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GENERAL ORDERS ON
MINES

Effective October 25, 1937

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GENERAL ORDERS ON MINES

INTRODUCTION

The first mine safety code of Wisconsin was the set of General Orders on Zinc Mines which the Industrial Commission adopted late in 1914. As indicated by the title, these orders applied only to lead and zinc mines — not to iron mining. These orders, admittedly, moreover, dealt with only a few of the hazards in zinc mining. Nor did the Industrial Commission have a qualified mine inspector on its staff until the fall of 1919.

When real safety inspection of mining operations was undertaken by the commission, it became apparent that a more complete safety code for mines was needed. To draft such a code, the following Advisory Committee on Safety in Mines was organized in December, 1920.

PROF. E. R. SHOREY, University of Wisconsin, Madison,
Chairman

PROF. H. B. MORROW, Wisconsin Mining School, Platteville
DR. J. J. RUTLEDGE, U. S. Bureau of Mines, St. Louis, Mo.

J. J. HANDLEY, Wisconsin Federation of Labor, Milwaukee

J. A. MACCULLOCH, Vinegar Hill Zinc Company, Platteville

T. H. GARNETT, Mineral Point Zinc Company, Galena, Illinois
THEO. A. WAECH, Platteville

A. A. BAWDEN, Odanah Mining Company, Ironwood, Michigan

O. M. SCHAUS and JOHN M. PRICE, Montreal Mining Company, Montreal

A. H. FINDEISEN, Industrial Commission, Madison, *Secretary*

This committee held several meetings after which it recommended the submission to public hearings of a set of tentative safety orders on mines. A few minor changes were incorporated in the orders and they were then adopted by the commission on March 28, 1922. They were published in the official state paper on March 31, 1922 and became effective

May 1, 1922. The old orders on lead and zinc mines were repealed as of this latter date.

In 1936 a reprinting of these orders became necessary but before doing so the commission considered it desirable to submit the orders to an advisory committee for revision. As some of the members of the former advisory code committee were no longer identified with mining operations in Wisconsin, the committee was re-organized with the following members:

PROF. E. R. SHOREY, University of Wisconsin, Madison, *Chairman*

PROF. H. B. MORROW, Wisconsin Mining School, Platteville
O. M. SCHAUS, Montreal Mining Company, Montreal

A. A. BAWDEN, Pickands, Mather & Co., Ironwood, Michigan

F. S. CRAWFORD, U. S. Bureau of Mines, Duluth, Minnesota

J. E. TREWARTHA, Vinegar Hill Zinc Company, Platteville

J. F. MELOY, Benton

NELS HANSEN, Wisconsin State Federation of Labor, Milwaukee

A. H. FINDEISEN, Industrial Commission, Madison, *Secretary*

A meeting of the committee was held in Montreal on July 8 and 9, 1937. After completing its work, the committee voted to recommend the revised orders to the commission for adoption.

A public hearing was held in Platteville on August 25, 1937 and no criticism of the revision was offered.

On October 25, 1937, the commission repealed orders 300, 301, 302, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 335, 336, 337, 338, 339, 340, and 345.

Adopted amended orders 300, 301, 302, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 333, 334, 335, 336, 337, and 338; the repeal of the old orders to be simultaneous with the effective date of the amended orders.

The orders were officially published on September 25, 1937 and became effective on October 25, 1937.

GENERAL ORDERS ON MINES

Order 300—Scope.

These orders shall apply to all mines operated in the State of Wisconsin.

Order 301—Construction of Orders.

Failure on part of superintendents, foremen, bosses and other persons having control of any place of employment, or of any employe and of any operations, to carry out any duty prescribed in these orders, is violation of such order by the employer.

Order 302—Definitions.

(a) *Approved*. The term "approved" means approved by the Industrial Commission.

(b) *Mine*. The term "mine" means prospect openings, pits, banks, and open-cut workings and embraces any and all parts of the property of such "mine" and mining plant on the surface or underground and at or in which any number of persons are engaged in work that may or does contribute directly or indirectly to mining, handling, recovery or extraction of minerals or mineral products.

(c) *Mineral*. The term "mineral" shall mean whatever is recognized by standard authorities as mineral, whether metalliferous or non-metalliferous.

(d) *Excavations or Workings*. The term "excavations" or "workings" means any or all parts of a mine excavated or being excavated, including shafts, tunnels, drifts, crosscuts, raises, winzes, stopes, open-cuts and all working places whether abandoned or in use.

(e) *Shaft*. The term "shaft" means an opening made for mining or finding ore, for hoisting and lowering men or material for raising water or ore, or for ventilating underground workings.

(f) *Underground*. The term "underground" means within the limits of any mine working beneath the surface of

the ground and shall not exclude such workings or excavations as may not be covered by rock or earth.

(g) *Explosives.* The terms "explosive" or "explosives" mean any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion, that contains an oxidizing and combustible units or other ingredients in such proportions, quantities or packing that an ignition by fire, by friction, by concussion, by percussion, or by detonator of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life or limb.

(h) *Detonator.* The term "detonator" means any kind of blasting cap used for detonating a high explosive.

(i) *Blasting Cap.* The term "blasting cap" means a capsule containing a detonating compound.

(j) *Electric Blasting Cap.* The term "electric blasting cap" means a blasting cap with an ignition head inserted into and sealed in the open end with two projecting firing wires.

(k) *Delay Electric Blasting Cap.* The term "delay electric blasting cap" means an electric blasting cap with a timing element interposed between the ignition head and detonating compound.

(l) *Primer.* The term "primer" means a capped fuse, electric exploder, or other source of ignition inserted in a cartridge of explosive.

(m) *Magazine.* The term "magazine" means any building or other structure used for the storage of explosives.

(n) *Permissible.* The term "permissible" means complete equipments having formal approval of the U. S. Bureau of Mines.

(o) *Person.* The term "person" means a firm or body corporate as well as natural persons.

Order 304—Care of the Injured.

(a) *Stretchers.* Approved stretchers with blankets, shall be kept at places convenient and accessible to employes.

(b) *First Aid Material.* An approved supply of first aid material shall be kept and maintained in dust and moisture-proof boxes at places convenient and accessible to employes.

(c) *First Aid Training.* Provision for first aid training of men shall be made each year. Standard U. S. Bureau of Mines instruction shall be given by a competent first aid in-

structor who has an effective first aid instructor's certificate issued by the U. S. Bureau of Mines or the American Red Cross.

At least two men on each shift in mines employing from two to fifty men shall be trained in first aid.

In mines employing over 50 men, all bosses and a sufficient number of workmen shall be trained in first aid so that at least 25 per cent of the personnel is trained.

(d) *Oxygen Breathing Apparatus.* In mining districts in which the Industrial Commission believes fire hazards exist and in which more than 50 men are employed underground at least fifteen sets of approved two-hour oxygen breathing apparatus shall be maintained to be used in case of emergency. A sufficient supply of oxygen, regenerator charges sufficient to keep all apparatus running for at least ten hours shall be kept on hand. An oxygen pump and a sufficient supply of spare parts shall be maintained. Monthly inspections of each apparatus shall include tests for tightness of all joints, breathing bags and breathing circuit, flow of oxygen from the reducing valve and volume of air in circulation. For injector types, the pressure and vacuum also shall be recorded. At least fifteen men thoroughly qualified and physically fit to use approved two-hour oxygen breathing apparatus shall be kept trained and shall practice with the apparatus at least once each month.

Order 305—Ventilation.

(a) *Ventilation Required.* All mines shall be ventilated to insure fresh air in all active sections of underground workings and all inactive sections shall be fenced.

(b) *Noxious Gases.* Noxious gases and insufficiency of oxygen in the air shall not exceed the following limits:

Carbon monoxide to be less than	0.01%
Carbon dioxide to be less than	1.00%
Methane to be less than	0.25%
Oxygen to be more than	19.00%

If the tests show an excess of these limits for any of the gases, mechanical ventilation shall be provided which will add sufficient fresh air to dilute the gases to comply with the limitations of the above table.

(c) *Harmful Dusts.* Harmful dusts shall be removed from the air breathed by workers, sufficiently to cause the air to be safe to breathe, as defined by order 2007 of the "General Orders on Dusts, Fumes, Vapors and Gases."

(d) *Fuel Burning Locomotives.* Where fuel burning locomotives are used in haulage ways, forced ventilation sufficient to maintain the carbon monoxide contents of the air in haulage ways to .01 per cent or less during period of poorest combustion shall be provided. Fuel burning locomotives shall not be used in dead-end drifts or allowed to idle when not engaged in hauling cars.

Order 306—General Safety Precautions.

(a) *Precautions Required.* Every reasonable precaution shall be taken to insure the safety of the workmen in or about the mine in all cases whether or not provided for in these orders.

(b) *Fencing Dangerous Places.* All dangerous places shall be properly fenced off, covered over or otherwise safeguarded.

(c) *Solitary Employment.* No man shall be in solitary employment at a working face at such a distance from another that his cries in case of need cannot be heard, unless he is in communication with another employe at least once every two hours.

(d) *Work in Dangerous Places.* No men shall be permitted to work in an unsafe place unless for the purpose of making it safe, and then only after proper precautions have been taken to protect the men who are doing the work.

(e) *Reporting Dangerous Conditions.* All defects in or damage to machinery or timbering or to apparatus and equipment generally in and about a mine, and all accidents occurring in the course of mining operations, even though not resulting in personal injury, shall be promptly reported by the person observing them to some one in authority who shall have the conditions made reasonably safe immediately or exclude all employes from the danger zone.

(f) *Projecting Nails.* All spikes or nails with points projecting shall be bent down or removed from lumber lying in working places or passageways.

(g) *Watchman on Surface.* At all times when men are working in a mine and flammable buildings are nearer than 100 feet of the mine opening, a man shall be on duty outside the mine.

(h) *Intoxicating Liquor.* No person, while under the influence of intoxicating liquor shall knowingly be permitted to enter any mine or any of the buildings connected with the

operation of the same where men are employed and no one shall carry or use intoxicating liquors in a mine.

(i) *Protective Hats.* All underground workers shall be compelled to wear protective hats or caps of approved design and manufacture.

(j) *Protective Shoes.* Approved hard-toed boots or shoes shall be used by all underground and surface employes who are exposed to toe injury hazards.

(k) *Safety Belts.* Approved tested and regularly inspected safety belts, harnesses or ropes with approved quick detachable snaps and ample lengths of rope shall be used wherever feasible by men working in places where there is serious danger of falling.

Order 307—Safety Bulletin Boards.

(a) *Bulletin Boards.* Safety bulletin boards shall be provided at all mines. From time to time matters pertaining to Safety shall be posted on these boards.

(b) *Men to Understand Operating Rules.* Every workman employed in or about the mine when first engaged shall have his attention directed to the provisions of the General Orders on Mines and other operating rules established by the employer.

Order 308—Orders for Underground Men.

The following rules apply to all men employed underground and shall be enforced.

1. *Reporting Injuries.* All injuries, however slight, shall be reported *immediately* for treatment.

2. *Warning Other Persons.* When working above or below other men warning shall be given to prevent injury from falling rock or materials.

3. *Testing and Trimming Ground.* The ground in working places shall be tested before mucking or drilling and at frequent intervals for loose pieces of rock or ore. Workmen shall stand to one side when barring or picking down loose material.

4. *Removal of Safety Devices.* No employe shall remove, damage or carry off any safety device furnished or installed for his protection.

5. *Oiling Machinery.* No attempt shall be made to oil the moving parts of any machinery while in motion.

6. *Goggles.* Goggles shall be worn by persons when sledging or doing any work whereby any substance is thrown off which may injure the eyes.

7. *Electricity and Compressed Air.* Electricity or compressed air shall not be turned on or machinery set in motion without first seeing that persons are not in a position to be injured.

8. *Getting off Cages.* Persons shall not get on or off of a cage, skip, bucket or underground locomotive while same is in motion.

9. *Shaft Gates.* Gates to open shafts shall be closed immediately when leaving or entering cages or buckets.

10. *Riding on Buckets and Cages.* Not more than four men shall ride in a bucket. When a cage is used for hoisting or lowering men the number of persons permitted to ride shall not exceed that allowed by the employer.

11. *Fastening Material on Buckets and Cages.* Tools, timbers or other materials shall be securely fastened to the bucket or cage so that their ends will not strike the side of the shaft when being raised or lowered. No such tools or materials shall be transported while the crew is being transported into or from the mine.

Order 309—Inspection.

(a) *Inspections and Trimming.* 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, sidewalls 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.

(b) *Inspection for Fire Hazards.* Inspection of the main shaft and the underground workings for any conditions tending to increase the fire hazard shall be required once each month. Required second exits and other portions of the mine not regularly frequented shall be inspected for fire hazards and deterioration of ladders or other appliances necessary to maintain an adequate escapeway, upon regular rounds through such places, and in any event at least once each month and a report of the inspection filed in the mine office. If any condition be found in a second exit making it inadequate for an escapeway, repairs shall be commenced immediately and completed with rea-

sonable diligence. A signed report of each inspection shall be kept in the mine office, whether hazardous conditions be found or not.

(c) *Inspection Lights.* Approved inspection lights of sufficient intensity shall be provided and maintained for underground inspections of roofs and sidewalls.

Order 310—Shafts.

(a) *Shaft Gates.* The tops of shafts and all shaft stations shall be protected by gates or standard rails and toeboards.

(b) *Shaft Doors.* In shafts where hoisting is being done by means of a bucket, doors shall be provided and used that will prevent any material from falling into the shaft while the bucket is being dumped.

(c) *Passageways Around Shafts.* All stations or levels shall have a passageway around the working shaft so that crossing through the hoisting compartment may be avoided.

(d) *Crossing Hoistway Compartments.* No person shall enter or cross the hoisting compartment of the shaft except to ascend or descend, or for the purpose of inspecting, or effecting repairs.

(e) *Repairs in Shafts.* Before repairs in a shaft are commenced, the person in charge of or directing repairs shall inform the hoisting engineer of the nature thereof.

(f) *Staging for Repairs.* Staging substantially constructed and secured shall be provided in shafts when repairs are being made.

(g) *Size of Compartment.* The hoisting compartment of shafts in which buckets are used for regular hoisting shall be not less than 6 feet in dimension perpendicular to the long axis of the shaft.

(h) *Concrete Lining.* The collars of all permanent shafts shall be lined with reinforced concrete to bedrock.

(i) *Obstructions in Shaft.* No obstructions shall be permitted in the hoisting compartment of shafts which may interfere with the movements of hoisting conveyances.

(j) *Shaft Sinking.* During shaft sinking operations no other work in any other place in the shaft shall be permitted nor shall any materials or tools be hoisted or lowered from or to any other place in the shaft while men are at work in the bottom of the shaft.

Exception: Hoisting or work in shafts may be permitted if men in

the bottom of the shaft are protected by a securely constructed covering extending over the whole area of the shaft and provided with closable openings for the passage of the men or bucket used in sinking operations.

(k) *Manways.* Manways shall be kept clear of loose rock and obstructions.

(l) *Abandoned Shafts.* All abandoned mining shafts, pits or other abandoned excavations including abandoned underground workings shall be securely covered over and fenced, or filled or otherwise effectively guarded.

(m) *Stoping near Shafts.* No stoping shall be done nearer than 50 feet of a shaft that is used for hoisting men or material.

(n) *Ladder Compartment.* Every shaft shall be wide enough to accommodate a ladder at a safe distance from the ascending or descending skip, bucket, or cage.

(o) *Derails.* A derail, stop block, or other effective device shall be provided at the collar and each shaft station to prevent cars from accidentally entering the shaft.

Order 311—Two Openings to Surface.

(a) *Exits to Surface.* All mines shall have two or more exits to the surface. An underground communicating passage-way to a neighboring mine may be considered as one of these exits.

(b) *Exceptions.* The requirements of Order 311 (a) shall not apply in the case of (1) Shafts or mines in process of being connected to comply with the terms of this order. (2) Shafts, winzes, raises, tunnels, and drifts to prospect for and develop mineral substances, but not for the extraction of mineral substances except such as may be removed in the course of such development.

(c) *Operations with One Outlet.* When it is impracticable to have two outlets, operation may be allowed with only one outlet under such conditions and with such precautions as the Industrial Commission may prescribe.

(d) *Passageways from Shaft.* When a shaft of a mine having only one outlet is covered with a combustible building the ladder compartment shall be protected by a fireproof bulkhead at a point at least 20 feet below the collar of the shaft. Below this bulkhead a passageway shall be provided so as to have its outlet at least 30 feet beyond the walls of the building covering the shaft.

(e) *Emergency Routes.* Routes shall be established through underground workings to exits or outlets and shall be plainly marked with signboards showing the direction to be taken in case of emergency.

Order 312—Fire Protection.

(a) *Precautions to be Taken.* Every reasonable precaution shall be taken against fire in and about mines and adequate fire protection shall be provided.

(b) *Shaft houses.* Buildings over shafts shall be open framework or lined with fire-resistant material.

(c) *Water Supply and Hose.* An adequate water supply and fire hose connections with sufficient hose shall be provided at or near shaft openings, stations, pump houses and other places where fire hazards exist. Provision for converting air line into water lines shall be made in timbered mines. Fire and draft doors shall be installed to control underground air currents in case of fire.

(d) *Fire Extinguishers.* Fire extinguishers of 2½ gallon capacity protected against freezing shall be provided and maintained in good condition in readily accessible places in all sections of buildings. Soda-acid extinguishers shall be recharged every year. Vaporizing liquid type fire extinguishers of at least one quart capacity shall be provided for electrical fire hazards.

(e) *Inspection of Apparatus.* Inspection of all fire apparatus shall be made every three months.

(f) *Smoking.* Smoking shall not be permitted in oil houses, or wherever there is flammable material.

(g) *Stoves and Furnaces.* Stoves or furnaces used for heating purposes shall be placed on fireproof floors projecting at least 2 feet on all sides. Combustible walls, partitions or ceilings located less than 2 feet from stoves or furnaces shall be protected with at least ¼ inch asbestos board covered with galvanized iron.

(h) *Metal Smoke Pipes.* Combustible materials in roofs, partitions or sides of buildings shall not be permitted within 18 inches of metal smoke pipes.

(i) *Oily Waste.* Covered metal receptacles shall be provided and maintained for the disposal of oily waste or rags.

(j) *Warning of Fire.* A fire alarm system adequate to give warning of a fire to all employes who are working below

ground shall be installed and maintained in good working order.

(k) *Pouring Gasoline.* Approved types of containers used for pouring gasoline shall be provided with a closed top, flexible spout and a safety screen and no open light shall be permitted within a 10 foot radius during pouring or filling operations.

(l) *Burning Explosives.* Should explosives start to burn all men shall be withdrawn immediately to a safe distance. Neither fire extinguishers nor water shall be used in an attempt to extinguish burning explosives.

Order 313—Flammable Material.

(a) *Storage on Surface.* Gasoline, naphtha, distillate, fuel oils and other dangerous flammable materials shall be stored in a building kept solely for such storage and the location of which is at least 100 feet away from any shaft or any building directly connected with the shaft opening.

(b) *Diverting Flow from Shaft.* If oil or gasoline storage places are so located that leakage would permit oil or gasoline to flow in the direction of the shaft means to prevent such flow shall be provided.

(c) *Lubricating Oil.* Not more than one barrel of lubricating oil or grease shall be kept in any one place in underground workings.

(d) *Fuel Oil Underground.* Gasoline, naphtha and other distillates shall not be stored in underground workings except that an amount sufficient to operate a fuel burning locomotive for one shift may be kept.

(e) *Cut-Off Valves in Supply Lines.* No tank shall be installed from which liquid fuel is to be conducted by gravity to the point of combustion, unless there be installed between such tank and point of combustion a simple and reliable cut-off valve.

(f) *Waste Timbers and Combustible Rubbish.* Waste or decayed timbers shall not be stored in underground workings except to form a mat, but shall be promptly removed therefrom; provided, however, that old timbers may remain in place in stoping areas and abandoned workings and that timber requirements for two days supply may be permitted near shaft stations. Empty boxes, wooden chips, paper and combustible

rubbish of all kinds shall not be allowed to accumulate underground.

(g) *Storage of Carbide.* Carbide shall not be stored underground or with explosives.

Order 314—Ladders and Ladderways.

(a) *Ladderway.* Every mine shall have at least one means of outlet for underground workers by means of ladders or stairway from the lowest workings of the mine to the surface.

Note: A ladder is a framework consisting of two or more approximately parallel stringers to which are attached horizontal cleats or rungs, uniformly spaced, used for ascending to and descending from elevated places.

(b) *Material for Ladders.* All wooden ladders and ladderways shall be built of clear lumber free of knots or other imperfections.

(c) *Stringers.* The stringers of wooden ladders shall be built of not less than 2 by 4 inch sound lumber or equivalent.

(d) *Clearance for Ladders.* The rungs of a ladder shall in no case be less than 4 inches from the wall upon which the ladder is fastened or any obstruction between the ladder and the wall.

(e) *Construction of Ladders.* The rungs and treads of every ladder shall be of uniform size and spacing, but in no case spaced more than 14 inches center to center. In the case of wooden ladders, round rungs shall be fastened to stringers by mortising, cleats shall be fastened to stringers in a manner such that no part is damaged, and treads shall be inset in the stringers or shall be fastened thereto by means of approved metal brackets. The stringers and rungs shall be braced and tied to prevent distortion of the ladder or spreading of the stringers. Metal rungs or treads shall be bolted, riveted or welded to the stringers.

Where ladders are spliced or arranged to be extended, the splice or extension device shall develop the full strength of the stringers.

Ladders constructed of material other than wood shall be the equivalent of wooden ladders in strength.

(f) *Rest Platforms.* Ladderways in shafts, winzes, and second exits shall have substantial platforms at intervals of not more than 25 feet in vertical and 50 feet in inclined shafts or

manways. If possible, the sections of the ladders shall be staggered at each platform so that no section shall be directly in line with the section above or below it.

(g) *Openings in Platforms.* The opening in any such platform shall be approximately 21 x 24 inches or larger, but no opening shall be of such size or dimension as to retard the passing through thereof of rescue men equipped with oxygen breathing apparatus.

(h) *Extensions above Openings.* Ladders shall project at least 3 feet above every platform in the ladderway and at least 3 feet above the collar of the shaft, winze or raise, unless convenient and secure hand holds are fixed at such places.

(i) *Fastening Ladders.* All ladders shall be securely fastened.

(j) *Inclined Ladders.* Under no circumstances shall any ladder inclining backward from the vertical be installed or used.

(k) *Ladders for Shaft Sinking.* Fixed ladders shall be provided in all shafts that are in the process of sinking, to within such a distance of the bottom thereof as will secure them from danger by blasting. A chain, wire rope or wooden extension ladder shall be provided from the end of the fixed ladder to the bottom of the shaft.

Order 315—Hoisting Equipment.

(a) *Power Requirement.* Each hoist shall have ample power to hoist unbalanced a normal load of men from the lowest point in the shaft.

(b) *Emergency Brakes.* All hoists used to hoist men shall be equipped with at least two separate and distinct brakes, either of which shall be capable of holding its fully loaded cage, skip or bucket at any point in the shaft.

(c) *Drum Flanges.* The drums of hoists used to hoist men shall be provided with flanges which will extend at least two inches radially beyond the last layer of rope when all of the rope is coiled on the drum.

(d) *Size of Drum.* The cable drum of hoists used to hoist men and every angle sheave shall have a diameter at least 60 times the diameter of the hoisting cable.

(e) *Locking Gear for Clutches.* The operating gear of the clutch of every man hoist drum shall be provided with locking gear or interlocked with the brake to prevent accidental withdrawal of the clutch.

(f) *Hoist Fittings.* Such bolts and other fittings of the drums, brakes and clutches as might be a source of danger in the event of their becoming loosened shall be rendered secure by means of suitable locking devices.

(g) *Safety Controllers.* Hereafter every hoist installed, and after two years from the effective date of this order all hoists now used to hoist men regularly from shafts shall be equipped with an approved automatic controller so designed, installed and maintained that it will cut off the power and apply the brakes in cases of emergency or when the speed limit is exceeded. Automatic controls shall be designed to permit the lowering of the cage, skip or bucket by brakes after it has been brought to rest through the failure of the power supply.

Order 316—Cages for Hoisting Men.

(a) *Cages Required.* Hoisting or lowering of men through a shaft deeper than 150 feet shall not be permitted unless an iron-bonneted safety cage, skip or bucket is used, but this provision shall not apply to shafts in process of sinking.

(b) *Construction of Cages.* All cages in which men are hoisted and lowered in shafts shall be constructed as follows, or in a manner equally safe:

The bonnet shall be of two steel plates 3/16 of an inch in thickness, sloping toward each side, and so arranged that they may be readily pushed upward to accord egress to persons therein. Such bonnet shall cover the top of the cage in such a manner as to protect persons on it from objects falling in the shaft.

(c) *Sides, Gates and Safety Catches.* Cages shall be provided with sheet iron or steel side casings not less than 1/16 inch thick or less than 5 feet in height, and provided with gates or doors if 50 per cent of the carrying capacity is exceeded. Every open man cage shall be equipped with bars arranged to give every man an easy and secure handhold. Every cage shall be provided with safety catches of sufficient strength to hold the cage with its maximum load at any point in the event the hoisting cable should break.

(d) *Testing Safety Catches.* The safety catches of cages and skips used to hoist men shall be kept well oiled and in good working order. They shall be tested at least once each month by tying up the cage or skip with hemp rope, lowering

a few feet of hoisting cable on top of cage, then cutting the hemp rope, provided, that any other system of testing, which is equally effective, may be used.

(e) *Structural Factor of Safety.* Every cage or skip used to hoist men shall be designed with a structural factor of safety of ten.

Order 317—Whims and Hand Operated Windlasses.

Whims and hand operated windlasses shall be provided with a reliable device to prevent accidental running back of the bucket.

Order 318—Hoisting Practice.

(a) *Rate of Speed.* Safe rates of speed for the cages, skips, buckets, or other conveyances shall be fixed by the employer for each shaft and shall not be exceeded in the hoisting or lowering of men.

(b) *Men in Conveyances.* When twenty-five or more men are employed underground on any one shift, and in which men are to be hoisted or lowered by cage or other conveyance other than a bucket, such cage or other conveyance shall be operated under the charge of a person appointed as conductor. No person other than this conductor shall give any signal for the movement of the cage, skip, or conveyance when lowering the shift into the mine or hoisting the shift out of the mine. The conductor shall be given all necessary authority to prevent crowding or scuffling of men in the vicinity of the shaft.

(c) *Number of Men Permitted to Ride.* The maximum number of men that may safely ride on each cage, skip, bucket, or other conveyance used in the mine shall be determined by the employer. There shall be posted a notice stating the maximum number of persons so permitted to ride and forbidding the carrying of any greater number.

(d) *Speeds Permissible for Buckets.* When hoisting or lowering men with a bucket, the speed shall not exceed two hundred feet per minute when the bucket is within one hundred feet of the surface or bottom, or five hundred feet per minute in any other part of the shaft.

(e) *Safety Cable Hooks.* No open hook shall be used with a bucket, cage or skip in hoisting, but some approved form of safety hook or shackle shall be used.

(f) *Transportation of Explosives.* No person or other

materials shall be transported upon or below any cage, car, skip or bucket that is loaded with explosives.

(g) *Protection of Bails.* When men are being hoisted or lowered in a shaft, at the beginning or end of a shift by means of a bucket, an emergency sling or an approved attachment shall be used from the cable to the bucket to prevent falling of the conveyance in the event of the breaking of the bail.

Order 319—Hoisting While Sinking Shaft.

A cage, skip or bucket shall not be lowered directly to the bottom of the shaft when men are working there. The conveyance shall be stopped at least fifteen feet above the bottom and only lowered from that point by a signal from one of the men at the bottom of the shaft.

Order 320—Hoisting Ropes.

(a) *Steel Cables Required.* No rope for hoisting or lowering men shall be used unless such rope shall be composed of metal wires with a factor of safety determined as hereinafter set forth.

(b) *Breaking Strength of Cables.* The safety factor of a new rope shall be calculated by dividing the breaking strength of the rope as rated by the manufacturers, by the sum of the maximum load to be hoisted, plus the total weight of the rope in the shaft when fully let out.

(c) *Safety Factors for Cables.* Hoisting rope safety factors for various depths of shafts shall continuously conform with the American Standards Association table as given below:

Length of Rope	Minimum factor of safety for new rope
500 feet or less	8
500 to 1000 feet	7
1000 to 2000 feet	6
2000 to 3000 feet	5
3000 feet and more	4½

(d) *Cable Rollers and Guide Pulleys.* At angle points in incline shafts, the rope shall be supported on rollers or guide pulleys to prevent severe abrasion by rock or track.

(e) *Cables Unfit for Use.* No rope shall be used for hoisting or lowering men:

(1) When 10% of the wires in the rope are broken in a length equal to eight rope diameters;

(2) If the wires on the crown are worn to sixty-five per cent of their original diameter;

(3) If more than three wires which have been reduced by wear more than 30 per cent in cross section are broken in one strand of a rope lay;

(4) If marked corrosion appears.

(f) *Inspection of Cables.* Each rope used for hoisting or lowering men shall be thoroughly inspected once every week by some competent person designated for that purpose.

If upon inspection, such hoisting rope shall be found to be below the requirements set forth in this order, it shall be discarded for such purpose forthwith.

(g) *Lubrication.* It is recommended that each hoisting rope should be kept well lubricated at all times.

(h) *Fastening on Drum.* Every rope used for hoisting or lowering men shall be securely fastened at both ends, and when in use shall never be fully unwound; at least three full turns shall remain always on the drum or reel.

(i) *Cable Fastenings.* The rope shall be attached to the load by the thimble and clip method, the zinc socketing method, or other approved method.

(1) *Thimble and Clip Method.*

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

(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 American Standards Association table below:

(c) The following number of clips as recommended in the American Standards Association table shall be used for various diameters of 6 ply 19 wire plow steel ropes:

(Follow manufacturer's recommendations for other kinds of wire rope.)

Diameter of rope (inches)	Number of clips	Minimum Space between clips (inches)
$\frac{3}{4}$	5	4 $\frac{1}{2}$
$\frac{7}{8}$	5	5 $\frac{1}{4}$
1-	5	6
1- $\frac{1}{8}$	5	7
1- $\frac{1}{4}$	6	8
1- $\frac{3}{8}$	7	9
1- $\frac{1}{2}$	8	10
1- $\frac{5}{8}$	8	10
1- $\frac{3}{4}$	8	11
1- $\frac{7}{8}$	8	12
2-	8	12

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

(2) *Socketing Method.*

(a) For wire ropes over 1 $\frac{1}{4}$ inches in diameter it is recommended that the zinc socketing method is used. If used, the work shall be done by a person experienced in this kind of work.

(b) Babbit metal or lead for socketing wire ropes shall not be used.

(j) *Renewing cable Fastenings.* When the thimble and clip method or the zinc socketing method is used for fastening the hoisting cable to the load, every cable shall be reclipped or resocketed at frequent intervals or when inspection shows it to be necessary.

(k) *Spliced Ropes.* Spliced hoisting ropes shall not be used for hoisting men in mines.

(1) *Defective Cables.* If, upon any inspection, a hoisting rope shall be found to be below the requirements set forth in this order, it shall be discarded for such purpose forthwith.

Order 321—Hoisting Signal System.

(a) *Signal System Required.* Every operating shaft, if exceeding fifty feet in depth, shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level and the various intermediate levels from which hoisting is being done. A signal system shall be installed in all shafts in the process of sinking.

(b) *Auxiliary System.* It is recommended that in every shaft that is three hundred feet or more in depth, through which hoisting is done, an independent signal line for calling the cage or skip be installed and maintained in good working order.

(c) *Maintenance of Signal System.* Special care shall be taken to keep the signalling apparatus in good order. Proper precautions shall be taken to prevent electric signal and telephone wires from coming in contact with other electric conductors, whether insulated or not.

Order 322—Hoisting Signals.

An easily legible copy of the signals in use in any mine shall be posted and maintained in the engine or hoisting room, at the collar of the shaft, and at each level or station.

Order 323—Hoisting Engineers.

(a) *Employment of Engineers.* Only competent men who are able to speak and read the English language shall be employed to operate mine hoists. Each hoisting engineer shall be given a thorough medical physical examination at least once in each year by a competent medical physician authorized to practice in Wisconsin. The physician shall fill out the examination blank, the form of which is given below, and return it to the employer.

INDUSTRIAL COMMISSION, MADISON, WISCONSIN

Medical Examination for Hoisting Engineers

Name of Applicant _____ Address _____
 Employer _____ Town _____ County _____

Record of Past Employment

Employer _____ Address _____ Time Worked _____

Nature of illness causing absence from work during past six months _____

Total years' Experience as hoisting engineer _____

Date of last examination, if any _____

Place of birth _____ Date _____

Single _____ Married _____ Living with wife _____ Divorced _____

Are you in good health? _____

Have you ever suffered from defective vision? _____

deafness _____ heart trouble _____ dizzy spells _____ epileptic fits _____

Have you a first aid certificate _____ year issued _____ by whom _____
 I certify that all my answers to the above are correct and true and that I have also read the "Orders for Hoist Engineers."

Date _____

Signature of Applicant _____

PHYSICIAN'S REPORT

1. Apparent age _____ Weight _____ Height _____ Temperature _____
 Blood Pressure _____
 2. Vision: Right eye _____ Left eye _____ Color perception _____
 3. Hearing: Right ear _____ Left ear _____
 4. Nose and throat: Normal _____ Abnormal _____
 5. Chest: Expiration _____ Inspiration _____
 6. Heart Rhythm _____ Size _____ Auscultation _____ Pulse _____
 7. Abdomen: Scars or hernia _____
 8. Spine _____ Deformities _____ Rigidity _____
 9. Genito-urinary system _____
 10. Urinalysis _____
 11. Hemorrhoids _____ Varicose veins _____
 12. Defects of joints, bones or muscles _____
13. Does applicant appear to be addicted to stimulants or narcotics? _____
14. Posture: Excellent _____ Good _____ Fair _____ Bad _____
15. Reflexes: Patella _____ Rhomberg _____ Rabinski _____
 Coordination _____
16. Nervous or composed _____ Tremors _____
17. Mental agitation? _____
 Reasons for rejection, if any _____
 Date _____ M.D.
- Address _____

(Copies of these forms are available from the Industrial Commission)

Hoist Engineer's Medical Examination

The medical examination of Mr. _____ leads me to believe he is physically able to assume the duties of a hoisting engineer as of this date.

City _____ Date _____ M.D. _____

(b) *Qualification of Engineers.* Hoisting engineers shall be familiar with the details and workings of a hoisting engine, and, except in cases of emergency, no others than such duly appointed hoisting engineers 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.

(c) *Hoisting Men.* At all times when the shift is hoisted out of a shaft or lowered in the shaft, a man who is

familiar with the operation of the hoist but not necessarily a qualified hoist engineer, shall be on the alert to assume immediate control of the hoist in the event the hoisting engineer should become incapacitated. This order does not apply to mines equipped with overwinding controls on their hoists that are operative at all times.

Order 324—Duties of Hoisting Engineers.

The following orders shall be observed by every hoisting engineer.

(1) It shall be the duty of the hoisting engineer to keep a careful watch over his engine, hoisting rope and all other machinery under his charge.

(2) He shall not at any time delegate any of his duties to other persons, except, to designated learners or to other qualified hoisting engineers as directed by the management.

(3) He shall familiarize himself with and use all signal codes for hoisting and lowering as directed to be used in these orders.

(4) He shall not run his engine unless the same is properly provided with efficient brakes, indicators, or distance marks on hoisting ropes or cables, as provided in these orders.

(5) It shall be the duty of the hoisting engineer to exclude every person from his engine room, excepting any person or persons whose duties require their presence therein, and authorized visitors.

(6) He shall hold no conversation with any one while his engine is in motion, or while attending to signals, except to receive orders or instructions.

(7) He shall run his engine with extreme caution whenever men are being hoisted or lowered.

(8) He shall not hoist men out of or lower men into any mine or shaft at a speed greater than the established safety rate posted in the engine room.

(9) He shall inspect daily all hoisting machinery and safety appliances and shall report any defects found to the proper authority.

(10) After any stoppage of hoisting for repairs or for any other purpose, exceeding in duration 8 hours, he shall run a bucket, skip, cage, or other conveyance, on which no men shall ride, except for purposes of inspection up and down the working part of the shaft at least once. He shall not permit the

bucket, skip, cage, or other conveyance to be used for hoisting or lowering men, until the hoisting machinery and shaft shall have been found to be in safe condition. Unless the hoist is in continuous operation, the cage, skip or bucket shall be lowered to the lowest working level and raised to the surface immediately prior to the beginning of the shift or before men are permitted to be lowered.

(11) He shall not land the bucket, skip, cage or other conveyance at the collar of the shaft, or at a level, but shall hang the conveyance at least ten feet above or below the collar of the shaft, or a level before leaving his post.

(12) He shall familiarize himself with and carry out the requirements of all orders pertaining to the discharge of his duties.

(13) Whenever men are working in a place to which they have been lowered by mechanical power, an engineer or a substitute shall remain within hearing of the telephone and signal gongs while the men remain in their working places.

(14) Hoisting engineers shall not permit the oilers to oil the engine while in motion, and shall exercise every care for the oilers' safety.

(15) When men are working in a shaft without a bulkhead over their heads, and the skip, cage or bucket is "hung up," neither the hoist engineer nor any one else, shall move it or knowingly give orders to move it without having received permission to do so from those who are holding it.

(16) When men are working in a shaft without a bulkhead over their heads, the hoisting engineer shall not move the skip, cage or bucket until he is satisfied that the employes in the shaft have been warned and given time to get in the clear.

A copy of these orders shall be posted in a conspicuous place in the engine house.

Explosives

Order 325—Storage, Transportation and Use of Explosives above Ground.

The handling, transportation and storage of explosives above ground shall be governed by the General Orders on Explosives.

Order 326—Storage, Handling and Use of Explosives Underground.

(a) *Supply Permitted.* Sufficient explosives may be stored within a mine to meet the estimated requirements of such mine during the succeeding week.

(b) *Storage.* Explosives shall be stored underground in approved magazines which shall consist of a separate tunnel or chamber where no men are employed, except the man in charge. The magazine shall be provided with a substantial door which shall be kept securely locked.

(c) *Storage in Working Places.* Not more than one shift's supply of explosives shall be kept for immediate use in any working place on any one level at any one time. Such explosives shall be kept in approved containers. Such containers shall be placed in locations not exposed to falling materials or derailments.

(d) *Smoking, Flammable Materials.* No loose flammable material shall be allowed within 60 feet of a magazine. Smoking shall not be permitted in, or in the vicinity of any magazine and no matches, igniter, tool, material, or appliances which might cause a spark or flame shall be carried into any magazine. Carbide shall not be stored with explosives.

(e) *Blasting Caps — Transportation of.* Detonators shall not be transported with explosives excepting that detonators may be carried to the face for immediate use, providing they are in one container and the explosive in a separate container.

(f) *Opening Containers.* Wooden or non sparking metal mallets and wedges shall be used to open boxes of explosives.

(g) *Carrying on Locomotives.* Explosives of any kind shall not be carried underground on electric locomotives and no one except the train crew or powder-man shall be allowed to ride on a train carrying explosives.

(h) *Location near Electric Wires.* Explosives shall not be placed near tracks or left less than 5 feet from electric wires or electric lights.

(i) *Smoking when Handling.* No person shall smoke in an explosive magazine or primer house, or while handling explosives.

Order 327—Blasting Caps, Fuses and Primers.

(a) *Storage of Detonators.* All detonators or blasting caps shall be stored above ground in an approved magazine, except that a sufficient supply for the needs of the mine during 48 hours may be stored underground, and if properly heated and ventilated storage is provided, one week's supply may be stored. No detonator shall be taken into any magazine containing other explosives.

(b) *Capping Fuses.* Fuses shall not be capped with blasting caps in any magazine or in any other place where explosives are stored.

(c) *Cap Crimpers.* Approved cap crimpers in sufficient quantities shall be provided.

(d) *Cutting and Capping Benches.* The cutting and capping of fuses shall be accomplished on a special bench properly located and protected against water.

(e) *Capped Fuses.* All primers and capped fuses shall be exploded within 36 hours after making unless stored in a dry, safe place.

Order 328—Blasting.

(a) *Tamping Sticks.* Wooden or non sparking metal tamping sticks shall be used for tamping explosives in bore holes. The diameter of the tamping stick shall not be less than the diameter of the explosive cartridge.

(b) *Warning.* Persons about to fire shots shall cause warning to be given in every direction and all entrances to the place or places where shots are to be fired shall be guarded.

(c) *Return to Misfires.* Where possible the number of explosions in every blast shall be counted by the men firing the same and if the total number of explosions heard is less than the number of charges fired, a report of the discrepancy shall be made as the employer shall direct. When a blast has been fired and there is reason to believe that any charge has not exploded, no person shall enter the place where such charge was placed within 30 minutes after the explosion.

Note: While the minimum requirement is given as one-half hour it is strongly recommended that where possible at least one hour elapse before return to a shot that has failed to explode.

(d) *Treatment of Misfires.* No person shall be permitted to extract explosives from a borehole, but shall, when possible, put in a new primer and blast again.

(e) *Spitting Fuses.* No man shall "spit" more than 15 fuses in a round of shots.

(f) *Fuse Lighters.* Where a carbide lamp or similar lighter is used in spitting fuses, a second light shall be kept burning as a safety measure, and such extra light shall be placed a safe distance from the blast.

Order 329—Electric Blasting.

(a) *Where Required.* Only electric or delay electric blasting caps shall be used in operations as follows:

(1) In sinking shafts or winzes.

(2) In cutting shaft stations.

(3) In drifts, crosscuts, storage pockets and pump sumps where there is not enough protection for the men from flying rock or concussion.

(b) *Blasting Lines.* Blasting lines shall be kept clear from all power and lighting lines and from all grounded pipes, rails, etc. and shall be run on the side of the working opposite all power and lighting circuits.

(c) *Power Switches.* When firing by electricity from power wires, a proper switch shall be furnished with lever down when "off." The switch shall be fixed in a box to which no person shall have access except the blaster. This box shall be constructed so that it can be closed and locked only when the switch is in the "off" position. The lead wires shall be furnished with plugs and shall not be connected with the switch until ready to fire. After blasting, the switch lever shall be pulled out, the wires disconnected, and the box locked before any person shall be allowed to return and shall remain so locked until ready to blast. The lead wires shall be kept short circuited and grounded until ready to be attached to the power switch or firing machine. A suitable lighting arrester shall be installed on the live side of all firing switches located at or near the shaft.

(d) *Insulation of Firing Cables.* Rubber covered insulated wires shall be used for fixed shot firing cables. Permanent lines shall be properly supported and mounted on insulators. Connecting wires from the fixed firing cables to the blast shall be single conductor insulated wire. No persons other

than the boss or blaster shall connect the lead wires to the firing machine or operate firing devices and such connection shall not be made until all other steps preparatory to the firing of a shot shall have been completed and the men removed to a safe distance.

Order 330—Sanitation.

(a) *Change Houses.* A dressing room or change house shall be provided for the purpose of drying clothes of persons employed in and about the mine. Adequate means of heating and lighting shall be provided and a temperature of not less than 70 degrees F. shall be maintained at all times. Dressing rooms or change houses shall be cleaned daily of all refuse and kept in a sanitary condition.

(b) *Underground Stables.* Every stable or other place underground used for the housing of mules, or horses shall be thoroughly cleaned and the waste contents thereof removed and disposed of at least once in every week or oftener when necessary.

(c) *Drinking Water.* Fresh and safe drinking water shall be available to employes during the working hours. This may be accomplished by piping water into the mine and drinking fountains provided, or by providing canteens or other sanitary means. Community drinking vessels shall not be used.

Order 331—Illumination.

(a) *Open Lights.* No open flame light shall be left burning unattended on or near flammable materials.

(b) *Shaft Stations and Surface.* Stationary lights shall be provided during the working hours at all shaft stations, stations on levels where hoisting or haulage is affected by mechanical means and at night at all places on the surface where work is being conducted.

(c) *Lighting for Machinery.* All places where hoisting, pumping or other machinery is maintained and in the proximity of which persons are working or moving about shall have a light intensity of not less than 0.25 foot candles.

(d) *Lamp Sockets.* The exterior of all underground lamp sockets shall be entirely non-metallic.

(e) *Portable Lamp Cords.* Lamp cord, where used for temporary lighting connections, shall have extra heavy insulation. Portable electric hand lamps shall be equipped with a

keyless socket of non-combustible, non-absorbent insulating material, large handle of non-absorbent insulating material (such as impregnated wood), basket guard, and proper cord.

(f) *Incandescent Lamps.* All incandescent lamps shall be so placed that they cannot come in contact with any combustible material.

(g) *Insulation of Wires.* Where light wires are supported on insulated supports, rubber covered wire with double braid covering shall be used. Separate uncased wires shall be kept at least 3 inches apart, except where they enter the fittings. In case the wires cannot be supported on proper insulators, cables or wires with moisture-proof covering (such as parkway cable or metal protected lead covered cable) shall be used.

(h) *Protection of Wires.* Wires which are not armored shall have mechanical protection wherever exposed to injury.

Order 333—Protection Against Water.

(a) *Distance Requirement.* No mine working shall be allowed to approach nearer than 16 feet of any part of a winze, stope, or other opening in which there is known or suspected dangerous accumulation of water.

(b) *Advance Drilling.* Notice shall be given to the Industrial Commission in writing before starting to advance a mine working toward another mine working that is suspected of being filled with water. A borehole shall be drilled at least 18 feet in advance of the face of the drift when in the vicinity of such mine working filled with water, and also, if necessary in other directions.

(c) *Means of Escape.* 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 Industrial Commission, to insure the escape of workmen.

Order 334—Timbering.

(a) *Where Required.* All working places and travel roads shall be, when necessary, kept securely timbered, barricaded, or otherwise guarded to prevent injury to any person from falling material.

(b) *Supplies to be Adequate.* An adequate supply of timbers and other materials necessary to keep working places in a safe condition shall be supplied and maintained at all times.

(c) *Operations to be stopped.* If for any cause, neces-

sary timbers cannot be supplied, work at that place shall cease until timbers are supplied.

Order 335—Winzes, Raises and Openings.

Winzes or other openings in the floor of mine workings shall be so guarded that persons will not fall into them.

Order 336—Haulage.

(a) *Refuge Places.* When mechanical haulage is employed there shall be at intervals of not more than 100 feet places of refuge affording a space of at least 2½ feet in width between the widest portion of the car or train running on the track and the side of the refuge. The length shall not be less than 3 feet.

Refuge places shall be kept free of rubbish and painted or otherwise plainly marked.

(b) *Riding Cars.* Employes shall not be allowed to ride on cars and locomotives unless authorized to do so.

(c) *Lights on Trains.* Lights or warning signals shall be kept on both ends of all moving trains.

Order 337—Dump Tracks.

Dump tracks on the surface shall be kept in good condition and a bumper or other effective device placed so as to prevent the car from rolling over the embankment. A proper runway for the car men shall be provided.

Order 338—Maps.

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.

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 Industrial Commission. This map shall not be available to any person other than the Industrial Commission, without authorization of the owner of the property.

GENERAL NOTE

The following publications contain the general orders of the Industrial Commission:

Safety, general orders on, 1932 (machines in general)
Explosives, general orders on, 1933
Tunnel, caisson and trench construction, general orders on, 1936
Quarries and pits, general orders on, 1930
Construction, general orders on safety in, 1933
Dusts, fumes, vapors and gases, general orders on, 1932
Sanitation, general orders on, 1922
Electrical safety code, 1930 (obtainable only from Bureau of Purchases, State Capitol, Madison, at cost.)

Copies of these bulletins applicable to your plant may be obtained free on request from the Industrial Commission with the exception of the electrical code, which is obtainable from the Bureau of Purchases.