correct for rope creep or stretch.

(9) An accurate and reliable indicator of the position of the cage, skip, bucket, or cars, in the shaft shall be provided.

(10) Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

(11) Flanges on drums shall extend radially a minimum of 3 rope diameters beyond the last wrap.

(12) Advisory.

WIRE ROPE

(20) Advisory.

(21) The following static-load safety factors shall be used for selecting ropes to be used for hoisting men and for determining when such ropes shall be removed from man hoists.

Length of rope in shaft (feet)	Minimum factor of safety (new rope)	Minimum factor of safety (remove)
500 or less.....	8	6.4
501-1,000.....	7	5.8
1,001-2,000.....	6	5.0
2,001-3,000.....	5	4.3
3,001 or more.....	4	3.6

(22) At least 3 wraps of rope shall be left on the drum when the conveyance is at the bottom of the hoistway. This provision does not apply to friction hoists.

(23) The end of the rope at the drum shall make at least one full turn on the drum shaft, or a spoke of the drum in the case of a free

drum, and shall be fastened securely by means of rope clips or clamps. This provision does not apply to friction hoists.

(24) The rope shall be attached to the load by the thimble and clip method, the socketing method, or other approved method. If the socketing method is employed, zinc or its equivalent shall be used. The use of babbitt metal or lead for socking wire ropes is prohibited. If the thimble and clip method is used, the following shall be observed:

(a) The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or "live" end of the rope and fastening the 2 parts of the rope together with clips.

(b) 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 accompanying table.

(c) The following number of clips or equivalent shall be used for various diameters of 6 strand 19 wire plow steel ropes: (Follow manufacturer's recommendations for other kinds of wire rope and clips.)

Diameter of rope, inches	Number of clips	Center-to-center spacing of clips, inches
$\frac{3}{4}$	4	$4\frac{1}{2}$
$\frac{7}{8}$	4	$5\frac{3}{4}$
1	4	6
$1\frac{1}{8}$	5	$6\frac{3}{4}$
$1\frac{1}{4}$	5	$7\frac{1}{2}$
$1\frac{3}{8}$	6	$8\frac{1}{4}$
$1\frac{1}{2}$	6	9
$1\frac{5}{8}$	6	$9\frac{3}{4}$
$1\frac{3}{4}$	7	$10\frac{1}{2}$
$1\frac{7}{8}$	8	$11\frac{1}{4}$
2	8	12
$2\frac{1}{8}$	8	13
$2\frac{1}{4}$	8	14

(d) For all ropes less than $\frac{3}{4}$ inch in diameter, at least 4 clips or equivalent shall be used.

(e) When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in these regulations.

(25) New ropes shall be broken in in accordance with the manufacturer's recommendations.

(26) Corrosion of hoist ropes at the attachment of safety connections shall be minimized by the design of the attachment devices and by lubrication.

(27) Advisory.

HEADFRAMES AND SHEAVES

(35) Headframes shall be designed and constructed to withstand pulls by the hoists greater than the breaking strengths of the hoist ropes.

(36) Advisory.

(37) Advisory.

(38) Advisory.

(39) Diameters of head sheaves and hoist drums shall conform to the following specifications:

Rope construction	Diameter of sheave and drum	
	Recommended	Minimum
	Times rope diameter	Times rope diameter
6 x 7 classification.....	72	42
6 x 19.....	45	30
6 x 37.....	27	18
6 x 25 type B, flattened strand.....	45	30
6 x 27 type H, flattened strand.....	45	30
6 x 30 type G, flattened strand.....	45	30
18 x 7 classification.....	51	34

(40) Head, idler, knuckle, and curve sheaves shall have grooves that support the ropes properly. Before installing new ropes, the grooves shall be inspected and where necessary shaped to the proper contour and the proper groove diameter.

CONVEYANCES

(45) Man cages and skips used for hoisting or lowering employes or other persons in any vertical shaft or any incline shaft with an angle of inclination of 45 degrees from the horizontal, shall be covered with a metal bonnet.

(46) Man cages shall be fireproof, of substantial construction and provided with:

(a) Fully enclosed sides, and safety gates; gates shall be at least 5 feet high and have no openings except those necessary for signaling.

(b) Escape hatches.

(c) Safety catches. This provision, (c), does not apply to friction-hoist cages that are suspended from more than one pin.

(47) All skips conveying men shall be provided with:

(a) Safety catches. This provision, (a), does not apply to friction-hoists' skips that are suspended from more than one pin.

(b) Safe means of access.

(c) Platforms, where necessary, to provide safe footing.

(d) Stop controls to prevent travel into the dumping position.

(e) Anchored platforms inside the skips, if they are bottom-dumping.

(f) Devices to prevent tilting.

(48) Man cars shall be of substantial construction and provided with:

(a) Drags or equivalent safety devices on the last car of man trips operated in inclined shafts where guides are not provided.

(b) Safety catches if guides are provided.

(c) Secondary safety connections where possible.

(d) Safety chains or wire ropes between cars.

(e) Adequate seating for the number of men handled.

(49) Buckets shall not be used to hoist men except during shaft sinking operations, inspection, maintenance, and repairs.

(50) Buckets used to hoist men during shaft sinking operations shall have:

- (a) Crossheads equipped with safety catches and protective bonnets when the shaft depth exceeds 50 feet.
- (b) Devices to prevent accidental dumping.
- (c) Sufficient depth to transport men safely in a standing position.

HOISTING PROCEDURES

(55) When a manually operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any person is underground.

(56) Advisory.

(57) Hoistmen shall be physically fit and shall undergo yearly examinations to determine their continued fitness; certification to this effect shall be available at the mine.

(58) Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

(59) Advisory.

(60) Advisory.

(61) The safe speed shall be determined for each shaft; in no instance shall this speed exceed 2,500 feet per minute for hoisting men.

(62) Maximum acceleration and deceleration shall not exceed 6 feet per second.

(63) Only authorized personnel shall be in hoist rooms.

(64) Advisory.

(65) Conveyances shall not be lowered by the brakes alone except during emergencies.

(66) Management shall designate the maximum number of men permitted to ride on a trip at one time; this limit shall be posted.

(67) Authorized persons shall be in charge of all man trips.

(68) Advisory.

(69) Men shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

(70) Cage doors or gates shall be closed while men are being hoisted; they shall not be opened until the cage has come to a stop.

(71) Men shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

(72) When combinations of cages and skips are used, the skips shall be empty while men are being transported.

(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.

(74) Men shall not ride the ball, bail, hook, rim, or bonnet of any shaft conveyance, except where necessary for the inspection and maintenance of the shaft and lining.

(75) Open hooks shall not be used to hoist buckets or other conveyances.

(76) When men are hoisted, bucket speeds shall not exceed 500 feet a minute, and shall not exceed 200 feet a minute when within 100 feet of a landing.

(77) Buckets shall be stopped about 15 feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

(78) Advisory.

(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.

(80) When tools, timbers, or other materials are being lowered or raised in a shaft by means of a bucket, skip, or cage, they shall be secured or so placed that they will not strike the sides of the shaft.

(81) Conveyances not in use shall be released and raised or lowered at least 10 feet from the floor of the landing.

SIGNALING

(90) There shall be at least 2 effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or intercom.

(91) Advisory.

(92) A method shall be provided to signal hoist operators from within conveyances at any point in the shaft.

(93) A standard code of hoisting signals shall be adopted and used at each mine.

(94) A legible signal code shall be posted prominently in the hoist house within easy view of the hoistmen, and at each place where signals are given or received.

(95) Hoisting signal devices shall be maintained within easy reach of men on the shaft bottom during sinking operation.

(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.

SHAFTS

(100) Shaft landings shall be equipped with substantial safety gates so constructed that materials will not go through or under them; gates shall be closed except when loading or unloading shaft conveyances.

(101) Positive stopblocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

(102) Advisory.

(103) Advisory.

(104) Adequate clearance shall be maintained at shaft stations to allow men to pass safely and to allow materials to be handled safely.

(105) A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

(106) Shaft timbers shall be kept clean of rocks and other loose material.

(107) Hoistmen shall be informed when men are working in a compartment affected by that hoisting operation and "Men Working in Shaft" sign shall be posted at the hoist.

(108) Advisory.

(109) Shaft inspection and repair work shall be performed from substantial platforms equipped with bonnets or equivalent overhead protection.

(110) A substantial bulkhead or equivalent protection shall be provided above men at work deepening a shaft.

(111) Substantial fixed ladders shall be maintained as near the

shaft bottom as practical during shaft-sinking operations. Chain, wire rope, or other extension ladders shall be used from the fixed ladder to the shaft bottom.

INSPECTION AND MAINTENANCE

(120) A systematic procedure of inspection, testing, and maintenance of shafts and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until the malfunction has been located and repaired or adjustments have been made.

- (121) Advisory.
- (122) Advisory.
- (123) Advisory.
- (124) Advisory.
- (125) Advisory.
- (126) Advisory.
- (127) Advisory.

(128) Ropes shall not be used for hoisting when they have:

- (a) More than 6 broken wires in any lay.
- (b) Crown wires worn to less than 65% of the original diameter.
- (c) A marked amount of corrosion or distortion.
- (d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition.

(129) Hoistmen shall examine their hoist and shall test overtravel, overspeed, and deadman controls, position indicators, and braking mechanisms at the beginning of each shift.

- (130) Advisory.
- (131) Advisory.
- (132) Advisory.
- (133) Advisory.
- (134) Advisory.
- (135) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.21 Gassy mines.

Note: Gassy mines shall be operated in accordance with all mandatory standards in this part. Such mines shall also be operated in accordance with the mandatory standards in this section. The standards in this section apply only to underground operations.

MINE CLASSIFICATION

(1) A mine shall be deemed gassy, and thereafter operated as a gassy mine, if:

- (a) The state in which the mine is located classifies the mine as gassy; or
- (b) Flammable gas emanating from the orebody or the strata surrounding the orebody has been ignited in the mine; or
- (c) 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
- (d) The mine is connected to a gassy mine.

(2) Flammable gases detected while unwatering mines and similar operations shall not be used to class a mine gassy.

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FIRE PREVENTION AND CONTROL

(10) Men shall not smoke or carry smoking materials, matches, or lighters underground. The operator shall institute a reasonable program to insure that persons entering the mine do not carry smoking materials, matches, or lighters.

(11) Except when necessary for welding or cutting, open flames shall not be used in other than fresh air or in places where flammable gases are present or may enter the air current.

(12) Welding or cutting with arc or flame underground in other than fresh air or in places where flammable gases are present or may enter the air current shall be under the direct supervision of a qualified person who shall test for flammable gases before and frequently during such operations.

(13) Welding or cutting shall not be performed in atmospheres containing more than 1.0 percent of flammable gases.

VENTILATION

(20) Main fans shall be:

(a) Installed on the surface.

(b) Powered electrically from a circuit independent of the mine power circuit. Internal combustion engines shall be used only for standby power, or where electrical power is not available.

(c) Installed in fireproof housing provided with fireproof air ducts.

(d) Offset not less than 15 feet from the nearest side of the mine opening and equipped with ample means of pressure relief unless:

1. The opening is not in direct line with forces which would come out of the mine should an explosion occur, and

2. Another opening not less than 15 feet nor more than 100 feet from the fan opening is equipped with a weak-wall stopping or explosion doors in direct line with the forces which would come out of the mine should an explosion occur.

(e) Installed to permit prompt reversal of airflow.

(f) Attended constantly, or provided with automatic devices to give alarm when the fans slow down or stop. Such devices shall be placed so that they will be seen or heard by responsible persons.

(21) Advisory.

(22) Advisory.

(23) When single shafts are used for intake and return the curtain wall or partition shall be constructed of reinforced concrete or equivalent and provided with pressure relief devices.

(24) When a main fan fails or stops and ventilation is not restored in a reasonable time, action shall be taken to cut off the power to the areas affected and to withdraw all men from such areas.

(25) When there has been a failure of ventilation and ventilation has been restored in a reasonable time, all places where flammable gas may have accumulated shall be examined by a qualified person and determined to be free of flammable gas before power is restored and work resumed.

(26) When ventilation is not restored in a reasonable time, all men shall be removed from the areas affected, and after ventilation has been restored, the areas affected shall be examined by qualified persons for gas and other hazards and made safe before power is

restored and before men, other than the examiners and other authorized persons, return to the areas affected.

(27) When the main fan or fans have been shut down with all men out of the mine, no person, other than those qualified to examine the mine, or other authorized persons, shall go underground until the fans have been started and the mine examined for gas and other hazards and declared safe.

(28) Booster fans shall be:

(a) Operated by permissible drive units maintained in permissible condition.

(b) Operated only in air containing not more than one percent flammable gas.

(29) Advisory.

(30) Auxiliary fans shall be:

(a) Operated by permissible drive units maintained in permissible condition.

(b) Operated only in air containing not more than 1.0 percent flammable gas.

(31) Advisory.

(32) Men shall be withdrawn from areas affected by auxiliary or booster fans when such fans slow down or stop.

(33) The volume and velocity of the current of air coursed through all active areas shall be sufficient to dilute and carry away flammable gases, smoke, and fumes.

(34) The quantity of air coursed through the last open crosscuts in pairs or sets of entries, or through other ventilation openings nearest the face, shall be at least 6,000 cubic feet a minute.

(35) At least once each week, a qualified or competent person shall measure the volume of air entering the main intakes and leaving the main returns, the volume of the intake and return of each split, and the volume through the last open crosscuts or other ventilation openings nearest the active faces. Records of such measurements shall be kept in a book on the surface.

(36) Advisory.

(37) Advisory.

(38) Changes in ventilation that materially affect the main air current or any split thereof and may affect the safety of persons in the mine shall be made only when the mine is idle. Only those persons engaged in making such changes shall be permitted in the mine during the change. Power shall be removed from the areas affected by the change before work starts and not restored until the effect of the change has been ascertained and the affected areas determined to be safe by a qualified person.

(39) If flammable gas in excess of 1.0 percent by volume is detected in the air not less than 12 inches from the back, face, and rib of an underground working place, or in air returning from a working place or places, adjustments shall be made in the ventilation immediately so that the concentration of flammable gas in such air is reduced to 1.0 percent or less.

(40) If 1.5 percent or higher concentration of flammable gas is detected in air returning from an underground working place or places, the men shall be withdrawn and the power cut off to the por-

tion of the mine endangered by such flammable gas until the concentration of such gas is reduced to 1.0 percent or less.

(41) Air that has passed by an opening of any unsealed abandoned area and contains 0.25 percent or more of flammable gas shall not be used to ventilate working areas. Examinations of such air shall be conducted during the preshift examination required by subsection (59).

(42) Air that has passed through an abandoned panel or area which is inaccessible for inspection shall not be used to ventilate any active face workings in such mine. No air which has been used to ventilate an area from which the pillars have been removed shall be used to ventilate any active face workings in such mine, except that such air may be used to ventilate enough advancing working places or rooms immediately adjacent to the line of retreat to maintain an orderly sequence of pillar recovery on a set of entries.

(43) Abandoned areas shall be sealed or ventilated; areas that are not sealed shall be barricaded and posted against unauthorized entry.

(44) Seals shall be of substantial construction. Exposed surfaces shall be made of fire-resistant material or, if the commodity mined is combustible, seals shall be made of noncombustible material.

(45) One or more seals of every sealed area shall be fitted with a pipe and a valve or cap to permit sampling of the atmosphere and measurement of the pressure behind such seals.

(46) Crosscuts shall be made at intervals not in excess of 100 feet between entries and between rooms.

(47) Advisory.

(48) Line brattice or other suitable devices shall be installed from the last open crosscut to a point near the face to assure positive airflow to the face of every active underground working place, unless the department or an authorized representative permits an exception to this requirement.

(49) Advisory.

(50) Damaged brattices shall be repaired promptly.

(51) Advisory.

(52) Entries or rooms shall not be started off entries beyond the last open crosscuts, except that room necks and entries not to exceed 18 feet in depth may be turned off entries beyond the last open crosscuts if such room necks or entries are kept free of accumulations of flammable gas by use of line brattice or other adequate means.

(53) Advisory.

(54) Advisory.

(55) The main ventilation shall be so arranged by means of air locks, overcasts, or undercasts that the passage of trips or persons does not cause interruptions of air currents. Where air locks are impracticable, single doors may be used if they are attended constantly while the areas of the mine affected by the doors are being worked, unless they are operated mechanically or are self-closing.

(56) Air locks shall be ventilated sufficiently to prevent accumulations of flammable gas inside the locks.

(57) Doors shall be kept closed except when men or equipment are passing through the doorways.

(58) Advisory.

(59) Preshift examinations shall be made of all working areas by qualified persons within 3 hours before any workmen, other than the examiners, enter the mine.

(60) Each examiner shall be responsible for a definite underground area and shall:

(a) Inspect the working places and test the air therein with a permissible flame safety lamp for oxygen deficiency and with a device approved by the department for detecting flammable gas.

(b) Examine the seals and doors to determine whether they are functioning properly.

(c) Inspect the roadways, travelways, approaches to abandoned workings, and accessible falls in active areas for flammable gas.

(d) Determine whether the air in each split is traveling in its proper course and in normal volume.

(e) Place his initials and the date at or near the face of each place he examines.

(f) Indicate places that he considers may be dangerous to persons who may enter or be in such places by posting danger signs conspicuously at points that persons must pass to enter such dangerous places.

(g) After completing his examination, report the results to the mine operator or other designated persons, at a designated place on the surface of the mine or underground, before other persons enter the underground areas of such mine.

(h) Record the results of his examination with ink or indelible pencil in a book kept for that purpose at a designated place on the surface of the mine.

(61) Only qualified examiners and persons authorized to correct the dangerous conditions shall enter places or areas where danger signs are posted.

(62) Danger signs shall not be removed until the dangerous conditions have been corrected.

(63) Underground working places shall be examined for hazards by qualified persons at least once during each producing shift, and more often, if necessary. Examinations shall include tests for oxygen deficiency with a permissible flame safety lamp and for flammable gas with a device approved by the department for such use.

(64) Idle and abandoned areas shall be inspected for gas and for oxygen deficiency and other dangerous conditions by a qualified person as soon as possible, but not more than 3 hours before other employes are permitted to enter or work in such places. However, persons who are required regularly to enter such areas in the performance of their duties, and who are trained and qualified in means approved by the department for detecting flammable gas and who are trained in the use of a permissible flame safety lamp for oxygen deficiency are authorized to make such examinations for themselves, and each such person shall be properly equipped and shall make such examinations upon entering any such area.

(65) Advisory.

(66) Advisory.

EQUIPMENT

(75) Diesel-powered equipment not approved as permissible by the department for use in mines subject to these regulations shall not

be used underground. Permissible equipment shall be maintained in permissible condition.

(76) Diesel-powered equipment shall not be taken into or operated in places where flammable gas exceeds 1.0 percent at any point not less than 12 inches from the back, face, and rib.

(77) Trolley wires and trolley feeder wires shall be on intake air and shall not extend beyond the last open crosscut or other ventilation opening. Such wires shall be kept at least 150 feet from pillar workings.

(78) Only permissible equipment maintained in permissible condition shall be used beyond the last open crosscut or in places where dangerous quantities of flammable gases are present or may enter the air current.

(79) Only permissible distribution boxes shall be used in working places and other places where dangerous quantities of flammable gas may be present or may enter the air current.

(80) Tests for flammable gas shall be made with a device approved by the department, by persons trained in the use of such lamps or devices, before electrically powered or diesel-powered equipment is taken into or operated in face regions, and such tests shall be made frequently during such operations.

(81) No electric equipment shall be taken into or operated in places where flammable gas can be detected in the amount of 1.0 percent or more at any point not less than 12 inches from the back, face, and rib.

ILLUMINATION

(90) Only permissible electric lamps shall be used for portable illumination underground.

EXPLOSIVES

See Wis. Adm. Code, chapter Ind 5, Explosives and Blasting Agents.

(101) Advisory.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

Ind 3.23 Miscellaneous.

GENERAL—SURFACE AND UNDERGROUND

(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.

(2) Potable water shall be available to all employes during working hours.

(3) Advisory.

(4) Advisory.

(5) Carbon tetrachloride shall not be used.

(6) Advisory.

(7) Advisory.

(8) Toilet facilities shall be provided at convenient locations and shall be kept clean and sanitary.

(9) Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

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(10) If failure of a water or silt retaining dam will create a hazard, it shall be of substantial construction and inspected at regular intervals.

SURFACE ONLY

(20) Access to unattended mine openings shall be restricted by gates or doors, or the openings shall be fenced and posted.

(21) Upon abandonment of a mine, the owner or operator shall effectively close or fence off all surface openings down which persons could fall or through which persons could enter. Upon or near all such safeguards, trespass warnings and appropriate danger notices shall be posted.

UNDERGROUND ONLY

(30) Whenever any working place in a mine is being advanced in an area where a dangerous inrush of water, silt, or gas may be encountered, test holes of sufficient depth, proper orientation, and number shall be drilled in advance of such workings to insure that at least 20 feet of tested ground remains to prevent an uncontrolled inrush after any blast advancing the face.

(31) In areas where dangerous accumulations of water, gas, mud, or fire atmosphere could be encountered, men shall be removed to safe places before blasting.

(32) Advisory.

(33) Maps:

(a) A clear and accurate map or maps, with sections, if necessary, showing clearly all the workings of the mine shall be made and maintained. At least twice in every calendar year or oftener, if necessary, all excavations made during the time elapsed since such excavations were last shown on such map or maps, and all parts of said mine that have been worked out or abandoned shall be clearly indicated on the map or maps. All underground workings shall be surveyed and mapped before they are allowed to become inaccessible. All surveys shall be tied to the legal subdivision.

(b) Before any mine having underground workings is abandoned, the operator of such mine shall cause to be made by a competent engineer or surveyor, a map on a scale not smaller than 100 feet to the inch, showing all underground workings. A certified print or copy of such map shall be filed in the office of the department. This map shall be made available at the discretion of the department to any person whose operations are endangered by the abandoned operation beneath adjoining property.

(34) Whenever any mine shaft, exploration shaft, or test well is abandoned or its use discontinued, the operator or contractor shall promptly fill same to grade or enclose the same with a fence of strong, woven wire not less than 46 inches wide, installed with no crawl space, and with one barbwire above, or cap same with a reinforced concrete slab at least 6 inches thick or with a native boulder at least 3 times the diameter of the test well hole, or with a tapered concrete plug. When a fence is used the strands of woven wire shall not be smaller than No. 12 wire and the cross wires and meshes shall not be smaller than No. 16 wire; the strands shall not be more than 12 inches apart, and the meshes shall not exceed 8 inches. All wires

shall be tightly stretched and fastened to substantial posts firmly set not more than 8 feet apart.

(35) A competent man or men shall be detailed to make daily inspection of those parts of the mine which are traversed or are being worked. He shall inspect the roof, side walls, and pillars of those parts of the mine where men are employed and he shall promptly retimber or bar down or cause to be retimbered or barred down in a safe manner any dangerous or questionable ground. Workmen shall stand to one side when barring down or picking loose material.

(36) Protection against water:

(a) No mine workings shall be allowed to approach nearer than 30 feet of any part of a winze, stope, or other opening in which there is known or suspected dangerous accumulation of water.

(b) Notice shall be given to the department in writing before starting to advance a mine workings toward another mine workings that is suspected of being filled with water. A borehole shall be drilled at least 30 feet in advance of the face of the drift when in the vicinity of such mine workings filled with water, and also, if necessary in other directions.

(c) Where there is danger of a sudden inburst of water, such additional raises, drifts, or other safety provisions shall be constructed as are necessary in the opinion of the department to insure the escape of workmen.

(37) Sanitation:

(a) A miner's dry-house shall be provided to dry the working clothes of persons employed in and about the mine. When men must bathe before donning street clothes this dry-house shall comply with general sanitation in all places of employment as referred to in Wis. Adm. Code chapter Ind 22, Sanitation. In any case, washing facilities as described in this rule shall be provided. The dry-house shall be:

1. Kept clean and sanitary;
2. Provided with at least 2 exits;
3. Well illuminated;
4. Provided with clothes lockers or approved hangers;
5. Kept well heated and, if necessary, heating equipment shall be guarded against contact hazards. A temperature of not less than 80° F. shall be maintained at all times when men are changing.

(b) Where an operating life of more than 2 years is anticipated, the dry-house shall meet the minimum ventilation requirements for general sanitation and service areas of chapter Ind 59 of Wis. Adm. Code, chapters 50-59—Building and Heating, Ventilating and Air Conditioning.

(c) Dressing rooms, dry-houses, lavatories, and showers shall be cleaned daily of all refuse and kept in a sanitary condition.

(d) Fresh and safe drinking water shall be available to employes during the working hours. Wherever necessary, employers shall pipe water into the mine and provide drinking fountains. Community drinking vessels shall not be used.

(e) Unless the miners are permitted to use the toilet facilities provided on the surface, within one year from the effective date of these rules, the best system of human waste disposal in mines that

can be developed shall be placed in operation in each mine in the state.

(38) Only competent men who are able to speak and read the English language shall be employed to operate mine hoists. Each hoistman shall be given a thorough medical physical examination at least every 6 months by a competent physician authorized to practice in Wisconsin. The physician shall fill out the examination blank, form SB-33, copies of which are available from the department, and return it to the employer.

(39) Hoistmen shall be familiar with the details and workings of a hoisting engine, and, except in cases of emergency, no others than such duly appointed hoistmen shall run such engine or hoisting machinery; except that learners may be taught the operation of the hoisting engine at such times and under such restrictions as may be free of risk to life and limb.

History: Cr. Register, April, 1972, No. 196, eff. 5-1-72.

APPENDIX A

ADVISORY SAFETY GUIDELINES

Note: The following advisory safety guidelines are based on title 30—Mineral Resources, chapter 1—Bureau of Mines, Department of the Interior, published in the Federal Register, Volume 34, No. 145, July 31, 1969.

A 3.03 Ground control.

(22) The miners should examine and test the back, face, and ribs of their working places at the beginning of each shift and frequently thereafter. Supervisors should examine the ground conditions during daily visits to insure that proper testing and ground control practices are being followed. Loose ground should be taken down or adequately supported before any other work is done. Ground conditions along haulageways and travelways should be examined periodically and scaled or supported as necessary.

(29) Shaft pillars should have sufficient strength to protect operating shafts.

(30) Rock-bolted reinforcement should be installed in a manner to provide safe and effective ground support.

(32) When needed, rock bolts should be installed as soon as possible after an area is exposed.

(33) Torque meters should be available at mines where rock bolts are used. Periodic tests should be made to determine if bolts meet recommended torque.

A 3.04 Fire prevention and control.

(5) Unburied flammable-liquid storage tanks should be mounted securely on firm foundations. Outlet piping should be provided with flexible connections or other special fittings to prevent adverse effects from tank settling.

(6) Buildings or rooms in which oil, grease, flammable liquids, or similar flammable materials are stored should be of fire-resistant construction and well ventilated.

(31) A firefighting organization should be established, equipped, and trained in firefighting; drills should be held at least twice a year.

(43) Buildings and other structures within 100 feet of mine openings should be fire-resistant.

(45) Blacksmith shops should be:

(a) A safe distance from mine openings and not in buildings or snowsheds adjoining mine openings.

(b) Of fire-resistant construction.

(c) Well ventilated and equipped with exhaust hoods over the forge and welding areas.

(d) Occupied when the forge fire is burning.

(e) Inspected carefully for smoldering fires at the end of the shift.

(60) Power circuits should be deenergized in all areas on idle shifts or idle days, except where power is required. These required circuits should be protected with minimum-capacity fuses.

(61) Fire doors should be provided at shaft stations or other appropriate locations to prevent the spread of smoke or gas; the doors should be equipped with latches operable from both sides.

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(62) Timbered mine entrances should be fire-resistant for at least 200 feet inside the mine portal or collar or provided with fire protection adequate to control a fire for at least 200 feet inside the mine portal or collar.

(63) Waterline outlets should be located so as to be accessible if a fire is at a station.

(64) All air lines in timbered mines should be readily convertible into waterlines if a water supply is available, unless the air lines are paralleled by waterlines.

(66) Adequate fire extinguishers or equivalent fire protection should be provided at the head, tail, and drive pulleys of belt conveyors and at suitable intervals along the belt line.

(68) Mines at which individual mine rescue stations are not maintained should affiliate with central or cooperative mine rescue stations.

(70) At least 2 rescue crews (10 men) should be trained annually in the use, care, and limitation of self-contained breathing and fire fighting apparatus and in mine-rescue procedures at mines employing 75 or more men. Smaller mines should have one or more trained men available.

(71) Rescue crews should include supervisory and key personnel familiar with all mine installations that could prove vital to fire fighting and rescue operations.

(72) Only trained mine rescue men should participate in fire fighting operations in advance of the fresh air base.

A 3.05 Air quality, ventilation, and radiation.

(4) Muck piles, haulage roads, rock transfer points, crushers, and other points where dust is produced should be wet down at the beginning of the shift and thereafter as necessary, unless dust is controlled adequately by other methods.

A 3.06 Ventilation and radiation.

(4) Separate mine openings should be provided for main intake and return air currents. A multiple compartment shaft does not constitute separate mine openings.

(10) Ventilation tubing should be installed so that the air current sweeps the face areas effectively. Maximum distance of the end of the tubing from the face generally should be 30 feet for blowing and 6 feet for exhausting.

(11) Ventilation doors not operated mechanically should be hung so that they are self-closing, and installed so as to remain closed regardless of the direction of air current.

A 3.07 Drilling.

(6) Receptacles or racks should be provided for drill steel stored on drills.

(7) Tools and other objects should not be left loose on the mast or drill platform.

(9) The drill helper, when used, should be in sight of the operator at all times while the drill is being moved to a new location.

(14) Men operating or working near jackhammers or jackleg drills and other drilling machines should position themselves so that they will not be struck or lose their balance if the drill steel breaks or sticks.

(15) Men should not drill from positions that hinder their access to the control levers or from insecure footing or staging, or from atop equipment not designed for this purpose.

(16) Bit wrenches or bit knockers should be used to remove detachable bits from drill steel.

(17) Starter steels should be used when collaring holes with hand-held or feed-leg drills.

(19) Air should be turned off and bled from the hose before hand-held drills are moved from one working area to another.

(25) Men operating or working near drilling machines should position themselves so that they will not be struck or lose their balance if the steel breaks or sticks.

(26) Men should not attempt to operate drills from positions that hinder their access to the control levers.

(27) Drilling should not be attempted from insecure footing or staging, or from atop equipment not designed for this purpose.

(28) Men should not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

(29) Air should be turned off before moving portable drills from one face to another.

(30) Receptacles or racks should be provided for drill steel stored on jumbos.

(31) Before drilling cycle is started, warning should be given to men working below jumbo decks.

(32) Drills on columns should be anchored firmly before drilling is started and should be retightened frequently thereafter.

A 3.00 Loading, hauling, dumping.

- (1) Equipment should be inspected each shift by an authorized individual. Equipment defects affecting safety should be reported.
- (5) Operators should be certain, by signal or other means, that all persons are clear before starting or moving equipment.
- (6) When the entire length of the conveyor is visible from the starting switch, the operator should 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 visual warning system should be installed and operated to warn persons that the conveyor will be started.
- (7) Unguarded conveyors with walkways should be equipped with emergency stop devices or cords along their full length.
- (8) Adequate protection should be provided at dumping locations where men may be endangered by falling material.
- (10) Operators' cabs should be constructed to permit operators to see without straining and should be reasonably comfortable.
- (15) Slusher hoists should be equipped with backlash guards, rollers, drum covers, and anchored securely before slushing operations are started.
- (16) Roadbeds, rails, joints, switches, frogs, and other elements on railroads should be designed, installed, and maintained in a safe manner consistent with the speed and type of haulage.
- (17) Equipment operating speeds should be prudent and consistent with conditions of roadway, grades, clearance, visibility, traffic, and the type of equipment used.
- (18) Dust control measures should be taken where dust significantly reduces visibility of equipment operators.
- (19) Track guardrails, lead rails, and frogs should be protected or blocked so as to prevent a person's foot from becoming wedged.
- (21) Vehicles should follow at a safe distance; passing should be limited to areas of adequate clearance and visibility.
- (26) Only authorized persons should be present in areas of loading or dumping operations.
- (29) Operators should sit facing the direction of travel while operating equipment with dual controls.
- (34) Loaded cars or trucks should not be moved until the loads are trimmed properly.
- (35) Movements of 2 or more pieces of rail equipment operating independently on the same track should be regulated by an efficient signal block, telephone, or radio system; movements on complex haulage systems should be adequately controlled.
- (38) When dumping cars by hand, the car dumps should be provided with tiedown chains or bumper blocks to prevent cars from overturning.
- (42) Rocker-bottom or bottom-dump cars should be equipped with positive locking devices.
- (44) Men should not ride in conveyances equipped with unloading devices unless a positive means is provided to prevent accidental starting of the unloading mechanism.
- (46) Backpoling of trolley poles should be avoided wherever possible; where backpoling is necessary, it should be done only at slow speeds.
- (49) Long material should be transported by a method designed to prevent any overhang from creating a hazard.
- (52) Inability of the motorman to clearly recognize the brakeman's signals when the train is under the direction of the brakeman should be construed by the motorman as a stop signal.
- (53) Dumping locations and haulage roads should be kept reasonably free of water, debris, and spillage.
- (55) Where the ground at a dumping place may fail to support the weight of a loaded dump truck, trucks should be dumped back from the edge of the bank.
- (57) Grizzlies, grates, and other sizing devices at dump and transfer points should be anchored securely in place.
- (63) Ramps and dumps should be of solid construction, of ample width, have ample clearance and headroom, and be kept reasonably free of spillage.
- (65) Cars should not be coupled or uncoupled manually from the inside of curves.
- (66) A locomotive on one track should not be used to move equipment on a different track unless a chain or drawbar is used.
- (70) A tow bar should be used to tow heavy equipment. A safety chain should be used in conjunction with the tow bar.
- (82) In areas where weather conditions justify, haulage trucks with cabs should be equipped with heaters and/or air conditioners maintained in good condition.

(84) Traffic rules, signals, and warning signs should be standardized at each mine and posted.

(86) Any load extending more than 4 feet beyond the rear of the vehicle body should be marked clearly with a red flag by day and a red light at night.

(96) Supplies, materials or tools, except properly secured rerailling devices, should not be carried on top of locomotives unless equipped with adequate sideboards.

(99) Supplies, materials, and tools other than small hand tools should not be transported with men in man-trip cars. Man-trips should be operated independently of ore and supply trips.

(100) Pneumatic-powered loading equipment should be provided with a valve to close the air line at the machine; this valve should be closed except when the machine is being operated.

(104) Warning devices or conspicuous markings should be installed when chute lips create a hazard to personnel.

(105) Empty chutes should be properly guarded prior to filling or sufficient material should be left in the chute bottom to prevent rock from flying out when broken material is dumped into the chute.

(108) Men attempting to loosen hangups should work with extreme caution.

(109) Men should not work or pass under hung draw openings unless the openings are blocked effectively.

(111) Shelter holes should be at least 4 feet wide, marked conspicuously, and should provide a minimum of 40 inches clearance from the farthest projection of moving equipment.

(115) Man-trip passengers should ride on the side of the car opposite the trolley wire, unless covered man cars are provided.

A 3.10 Aerial tramways.

(1) Buckets should not be overloaded, and feed should be regulated to prevent spillage.

(2) Carriers, including loading and unloading mechanisms, should be inspected each shift; brakes should be inspected daily; ropes and supports should be inspected as recommended by the manufacturer or as physical conditions warrant. Records of rope maintenance and inspections should be kept.

(4) Positive-action type brakes should be provided on aerial tramways.

(5) Track cable connections should be designed to offer minimum obstruction to the passage of wheels.

(6) Guards should be installed to prevent swaying buckets from hitting towers.

(8) Persons other than maintenance men should not ride aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load.

(b) Direct communication between terminals.

(c) Power drives with emergency power available in case of primary power failure.

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

A 3.11 Travelways and escapeways.

(11) Men climbing or descending ladders should face the ladders and have both hands free for climbing.

(15) Slippery walkways should be provided with cleats and handrails and/or ropes.

(17) Fixed ladders should not incline backwards at any point unless provided with backguards.

(25) Fixed ladders should be offset and have substantial railed landings at least every 30 feet unless backguards are provided.

(26) Steep fixed ladders (70° to 90° from the horizontal) 30 feet or more in length, should be provided with backguards, cages, or equivalent protection, starting at a point not more than 7 feet from the bottom of the ladder.

(35) Flexible ladders should be used only where rigid ladders may be impractical.

(37) The minimum, unobstructed cross-sectional opening in ladders should be 24 inches by 24 inches.

(39) Working floors in square-set stopes should be lagged closely and securely, and open sets should be equipped with guardrails.

(41) Ladders with an inclination of more than 70° off the horizontal should be offset and have landing gates, backguards or substantial landings at least every 30 feet.

A 3.12 Electricity.

(5) Neither crawler-mounted nor rubber-tired equipment should run over trailing cables, unless the cables are properly bridged or protected.

(9) Power wires and cables which present a fire hazard should be well installed on acceptable insulators.

(19) At least 3 feet of clearance should be provided around all parts of stationary electric equipment or switchgear where access or travel is necessary.

(22) Areas containing major electrical installations should be entered only by authorized personnel.

(24) Reverse-current protection should be provided at storage-battery charging stations.

(29) Electric equipment and wiring should be inspected by a competent person as often as necessary to assure safe operating conditions.

(31) Electric motors, switches, and controls exposed to damaging dust or water should be of dust tight or watertight construction.

(38) Trailing cables should be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections.

(39) Surplus trailing cables to shovels, cranes, and similar equipment should be stored in cable boats or on reels mounted on the equipment or otherwise protected from mechanical damage.

(42) Both rails should be bonded or welded at every joint. Rails should be cross bonded at least every 200 feet if the track serves as the return trolley circuit, except where a control signal cannot be used on a crossbonded track.

(44) Lightning arrester grounds should be connected to earth at least 10 feet from the track or mine return circuit.

(49) Men should not stand on the ground in the vicinity of an electrically powered shovel or other similar heavy equipment during an electrical storm.

(50) Trolley wires should be aligned properly and installed at least 6 inches outside and 7 feet above the track.

(51) Trolley wire hangers should be spaced so that the wire will not sag more than 3 inches between hangers and so that the wire may be detached from any one hanger without creating a shock hazard.

(52) Trolley wires and trolley feeder wires should be provided with sectionalizing switches at man-trip stations and near the beginning of all branch lines.

(53) Ground wires for lighting circuits powered from trolley wires should be connected securely to the ground return circuit.

(54) Tools and supplies should be carried in the hands and not on the shoulders when men travel near bare power conductors.

(69) Lightning arresters should be provided where telephone circuits enter a mine; mine telephone extensions in surface buildings should be provided with a lightning arrester for each circuit entering the building.

(70) Each exposed power circuit that leads underground should be equipped with lightning arresters of an approved type at or near the point where the circuit enters the mine.

(81) Metal pipelines 1,000 feet or more in length along haulage roads where grounded return circuits are used should be bonded to the return at the ends and at intervals not exceeding 500 feet.

(83) Power cables in shafts and boreholes should be fastened securely in such manner as to prevent undue strain on the sheath, insulation, or conductors.

(84) Disconnecting switches that can be opened safely under load should be provided underground at all primary power circuits near shafts, levels, and boreholes.

(86) Trolley and trolley feeder wires should be installed opposite the clearance side of haulageways.

(87) Not more than 5 splices should be made in any trailing cable unless they are vulcanized.

(88) On machines not using cable reels, no splices should be present in the first 25 feet of trailing cable adjacent to the equipment.

A 3.13 Compressed air and boilers.

(12) Compressor air intakes should be installed to insure that only clean, uncontaminated air enters the compressors.

(16) Compressors should be operated and lubricated in accordance with the manufacturer's recommendations.

(17) Compressor discharge pipes should be cleaned periodically

A 3.14 Use of equipment.

(30) Men should not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

(36) Tools and equipment should be used only for the purpose and within the capacity for which they were intended and designed.

A 3.15 Personal protection.

(6) Protective clothing, rubber gloves, goggles, or face shields should be worn by persons handling substances that are corrosive, toxic, or injurious to the skin.

(13) Where there is danger of a vehicle overturning, seat belts should be used.

A 3.16 Materials storage and handling.

(2) Men working on surge piles or storage piles should not walk or stand immediately above a reclaiming area during reclaiming.

A 3.18 Safety programs.

(2) Regular safety inspections should be made by company officials and/or safety committees. Written reports should be made of the findings and the actions recommended or taken; this information should be made available to the employees.

(5) All employees and officials should be familiar with company, state and federal safety regulations.

A 3.19 Man Hoisting.

(12) Where grooved drums are used, the grooves should be of the proper size and pitch for the ropes used.

(20) The specifications of the American National Standards Institute "Wire Ropes for Mines," M11.1-1960, or the latest revision thereof, should be used as a guide in the selection, installation, and maintenance of wire ropes used for hoisting, except in those instances where the recommendations cited herein are more stringent.

(27) Where possible, conveyances attached to single ropes used to hoist men should be provided with secondary safety connections.

(36) Headframes should be high enough to provide at least 15 feet of clearance between the bottom of the sheave or drum and the uppermost part of the highest rope connection of the conveyance when the conveyance is at its uppermost man landing.

(37) Fleet angles should not exceed 1½ degrees.

(38) Platforms with toeboards and handrails should be provided around elevated head sheaves.

(56) When automatic hoisting is used, a qualified hoistman should be in attendance on the premises while any person is underground.

(59) Whenever a regular shift of men is being hoisted or lowered by a manually operated hoist, a second man familiar with and qualified to stop the hoist should be in attendance; this provision should not apply to sinking operations, level development, or repair operations in the mine.

(60) Hoistmen should use extreme caution when hoisting or lowering men.

(64) Conveyances intended to be operated in balance should not be balanced when men are on the cage.

(68) Men should enter, ride, and leave conveyances in an orderly manner.

(78) Buckets should be stopped after being raised 3 feet when men are hoisted from the bottom; a second hoisting signal should be given after the bucket has been stabilized. Hoisting should be at a minimum speed and the bellicord should be attended constantly until the cross-head has been engaged.

(91) Hoistmen should not accept hoisting instructions by telephone unless the regular signaling systems are out of order. During such an emergency one person should be designated to direct movement of the conveyance.

(102) Guides should be provided in each hoisting compartment in shafts inclined more than 45° from the horizontal.

(103) Dumping facilities should be so constructed as to minimize spillage into the shaft.

(108) "Men Working in Shaft" signs should be posted at the signal devices at all active stations and landings when men are working in a compartment affected by that hoisting operation.

(121) Complete records should be kept of installation, lubrication, inspection, tests, and maintenance of shafts and hoisting equipment.

(122) Parts used to repair hoists should have properties equal to or better than the original parts; replacement parts should be designed to fit the original installation.

(123) Ropes should be kept well lubricated from end to end as recommended by the manufacturer.

(124) Ropes should be cut off and reconnected to the conveyance as often as necessary to assure adequate inspection of rope condition and to effectively distribute wear of the rope. At least 6 feet should be cut from the rope above the highest connection; this portion should be examined carefully for corrosion, damage, wear, and fatigue by the rope manufacturer or an equally competent agency.

(125) Hoisting ropes wound in multiple layers should be cut off and repositioned on the drum at regular intervals as necessary to effectively distribute wear of the rope. The length of the cutoff at the drum end should be greater than, but not an even multiple of, the circumference of the drum.

(126) Ropes should be calipered at regular intervals as necessary to effectively determine the rate of wear and damage. Caliper measurements should be taken:

- (a) Immediately above the socket or clips and above the safety connection.
- (b) Where the ropes rest on the sheaves.
- (c) Where the ropes leave the drums when the conveyances are at the regular stopping points.
- (d) Where a layer of rope begins to overlap another layer on the drum.

(127) Electromagnetic or other nondestructive rope testing systems should be used only as supplements to and not as substitutes for recommended inspection and tests.

(130) Empty conveyances should be operated up and down shafts at least one round trip before hoisting men and after any shaft or equipment repairs and before regular man trips are hoisted or lowered.

(131) Rope and conveyance connections should be inspected daily.

(132) Safety catches should be inspected daily; drop tests should be made at the time of installation. Every 2 months the cage should be rested on chairs or proper blocking to check the operation or activation of the safety catches by allowing the rope to slacken suddenly.

(133) Shafts should be inspected at least weekly.

(134) Sheaves should be inspected daily and kept properly lubricated.

(135) Rollers used in inclined shafts should be lubricated, properly aligned, and kept in good repair.

A 3.21 Gassy mines.

(21) Main fans should be:

(a) Operated continuously except when the mine is shut down for an extended period.

(b) Provided with pressure-recording gauges.

(c) Inspected daily and records kept of such inspections and of fan maintenance.

(22) The main intake and return air currents in mines should be in separate shafts, slopes, or drifts.

(29) Booster fans should be:

(a) Inspected by a qualified person at least once each shift or provided with automatic devices to give alarm when the fans slow down or stop.

(b) Equipped with devices that automatically cut off the power in areas affected if the fans slow down or stop when the fans are not provided with automatic alarm devices.

(c) Provided with air locks, the doors of which open automatically if the fan stops operating.

(31) Auxiliary fans should be inspected by qualified persons at least twice each shift.

(36) Permanently installed battery-charging and transformer stations should be ventilated by separate splits of air conducted directly to return air courses.

(37) Electrically operated pumps, compressors, and portable substations should be in intake air.

(47) Crosscuts should be closed when necessary to provide adequate face ventilation.

(49) Brattice cloth should be of flame-resistant material.

(51) Crosscuts should be provided, where practicable, at or near the faces of entries and rooms before they are abandoned.

(53) Stoppings in crosscuts between intake and return airways, on entries other than room entries, should be built of solid, substantial material; exposed surfaces should be made of fire-resistant material or, if the material mined is combustible, stoppings should be made of noncombustible material.

(54) Stoppings should be reasonably airtight.

(58) Overcasts and undercasts should be:

(a) Constructed tightly of noncombustible material.

(b) Of sufficient strength to withstand possible falls from the back.

(c) Kept clear of obstructions.

(65) Examinations for dangerous conditions, including tests for flammable gas with a device approved by the department, should be made at least once each week, and at intervals of not more than 7 days, by the mine foreman or other designated mine official, except during weeks in which the mine is idle for the entire week. The foreman or other designated mine official should:

- (a) Examine and make tests:
1. In the return of each split where it enters the main return,
 2. On accessible pillar falls,
 3. At seals,
 4. In the main return,
 5. In at least one entry of each intake and return airway in its entirety,
 6. In idle workings,
 7. In abandoned workings, insofar as conditions permit.
- (b) Mark his initials and the data at the places examined,
- (c) Report dangerous conditions promptly to the mine operator or other designated person,
- (d) Record the results of his examination with ink or indelible pencil in a book kept for that purpose at a designated place on the surface of the mine.
- (66) The mine foreman or other designated mine official should read and countersign promptly the reports of daily and weekly examinations by qualified persons, and should take prompt action to have dangerous conditions corrected.
- (101) Shots and rounds should be fired by qualified persons.

A 3.23 Miscellaneous.

- (3) Good housekeeping should be practiced in and around a mine.
- (4) Men should not engage in horseplay.
- (6) Protruding nails which may cause injury should be removed or completely bent over.
- (7) Employes should be constantly alert to the potential of accidents on their jobs.
- (32) Telephone service or equivalent 2-way communication facilities should be provided from underground working areas to the surface.