

NOTICE

ORDERS 310-F, 311-A, 311-B, 312
AND RULES 43, 44 AND 45 OF ORDER
345, REPEALED MARCH 27, 1933
AND SUPERSEDED BY GENERAL
INDUSTRIAL COMMISSION OF WISCONSIN

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Effective May 1, 1922

GENERAL ORDERS ON MINES

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General Orders on Mines

I. INTRODUCTION

History of these Orders. 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, Dept. of Mining Engineering, University of Wis-

consin, Madison, Wisconsin, *Chairman.*

Prof. H. B. Morrow, School of Mines, Platteville.

Dr. J. J. Rutledge, United States Bureau of Mines, St. Louis, Mo.

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

J. A. MacCulloch, Vinegar Hill Zinc Co., Platteville.

T. H. Garnett, Mineral Point Zinc Company, Galena, Ill.

Theo. A. Waech, Platteville, Wis.

A. A. Bawden, Odanah Mining Co., Hurley.

O. M. Schaus and John M. Price, Montreal Mining Co., Hurley.

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. Hearings were then scheduled to be held at Rhinelander on November 4, 1921, and at Platteville on December 2, 1921, and notices of these hearings with copies of the proposed orders were sent to all operators in the state and to all other parties known to be interested. At these hearings no opposition, whatsoever, was expressed to the proposed orders as a whole, but a few valuable suggestions were made for minor modifications. These suggestions were gone over by the committee at a final meeting and were incorporated in the draft of the orders which it unanimously recommended to the Industrial Commission for adoption.

The orders as recommended were adopted by the commission on March 28, 1922. At the same time, the commission also repealed its old General Orders on Lead and Zinc Mines. The new General Orders on Mines were published in the official state paper, The Capital Times, at Madison, on March 31, 1922, and pursuant to law, became effective May 1, 1922.

Legal Effect of These Orders. These orders have the force and effect of law. Any interested party may petition the commission for a hearing on the reasonableness of any of its orders, and if the petition be denied, he may appeal to the circuit court for Dane County. The orders of the commission, however, are *prima facie* reasonable and lawful, and are in force until they are found otherwise by the courts, or until they are repealed by the commission. Violation of any order is punishable by a forfeiture of \$10 to \$100 for each day and each instance of violation. If an accident results because of the violation of any lawful general order of the Industrial Commission, the employer, under Paragraph (h) of Section 2394-9 (5), moreover, must pay the injured employee increased compensation, amounting to 15 per cent of the regular compensation; and this increase can be paid by the insurance company only in the event that the employer is bankrupt. It should also be noted that liability for forfeitures and for increased compensation does not depend upon whether the employer's attention has been specifically directed to the violations. It is the employer's duty to comply with all general orders of the Industrial Commission, and not merely with such orders as are especially brought to his attention.

Complaints to Industrial Commission. The advisory committee on safety in mines in its final report to the commission included the following recommendation:

Whenever the Industrial Commission receives a complaint in writing, signed by three or more persons employed in a mine, if less than 25 persons are employed therein, or by five or more persons employed in a mine, if more than 25 and less than 100 persons are employed therein, or by 10 or more persons employed in mine, if more than 100 persons are employed therein, setting forth the manner the mine in which they are working is being operated contrary to law and is in any respect dangerous to the health and lives of those employed therein, the Industrial Commission shall inspect such mine as soon as possible. The names of the persons making such com-

plaint shall be kept secret by the Industrial Commission, unless permission to disclose them be expressly granted by the person making the complaint, but the operator shall be advised of the nature of the complaint.

The commission hereby announces that it accepts this recommendation, and that it will investigate all complaints which it may receive relating to dangerous conditions and hazardous practices in mines. In accordance with its usual policy, the names of complainants will not be revealed.

II. GENERAL ORDERS ON SAFETY IN MINES

Section 1

Order 300—Construction of Orders. Failure on part of superintendents, foremen, bosses and other persons having control of any place of employment, or of any employee and of any operations, to carry out any duty prescribed in these orders, is violation of such order by the employer.

Order 301—Definitions:

Application. These orders shall apply to all mines in the state of Wisconsin producing minerals within the meaning of that term, as hereinafter defined, and employing an average of three or more men.

Note: Section 2394-48 of the statutes makes it the duty of all employers to provide a safe place of employment. The Industrial Commission cannot by order relieve employers of this obligation. No matter how the orders of the Industrial Commission may read, the employer is responsible if he does not provide safe employment. If any employee is injured through a violation of any order of the commission, he can recover a 15% increase in compensation from his employer, under the provisions of section 2394-9.7. This order, consequently, does not impose any obligation upon the employer which is not placed upon him by the statutes of the state, but makes it clear that this entire set of orders is not intended and cannot nullify the express provisions of section 2394-48.

The attention of superintendents and foremen and of other persons having control of any employee or any operation, however, is directed to the fact that the term "every person, firm, corporation, agent, manager, representative, or other person having control or custody of any employment, place of employment, or of any employee." The duty to provide a safe place of employment rests not only upon the employer, but also upon the superintendent and foreman. Failure on the part of a superintendent or foreman to comply with any order contained in this code and under Section 2394-60 and 2394-70 render him personally liable to a forfeiture of ten to one hundred dollars for each day and each instance of violation. This forfeiture can be collected at any time within two years after it is incurred through a civil suit brought by the attorney general. In such a suit the only possible defense is proof of compliance with the commission's order.

Superintendents, foremen and others who are specifically charged with any duty by any order contained in these general orders on quarries will be held responsible by the Industrial Commission for the discharge of such duties. Employers, however, should also realize that they may become liable for increased compensation if they do not see to it that the superintendents and foremen observe these orders.

Mine. The term "mine" shall include quarries, prospect openings, pits, banks, and open cut workings employing three or more men and shall embrace any and all parts of such "mine" and mining plant, on the surface or underground, that contribute directly or indirectly to the mining or handling of minerals. Provided, that when a group of workings in proximity to one another and under one administration are managed as distinct units, each working shall be considered a separate mine.

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

Superintendent. The term "superintendent" shall mean the person who at any time is charged with the immediate supervision of the mine.

Mine Foreman. The term "mine foreman" shall mean the person who at any time is charged with the immediate general direction of the underground work.

Excavations or Workings. The words "excavations" and "workings" shall signify all parts of a mine excavated, or being excavated, including shafts, tunnels, raises, entries, galleries, open cuts, and working places whether abandoned or in use.

Number of Men. Whenever the expressions "number of men" and "average number of men" employed in a mine are used in these orders as defined on constituting classes of mines to which this code, or any specific section, clause, provision, or rule thereof, does or does not apply, such expressions shall be considered to mean the average number of men employed during the previous year, as shown by returns to the Industrial Commission or by the pay roll of the mine, or by both such means, and such average number shall be determined by dividing the total number of man shifts by the number of days worked during the previous year.

Provided, that in case of a mine which has been put into production since the close of the previous year, the average above described shall be determined from reports and pay rolls for the mine for the period in which the mine has been in operation.

Explosive. The term "explosive" or "explosives" shall mean all explosive compounds commonly used in blasting practice, including the Dynamites, Gelatin Dynamites, Ammonium-

Nitrate Dynamites, blasting powders, black powders, and all detonators.

Underground. The term "underground" shall be held to mean "within the limits" of any mine working or excavations, and shall not exclude such workings or excavations as may not be covered by rock or earth.

Order 302—Reports to Industrial Commission. Mapping or Photographing Place of Accident. (a) It is made the duty of the operator of each and every mine within the state coming within the provisions of these orders to forward to the Industrial Commission, not later than February 1st in each year, a detailed report in writing on a form prescribed by the Industrial Commission, showing the character of the mine, tonnage of product during the previous year ended December 31st, the average number of men therein employed during the year, the number of days the mine was worked. The first report due under the operation of this section is that covering operations for the year 1922. All such reports shall be filed and become part of the confidential records of the Industrial Commission.

(b) Whenever an accident involving a major serious disability or fatality occurs in or about a mine, it shall be the duty of the operator to cause to be prepared by a competent person a map, sketch or photograph which shows location of spot and immediate vicinity at which accident occurred. The map, sketch or photograph shall in all cases be of sufficient size and detail to show the location of point at which accident occurred, and shall accompany report of accident to the Industrial Commission.

Order 304—Duties of the Superintendent. The superintendent shall inspect or cause some competent person or persons appointed by him to inspect all mining appliances, boilers, engines, magazines, shafts, shaft houses, underground workings, roofs, pillars, timbers, explosives, bell ropes, speaking tubes, telephones, tracks, ladders, dry closets, and all parts and appliances of said mine in actual use at such stated intervals as will insure their being in safe condition. Any such person or persons appointed by the said superintendent shall at once report any defects therein to him. It shall be the

Note: The above report is also required from all mines operated part of the year only and from operators selling or leasing mines during the year.

duty of the superintendent upon ascertaining such defects to take immediate steps to remedy them so as to comply with the provisions of these orders. It shall be the duty of the superintendent to appoint competent men to have full charge of every magazine containing explosives.

Order 305—Mine Foreman to Be Appointed. (a) The superintendent of every mine shall appoint a man who shall be personally in charge of the development of the underground workings of the mine and personally direct the work of the men employed underground therein, who shall be designated as the "mine foreman": Provided, however, that nothing herein contained shall be construed to prevent the superintendent of any mine from also filling the position of mine foreman.

(b) The mine foreman shall attend personally to his duties in the mine as provided in these orders, and shall see that the regulations provided herein for insuring the safety of all men employed in such mine are carried out; he shall immediately report to the superintendent of the mine any violations or infringements of these orders observed by him within the mine, and shall take immediate steps to remedy the same. He shall warn all employes of danger to life and limb observed by him within the mine, and permit no person to work in an unsafe place, unless for the purpose of making it safe or when work in such place is necessary and unavoidable.

Order 306—Establishing Identity of Men. It shall be the duty of the operator to see that the number and identity of the men regularly employed underground on every shift is established and that all such men return to the surface or be accounted for at the end of their shift.

Order 307—Care of Injured. It shall be the duty of operators, superintendents, or anyone in charge of any mine to keep at such place or places as shall be convenient and accessible to employees, a stretcher, a woolen blanket, and a waterproof blanket in good condition for use in carrying any person who may be injured at the mine. Where more than 100 persons are employed, two stretchers, two woolen blankets, and two waterproof blankets shall be kept. At all mines an adequate supply of materials shall be kept readily accessible for the treatment of anyone injured. Furthermore, in all mines where 100 or more men are employed a first-aid corps

shall be organized, consisting of at least five per cent of the men employed; and it shall be the duty of the operator to procure the services of a competent person to instruct the members of such first-aid corps from time to time, not less than once in every three months, in the proper handling and treatment of injured persons before the arrival of a physician.

Order 308—Mine Maps. The operator of every mine shall make or maintain, or cause to be made or maintained by a competent mining engineer or surveyor, a clear and accurate map or maps, with sections, if necessary, showing clearly all the workings of such mine. At least once in every six months, or oftener, if necessary, the operator, or superintendent of each mine shall cause to be shown clearly and accurately on the map or maps of such mine all of the excavations made therein during the time elapsed since such excavations were last shown on such map or maps, and all parts of said mine that shall have been worked out or abandoned during such elapsed period of time shall be clearly indicated on said map or maps, and all underground workings shall be surveyed and mapped before they are allowed to become inaccessible. Such maps shall at all times be open to the examination of the Industrial Commission or any of its deputies. In the event of the closing of a mine under conditions that will result in its workings becoming inaccessible the maps herein specified, or certified copies of them, shall be filed with the Industrial Commission, and shall not leave their possession and shall be accessible to others only upon written order of the owners of the property or operators furnishing such map or maps.

Order 309—Inflammable Material. (a) It shall be the duty of the operator of every mine in which oils and other dangerously inflammable materials are used, to store such materials, or cause them to be stored, in a covered building kept solely for such storage, which building shall be at least 100 feet from any shaft, tunnel or other mine opening, and at least 300 feet from any powder magazine: Provided, that gasoline, naphtha, distillate, and fuel oils may be stored in a tank or tanks buried in the ground, which tank or tanks shall be provided with proper vents, and shall be placed at least 50 feet from any shaft, tunnel, or other mine opening, and at least 300 feet from any powder magazine: And, provided further, That lubricating oils may be stored in a well-constructed, covered building,

which shall be at least 30 feet from any shaft, tunnel, or other mine opening, and at least 300 feet from any powder magazine. 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 such point of combustion a simple and reliable cut-off valve which shall be capable of being reached and closed within 30 seconds from any point within the building in which such point of combustion is situated.

(b) The man in charge of such building, tank or tanks who shall be the superintendent or a person expressly designated by him, shall permit only sufficient oil or other inflammable material to be taken from such building, tank or tanks to meet the requirements of one week. If any oil or gasoline storage be so situated that leakage would permit the oil or gasoline to flow within the above specified distances, means to prevent such flow must be provided.

(c) No more than one week's supply of any one kind of lubricating oil shall be stored underground on any one level at any one time. No oil, candles, explosives, or other combustible materials shall be stored in shaft stations or within 50 feet thereof, provided, however, that timber requirements for two days' supply will be permitted in shaft stations.

(d) Gasoline shall not be stored underground: Provided, however, that a tank containing gasoline and connected to the engine or other apparatus in which it is being used shall not be construed as a storage tank.

(e) Waste timber or old timber shall not be piled in stations, or main thoroughfares: Provided, however, that in stores or other workings old timber may be buried in the filling material and permitted to remain in the mine. Empty boxes, wooden chips, paper, and combustible rubbish of all kinds shall not be allowed to accumulate.

(f) Oily waste and oily rags used in and about underground machinery shall be deposited in metal receptacles.

(g) Calcium carbide shall be stored on the surface only in waterproof, dry, and well-ventilated buildings, and shall be kept in metal containers not exceeding 100 pounds each. All such containers but one in such storage place shall remain sealed, except that a new container may be opened when in

the only other open container there remains less than 5 pounds of calcium carbide. No calcium carbide shall be stored underground.

Section 2

Order 310—Storage of Explosives. (a) The term "magazine" as used in this section shall be held to mean and include any building or other structure or place in which explosives are stored or kept, whether above or below ground.

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

(c) No explosive shall be kept at any place within a mine where its accidental discharge would cut off the escape of miners working therein. No explosive shall be stored in a tunnel located in a pillar that is exposed on four sides, unless approved by the Industrial Commission.

(d) Not more than 75 pounds of explosives shall be kept in any working place on any one level at any one time, except that such explosive may be stored in an underground magazine, from which supplies required for immediate use shall be distributed to the various working places by an authorized and competent person or persons. Such underground magazine may consist of a separate drift or chamber. The entrance to such underground magazine shall be kept securely locked, except when it has to be entered by the person or persons in charge thereof.

(e) All explosives within the mine except in the magazine shall be kept in stout, tight boxes or bags from which the explosives shall be removed only as required for immediate use. No such boxes or bags containing explosives shall be kept near any track or electric conductors or in any manway except for immediate use. No grains or particles of such explosives shall be permitted to remain on the outside or about the containers in which such explosives are held.

(f) All explosives, except detonators, in excess of the temporary supply authorized to be taken into or stored in the mine shall be stored in a magazine above ground, which shall be placed not less than 300 feet distant from any shaft, adit, or other mine entrance, boiler, engine house, habitation, public highway, or public railway: Provided, however, that in cases

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where the location of any mining property makes it impossible to comply with the provisions of this section the Industrial Commission may grant permission in writing to the operator of each mining property to place such magazine in some other place on such property, if, in the opinion of the Industrial Commission, such location be not dangerous to the safety of the mine employees and of the public.

Order 311—(a) Any surface magazine constructed after the adoption of these orders shall, unless otherwise authorized by the commission, be constructed as follows: It shall be so constructed as to be fire resistant and bullet proof and shall have no opening except for ventilation and entrance. Doors of such magazines must be fire resistant and bullet proof and shall be kept securely locked, except when it has to be entered by the person or persons in charge thereof. All nails in the interior of the magazine shall be countersunk. The ground around such magazine shall be kept free from rubbish, dead grass, shrubbery, or other incumbrance, and no person shall be allowed to loiter about such place. All electric wires in any magazine shall be inclosed in suitable conduit.

(b) The use of matches or fire of any kind shall not at any time be permitted in any magazine. Surface magazines shall be ventilated, and the openings for ventilation shall be so screened that sparks of fire may not enter therein. Magazines shall at all times be kept clean and dry. Before any alterations are made to any part thereof, all explosives shall be carefully removed and no particles or grains of powder allowed to remain in, and all wooden parts discarded shall be immediately burned in a safe place.

(c) All detonators shall be stored above ground in a suitable magazine or magazines, properly protected against molestation, 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. No fuses shall be capped with detonators in any magazine or in any other place where explosives are stored. Cap crimpers shall be furnished in sufficient quantity to avoid the necessity of crimping in any other way. No detonators shall be transported with other explosives, except when made into a primer with such other

explosive. All primers shall be exploded within 24 hours after making. Not more than 1,000 detonators shall be kept underground in any one level at any time.

(d) Fuse shall not be stored underground for a longer period than 72 hours.

(e) When supplies of explosives or fuse are removed from a magazine those that have been longest in the magazine shall be taken first. No package of powder shall be opened with iron or steel instruments.

Order 312—Marking of Explosives, Detonators and Fuses.

(a) The operator or superintendent of any mine shall not permit the use within such mine of any explosive, or any blasting caps or detonators, or fuse, unless there shall be plainly printed or marked, in the English language, on every original package containing explosive, the name and place of business of the manufacturer of such explosive and its strength; and on every original package containing such fuse, the name and place of business of the manufacturer of such fuse; and on every original package containing the blasting caps or detonators the name and place of business of the manufacturer of such blasting caps or detonators.

Order 313—Blasting. (a) Bosses, shot firers, or other competent men shall be in immediate charge of and responsible for blasting within the mine. The use of any metal tools is prohibited for tamping or charging explosives. Detonators of not less strength than No. 6, shall be used in firing blasts. Bosses or shot firers and miners about to fire shots shall cause warnings to be given in every direction, and all entrances to the place or places where charges are to be fired shall be guarded by men.

(b) The number of explosions in every blast, except in case of simultaneous firing shall be counted by the man firing the same, and if the total number of explosions is less than the number of charges fired, a report shall be made to the foreman or man in charge and the miners shall not return without his permission.

(c) Wherever possible, a charge that has failed to explode shall be exploded by inserting a new primer in the hole on the old charge and detonating such primer. When tight tamping has been used, or when for any other reason a new primer cannot be inserted, no attempt shall be made to extract the

explosive, but a new hole shall be drilled, which shall be a safe distance from the original hole, and such new hole shall be charged with a fresh charge of explosives and then detonated.

(d) When electricity is used to fire shots, no person shall knowingly enter the vicinity of the place where such shots have been fired until the cable from the source of electrical energy to the face of the blast shall have been disconnected. It shall be the duty of the boss, shot firer, or person in charge to see that special precautions are taken against the shot-firing cables or wires coming into contact with the lighting, power, or other circuits, or with any metal pipe lines. All portable devices for generating or supplying electricity for shot firing shall, when in the mine, be in charge of a boss, shot firer, or other competent person. No person other than the man in charge of firing shall connect the firing machine or battery to the shot-firing leads, and such connection shall not be made until all other steps preparatory to the firing of a shot shall have been completed. The primary or secondary batteries used for shot firing shall be of approved construction. The plug or key shall be detached when not actually in use for firing a shot, and shall not, under any circumstances, pass from the custody of the boss or shot firer.

(e) Electricity from light or power circuits shall not be used for firing shots in a mine, except when the electrical connection to such light or power circuits are made within an enclosed switch box or room, which shall be kept securely locked and shall be accessible only to the authorized person in charge of firing.

Section 3

Order 314—Hoisting Engineer. It shall be the duty of every superintendent of every mine having a hoisting engine to appoint and designate one or more men, who shall be able to speak and read the English language readily, to be known as hoisting engineers. At all shafts where men are hoisted or lowered such hoisting engineers shall be not less than 21 years of age. It shall be the duty of every superintendent to appoint as hoisting engineers men who are familiar with details and

Note: In the publication of the Bureau of Mines the word "stemming" denotes the material used to confine the charge of explosive in a blast hole; the word "tamping" denotes the act of pressing or ramming this material in place.

working of a hoisting engine, and except in case of emergency to permit no one other than such duly appointed hoisting engineers to run such engine or hoisting machinery, except that, by and with the consent of the superintendent, specified apprentices may be taught the operation of the hoisting engine at such times and under such restrictions as the superintendent may determine to be free of risk to life and limb.

Order 320—Hoisting. (a) The superintendent of the mine shall establish for each shaft rates of speed for the cages, skips, buckets, or other conveyances that shall not be exceeded in the hoisting or lowering of men: Provided, that the speed so permitted shall not be greater than 500 feet per minute in the case of shafts of less than 500 feet in depth, and not greater than 800 feet per minute in the case of shafts between 500 and 1,000 feet in depth, and in shafts of more than 1,000 feet in depth not more than one-half the speed normally employed in hoisting material: Provided, further, that in the case of inclined shafts the classification herein made shall be determined by the measurement of their slope.

(b) The superintendent of the mine shall determine the maximum number of men that in his judgment may safely ride on each cage, skip, bucket, or other conveyance used in the mine under his supervision, and forbid the carrying of any greater number. At the beginning of each shift the mine foremen or shift boss, or some other responsible person, shall be stationed on the loading platform at the top of the shaft and shall prevent any greater number of men than that permitted by order of the superintendent to enter upon or into any cage, skip, bucket or other conveyance. And at the end of the shift the man in charge shall post himself at the station of the shaft at that level and shall prevent any greater number of men than the maximum permitted to enter upon or into any cage, skip, bucket, or other conveyance and shall remain in this station and be the last man to ascend.

(c) At every mine in which 100 or more men are employed underground, whenever men are being lowered or hoisted at the beginning or end of a shift, there shall be with the hoisting engineer an extra man competent to operate the engine in an emergency.

(d) Every hoisting engine which is operated to hoist men from or lower men into a mine shall be provided with two efficient means of braking.

(e) In no case except for repairs shall men be hoisted above shaft collar or other regular landing floor in any cage, skip, or bucket or other conveyance in any mine shaft.

(f) The superintendent of the mine shall be responsible for the enforcement of the provisions of this section.

Order 321—Safeguards Against Overwinding. (a) The sheave carrying the hoisting rope shall be placed upon a head frame so designed as to resist a pull in the direction of the hoisting engine greater than the pull which the engine can exert.

(b) All hoisting engines hereafter installed in shafts over 500 feet in depth, where men are regularly hoisted, shall be equipped with an automatic stopping device.

Order 322—Duties of Hoisting Engineer. The following rules shall be observed by every hoisting engineer employed within this state:

Rule 1. It shall be the duty of every hoisting engineer to keep a careful watch over his engine and over all machinery under his charge and report defects to his superior officer.

Rule 2. He shall at all times be in immediate charge of his engine, and shall not at any time delegate any of his duties to any other person, except to other men duly designated.

Rule 3. He shall familiarize himself with and use the signal code for hoisting and lowering as directed to be used by the superintendent.

Rule 4. He shall not run his engine unless the same is properly provided with brakes and indicators, or distance marks.

Rule 5. He shall hold no conversation with anyone while his engine is in motion, or while attending to signals.

Rule 6. After any stoppage of hoisting for repairs, he shall run the bucket or skip, cage, or other conveyance, on which no men shall ride, up and down the working part of the shaft, at least once, and 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.

Rule 7. He shall do no hoisting in any compartment of a shaft while repairs are being made in the said compartment except such hoisting as may be necessary to make such repairs.

Rule 8. There shall be no change in hoisting engineers while hoist is in motion.

Rule 9. Upon receiving the blasting signal, the engineer shall answer by raising the bucket, skip, cage, or other conveyance a few feet and letting it back slowly, and then upon receiving the proper signal he shall hoist the men away from the blast.

Order 323—Hoisting Ropes. (a) No operator of any mine shall use any ropes or cable for hoisting or lowering either men or material, when such hoisting or lowering is done by any means other than human or animal power, unless such rope or cable shall be composed of metal wires, with a factor of safety determined as hereinafter set forth:

(b) Hoisting ropes or cables when used for raising or lowering of men, shall have a factor of safety as given in the following table:

Length of Rope Feet	Minimum safety factor for new rope	Minimum safety factor when rope must be discarded	Percentage Reduction
500 or less.....	8	6.4	20
500 to 1,000.....	7	5.8	17
1,000 to 2,000.....	6	5.0	16½
2,000 to 3,000.....	5	4.3	14
3,000 and over.....	4	3.6	10

(c) There shall not be used any rope or cable for the raising or lowering of men, either when the number of breaks in any consecutive ten (10) feet of said rope exceeds (10) per cent of the total number of wires composing the rope, or when the wires on the crown of strands are worn down to less than sixty (60) per cent of their original area, or when the superficial inspection provided for in these orders shows marked signs of corrosion.

(d) The superintendent of a mine shall keep a record of every hoisting rope used at the mine or mines in his charge,

Note: The factor is to be determined by dividing the breaking strength of the rope as given in the manufacturer's published tables, by the total weight of suspended equipment and load. The several factors given in the table are based on an actual safety factor of 4 and are made greater for the shallower shafts because in them the acceleration stresses and many of the possible extraordinary stresses are normally greater.

noting the length and diameter of the rope, the construction of the rope, the date when put in use, the designation of the shaft, and compartment in which the rope is used, the dates of resocketing, the dates of reversing ends, and the date when discarded.

(e) Hoisting rope shall not be used after three years from the time of its first installment, irrespective of whether use of the rope in the interval has been continuous or intermittent, unless a piece be cut off from the socket end of said rope and subjected to an actual breaking test in the laboratory of a responsible rope manufacturer or testing laboratory of recognized standing and shall be found thus to be above the minimum limit of strength as prescribed in these orders, unless rope has been removed and properly lubricated and stored during the intermission in which case the total operating period must not exceed three years or such time as determined by test outlined.

(f) Every hoisting rope whereof the hook for connecting with the skip, cage, bucket, or other conveyance is made by means of a babbitted or zinc filled socket or by means of clips must be resocketed or reclipped at frequent intervals, or when inspection shows it to be necessary.

(g) When a new hoisting rope is installed, it must be run for at least one trip preferably under full load before it is used for lowering or hoisting men and after each resocketing, re-clipping, reclamping, or recapping, every rope shall be similarly run for at least one trip before it is used for lowering or hoisting men. All ropes shall be superficially inspected once each week by some competent person designated for that purpose.

Order 324—Safety Hooks. No open hook shall be used with a bucket, cage or skip in hoisting, but some approved form of safety hook or shackle hook shall be used.

Order 325—Cages for Hoisting Men. (a) No operator of any mine shall permit the regular hoisting or lowering of men through a vertical shaft deeper than 350 feet unless an iron-bonneted safety cage be used, but this order shall not apply to shafts in process of sinking.

(b) All cages for the raising and lowering of men shall be so constructed and operated that any person riding upon same will be protected from falling material and shall be further

provided with suitable sides and hand holds. If 50 per cent of the carrying capacity is exceeded bars or gates shall be provided. Every cage shall be provided with a safety-catch of sufficient strength to hold the cage with its maximum load at any point in the shaft in the event that the hoisting cable should break.

Section 4

Order 326—Two Openings to Surface. (a) It shall be the duty of every operator of every timbered mine, except as hereinafter provided, to maintain at least two outlets to the surface from such mine, or an underground communicating passage-way between every such mine and some other neighboring mine, so that there shall be at all times at least two distinct and available means of access to the surface to all persons employed in such mine. Such outlets shall not be less than 100 feet apart and there shall be between them a space not less than 50 feet in width free of buildings or inflammable structures or material.

Provided, however, that the above requirements shall not apply in the case of (a) shafts or mines in process of being connected, to comply with the terms of this order; (b) shafts, winzes, adit levels, tunnels, and drifts to prospect for and develop mineral substances, but not for the extraction of mineral substances, except such as may be extracted in the course of such prospecting and developing work; (c) any mine in which one of the shafts or outlets shall have temporarily become unavailable for the person employed in the mine, and in which every effort is being made by the operator of the mine to open such temporarily unavailable outlet, and provided the same is not, in the opinion of the Industrial Commission, dangerous to the life and health of those employed therein; (d) mines having workings less than 100 feet deep and extending less than 200 feet from the shaft in any direction, but not mines opened primarily by an adit level or tunnel; and (e) mines opened by an adit level, tunnel, or drift less than 1,000 feet in length; and provided further, that mines opened by an inclined shaft of less than 20 degrees from the horizontal shall be considered for the purpose of these orders as equivalent to a mine opened by an adit level, tunnel, or drift.

Note: Whenever it is impracticable to comply with the provisions of this order in existing installations the Commission may make exceptions to this order.

Provided, further, that any prospecting or development property opened by a timbered shaft and exempt under exception (b) from providing two outlets to the surface shall not permit more than 10 men to work underground at any one time, unless such shafts be provided with a water-sprinkling system.

Provided, further, 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.

(b) A suitable warning signal system operated from the surface shall be provided in every mine to call the men to the shaft in case of danger.

Order 327—Openings Through Other Mines. When a communicating outlet shall have been established by agreement between contiguous mine or mines not contiguous, the operator of either mine shall not close such outlets until other suitable means of egress are provided. When operators of such mines have by agreement established underground communication between said mines as an escapement outlet for the men employed in both, it shall be the duty of each operator to cause such communicating outlet in each operator's mine to be inspected at least once in every seven days, and it shall be the duty of each operator to see to it, within his respective mine, that the same is kept clear of every obstruction to travel and that intervening doors, if any, shall be kept unlocked and ready at all times for immediate use, and of such size and construction that they may be readily opened by one man.

Order 328—Provisions Affecting Timbered Mines: Having Only One Outlet. In every timbered mine, where under the provisions of Order 326 only one outlet is required and where a single shaft affords the only means of ingress or egress to persons employed underground, such shafts if more than 200 feet deep shall be divided into at least two compartments. One of said compartments shall be set aside for use as a ladderway and no hoisting conveyance shall be allowed therein. When such ladderway compartment shall be covered by a nonfireproof building, it shall be the duty of the operator of said mine to cause the said ladderway to be securely bulkheaded at a point at least 25 feet below the collar of the shaft;

and below this bulkhead a passageway shall be driven to the surface so as to have its outlet in no case less than 30 feet beyond the walls of the building covering the main shaft. The said passageway shall be equipped with a ladderway when necessary, as provided in rules 25 to 30 of section 5 of these orders and shall be kept in good repair and shall afford an easy exit in the event of fire. Every mine opened by adit or tunnel or by an inclined shaft, or slope of less than 20 degrees angle from the horizontal, which is less than 1000 feet in length, shall have a similar side outlet.

Order 329—Protection of Outlets Against Fire. (a) No operator of any mine shall, after the adoption of these orders erect any combustible structure over the shaft, tunnel, or other mine opening except headframes necessary for the hoisting from such shaft or other mine opening, or such buildings necessary for the treatment or disposal of the ore mined.

(b) It shall be the duty of every operator to provide every adit, tunnel, inclined shaft, or slope of less than 20 degrees angle from the horizontal, the mouth of which is covered by a building or house of any kind, with a door near the mouth of such adit, tunnel, inclined shaft, or slope less than 20 degrees angle from the horizontal that can be closed from outside of the building by a pull wire or cable in the event of fire.

Order 330—Ladderways and Ladders. (a) It shall be the duty of the operator of every mine to provide, in addition to any mechanical means of ingress or egress, at least one means of outlet for the miners by means of ladders from the lowest workings of the mine to the surface. All ladders and ladderways constructed after approval of these orders shall be built as prescribed in rules 35-40 of section 5. All ascending and descending manways through stopes, and every shaft, winze, raise through which men are obliged to pass, shall be provided with ladders and ladderways as specified in this section: Provided, however, that where the slope of the working place is such as to permit the installation of stairways that can be easily and safely traversed, such stairways may be substituted for ladders.

(b) Every branched or forked route to an exit or outlet from a mine shall be marked with signboards plainly showing the direction to be taken wherever more than one course is possible.

Order 331—Ventilation. (a) The operator of every mine, whether operated by shaft, slope, tunnel, adit, level, or drift shall provide and maintain for such mine ventilation systems which will cause to be circulated through and into all the shafts, winzes, levels, and working places, by forced ventilation if necessary the following amounts of air: For each man employed 30 cubic feet free air per minute; for each animal employed 100 cubic feet free air per minute.

(b) Where gasoline locomotives are used in haulage ways, forced ventilation sufficient to maintain the C O contents of the air in haulage way to 0.1% or less during periods of poorest combustion must be provided.

(c) Gasoline motors shall not be permitted in dead end drifts. Motorman's platform shall be so located on gasoline motor that the motorman is always on fresh air side or end of his motor.

Order 332—Sanitation—Dry Closets, Drinking Water, Change Houses, etc. (a) It shall be the duty of the operator of every mine, for the purpose of improving the sanitation thereof and preserving the health of those employed therein, to provide dry-closets, water-closets, or closet cars up on all main working levels for the use of all men employed in the mine. At least one such closet shall be provided for every 20 men employed within the mine. Ready means of access to each such closet shall be provided by the operator. No closet shall be constructed without adequate provisions for the effectual cleansing of the contents thereof, which shall be removed and disposed of at least once in every week. It shall be the duty of the mine foreman to cause each dry-closet to be supplied with some disinfectant or deodorizer to be sprinkled upon the contents thereof. It shall be the duty of all men employed within any mine where such closets are provided to use such closets exclusively when in the mine. Provided, however, That this order shall not apply to any mine where the operator or superintendent prefers to permit the men to go to the surface, and requires the men to do so.

(b) Every stable or other place underground used for the housing of mules, horses, or other animals shall be thoroughly

Note: Under worst conditions a gasoline motor will generate C. O. in amount equal to 13 1/2% of its piston displacement. A 4 1/4 x 5 1/4 -4 cyl. motor running at 800 R. P. M. will require 9910 cubic feet free air per minute to maintain proper dilution of C. O. A 8" x 7"-6 cyl. motor at 500 R. P. M. will require 35,140 cubic feet free air per minute to maintain C. O. at 1%

cleaned and the waste contents thereof removed and disposed of at least once in every week or oftener when necessary.

(c) It shall be the duty of the operator of every mine to provide a safe quality of drinking water for the use of all men employed in the mine, a supply of which shall be provided on each main working level, and it shall be the further duty of the superintendent to cause such supply of drinking water to be adequately protected from contamination by dust, and from promiscuous drinking from the supply vessel on the part of the men.

(d) The operator of the mine employing more than 20 men underground shall provide a dressing room or a change house for the purpose of drying the clothing of the persons employed in and about the mine, and such dressing room or change house shall be provided with adequate means of heating and lighting. Such dressing room or change house shall be available to the men, free of cost, at all reasonable hours.

Order 335—Roof and Pillar Inspection. (a) In all mines it shall be the duty of the superintendent to employ for each 250 tons or portion thereof, of mine run ore broken to definitely delegate to his mine foreman or an experienced miner the duties of trimmer. The "trimmer" or "trimmers" shall make daily inspection of the roof and pillars and walls in those portions of the mine in which men are employed, or through which men pass, and he or they shall immediately dislodge all slabs or portions which shall have become loose or shall report to his superior any condition which he cannot immediately remedy. During this dislodgement the floor of the stope below such loose rock must be fenced off or otherwise securely guarded, provided, that it shall be the duty of every miner to care for the roof of the place where he is working, provided, that nothing in this section shall be construed to mean that the trimmer shall not have other duties.

(b) When a stope, or working that has been temporarily abandoned is to be re-opened, a similar examination must be made, and all material which has become loosened during disuse must be removed before operations are resumed.

Order 336—Safety Pillars. No stoping shall be done within 20 feet of a shaft that is used for hoisting men or material unless the shaft is to be abandoned.

Order 337 — Elevated Dump Tracks. Elevated dump tracks shall be kept in good condition and a bumper placed thereon to prevent car rolling over the embankment. A proper runway for car men shall be provided.

Order 338—Trolley Wires. Where tramming is done by electric power the trolley wire opposite all chutes and shaft openings shall be guarded on both sides so as to protect men from being injured by tools or materials coming in contact with the trolley wires.

Order 339—Height of Trolley Wires. On new installations electric trolley wires in all mines shall be at least seven feet above the floor. Trolley wires shall be placed as near to one side of the drift as possible.

Order 340—Clearance Between Cars. All mine cars hereinafter installed shall be equipped in such a manner, that in the event of cars being coupled together in trains, there shall be a clearance of not less than 6 inches between bodies of the cars.

Section 4

Order 345—General Rules:

Subject

- 1— General Safety Precautions.
- 2— Foreman's Duties.
- 3— Oxygen Breathing Apparatus.
- 4— 5 Cages.
- 6— Hoisting While Sinking Shaft.
- 7— Deepening Shaft—Protection.
- 8— Whims.
- 9— Signals.
- 10— Interference with Signals.
- 11— Signal Codes.
- 12— Cleaning Manways.
- 13— Fire Protection.
- 14-16 Timbering.
- 17— Fencing Disused Workings.
- 18-19 Lighting.
- 20-21 Places of Refuge.
- 22-24 Protection Against Water.
- 25-31 Ladders and Ladderways.
- 32— Enforcement of Rules 25 to 31.
- 33— Sumps.
- 34-36 Winzes or Raises.
- 37-39 Shaft Protection.

- 40— Oiling Cages, Safety Catches.
- 41-48 Explosives—Thawing and Handling.
- 49— Fuses.
- 50-51 General Rules.

The following general rules shall be observed in every mine:

Rule 1—General Safety Precautions. The operator and superintendent of every mine shall use every precaution which in his judgment will insure the safety of the workmen in the mine in all cases, whether provided for in these orders or not.

Rule 2—Foreman's Duties. The mine foreman shall see that all dangerous places are properly fenced off and proper danger-signal boards are so hung on such fencings that they may be plainly seen.

Rule 3—Oxygen Breathing Apparatus. Where a fire or gas hazard exists a mining company employing more than 50 men underground shall provide, maintain and keep in a readily accessible place at least one set of five oxygen breathing apparatus to be used in case of emergency. They shall not be used by anyone who does not thoroughly understand their operation or who have not had at least 10 hours' training in their use under a competent instructor.

Rule 4—Cages. No person shall ride upon any skip, or bucket that is loaded with tools, timber, powder, or other material except for the purpose of assisting in passing such material through a shaft or incline, and then only after a special signal has been given.

*Rule 5—*When tools, timber, or other materials are to be lowered or hoisted in a shaft, their ends, if projecting above the bail of the bucket, skip or other conveyance, shall be securely fastened to the hoisting rope or to the upper part of the conveyance and all tools, timber, or other materials loaded upon a cage shall be securely lashed before being lowered or hoisted.

Rule 6—Hoisting While Sinking Shaft. In no case shall a cage, skip, or bucket or other conveyance be lowered directly to the bottom of the shaft when men are working there, but such cage, skip, or bucket or other vehicle shall be stopped at least 15 feet above the bottom of such shaft until the signal to lower farther shall have been given to the hoisting engineer by one of the men at the bottom of the shaft.

Rule 7—Deepening Shaft—Protection. During shaft-sinking operations, no other work in any other place in the shaft shall be executed, nor shall any material 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, unless the men so at work be protected from the danger of falling material by a securely constructed covering extending over the whole area of the shaft, sufficient closable openings being left in the covering for the passage of men and the bucket or other conveyance used in the sinking operations.

Rule 8—Whims—Windlasses. Whims and windlasses in use at or in mines shall be provided with suitable stopper or some other reliable device to prevent running back of the bucket or other conveyance.

Rule 9—Signals. Every shaft, if extending 50 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. The signaling apparatus shall be of cord or wire actuating a knocker, bell, or whistle, or a speaking tube, or telephone, or an electrical system, and special care shall be taken to keep the signaling apparatus in good order, and all proper precautions shall be taken to prevent electric signal and telephone wires from coming into contact with other electric conductors, whether insulated or not.

Rule 10—Interference with Signals. No person shall interfere with or impede any signaling in any mine, or knowingly damage any signal systems, or knowingly give or cause to be given any wrong signal within the mine or to ride upon any cage, skip, bucket, or other conveyance at a time when signals have been given informing the hoisting engineer that no person is so riding.

Rule 11—Signal Codes. An easily legible copy of the signal code 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. The superintendent of the mine shall be responsible for the carrying out of this rule.

Rule 12—Cleaning of Manways. The timbers in all manways in daily use shall be kept cleaned of all loose rock lodged upon them. Manways in daily use shall be kept clear of obstructions.

Rule 13—Fire Protection. All air lines in mines where fire hazards exist shall be readily convertible into water mains as an added protection against fire.

Rule 14—Timbering. Every shaft incline, slope, adit, tunnel, level, or drift, and any working place in the mine shall be, when necessary, kept securely timbered or protected to prevent injury to any person from falling material. It shall be the duty of the operator to carry out and enforce the provisions of this rule, but nothing contained herein shall be construed to relieve the miner from the duty of caring for his own working place, save as hereinafter provided.

*Rule 15—*It shall be the duty of the operator to see that all miners in the mine are supplied at all times with such timbers as are necessary to keep their working places in a safe condition. For the purpose of this and the succeeding rules the term "timbers" shall be held to include and mean all wood to be used by the miner, or all steel or concrete material used in lieu of timber.

*Rule 16—*If, for any cause necessary timbers cannot be supplied to any miner when required, it shall be the duty of the mine foreman to instruct the miner or miners to vacate all such working places until supplied with the timbers needed, but nothing contained herein shall be construed to relieve the operator of the duty of supplying such timbers.

Rule 17—Fencing Disused Workings. All abandoned shafts, shafts temporarily out of use, or shafts used only as airways, shall be securely covered or fenced, and shall be so maintained. All mill holes, glory holes, and cavernous stopes opening to the surface shall be securely fenced, and shall be so maintained if such mill holes, glory holes, or cavernous stopes are within 300 feet of a highway or thoroughfare. All other abandoned excavations whereof the sides slope more than 40 degrees from the horizontal, and whereof the depth is more than 10 feet, shall be securely fenced, but such fencing need be erected only at those places where such slope is in excess of 40 degrees, and all such fencing shall be maintained in good condition.

Rule 18—Lighting. Stationary lights shall be provided during the working hours at all shaft stations during the time the same are in actual use, and also at all stations on the levels where hoisting or hauling is affected by means of machinery, and also at night at all places on the surface where work is being conducted, and at the head of any operating shafts not fenced or covered.

Rule 19—All places where hoisting, pumping, or other machinery is erected and in the proximity of which persons employed in the mines are working or moving about shall be lighted so that the moving parts of such machinery can be clearly distinguished.

Rule 20—Places of Refuge. In every mine in which mechanical haulage is employed there shall be at intervals of not more than 100 feet on each main haulage way, except in shafts, places of refuge affording a space of at least $2\frac{1}{2}$ feet in width between the widest portion of the car or train running on the tramway and the side of the gallery.

Rule 21—Every such place of refuge shall be kept constantly clear, and no refuse shall be placed therein, and no person shall in any way prevent access thereto.

Rule 22—Protection Against Water. No raise shall be allowed to approach within 12 feet of any part of a winze, stope, or other opening in which there is a dangerous accumulation of water unless such winze or stope be first unwatered by bailing or pumping or by means of a bore from the raise.

Rule 23—When advancing a drift, adit, level, or incline toward a mine working that is suspected to be filled with water a bore hole shall be kept at least 12 feet in advance of the breast of the drive when in the vicinity of such mine working, and also if necessary, in directions laterally from the course of the drive. Such additional precautionary measures shall be taken as may be deemed necessary to obviate the danger of a sudden breaking through of water.

Rule 24—In every mine where there is danger of a sudden inburst of water, such additional raises, drifts, or other workings shall be constructed as are necessary to insure the escape of workmen from the lower workings.

Rule 25—Fixed Ladders and Ladderways. The distance between the centers of the rungs of a ladder shall not exceed 12 inches, and shall not vary more than one-half inch in any one ladderway.

Rule 26—The rungs of all fixed underground ladders shall in no case be less than 3 inches from the wall of the shaft or any opening in which the ladder shall be used, and shall be not less than $\frac{3}{4}$ " round iron or $\frac{1}{2}$ " iron pipe.

Rule 27—Every ladderway hereinafter installed in an inclined shaft with an inclination of more than 45 degrees from the hori-

zontal, the vertical distance from the top and bottom of which is more than 50 feet, shall be provided with rest platforms at intervals of not more than 50 feet measured vertically. In vertical shafts where ladderway is regularly used by the men, rest platforms shall be spaced at distances of not more than 25 feet, and the ladders shall be staggered and their inclination shall not exceed more than 80 degrees from the horizontal.

Rule 28—All such platforms, except for an opening large enough to permit the passage of a man wearing an oxygen breathing apparatus, shall be closely covered.

Rule 29—Ladders shall project at least 3 feet above every platform in the ladderway and at least 3 feet above the collar of the shaft, unless handrails shall be fixed at such places.

Rule 30—Under no circumstances shall any ladder inclining backward from the vertical be installed.

Rule 31—Ladderways shall be provided in all shafts in the course of sinking to within such a distance from the bottom thereof as will secure them from damage by blasting. From the end of such ladderways, chain or wire rope ladders to reach to the bottom of the shaft shall be provided.

Rule 32—Enforcement of Rules 25 to 40. It shall be the duty of the superintendent to enforce the carrying out of rules 25 to 31.

Rule 33—Sumps. All sumps shall be securely covered or protected by a standard railing except when being cleaned or repaired or for similar purpose.

Rule 34—Winzes or Raises. Winzes opening directly from the floor of a drift or stope shall be kept covered by a substantial hatch, or shall be planked over, except when in use, or shall be barred off by a standard railing or shall be provided with a gangway not less than 10 inches wide, which gangway shall have a standard railing and self-closing bar gate.

Rule 35—Stopes opening directly from the floor of a drift shall be protected by a standard railing or such stopes shall be securely planked over.

Rule 36—Drifts used as manways intersecting overhead workings through which material is dropped shall be closed to the passage of persons by a standard rail on each side of the work-

Note: Standard railings are 42" in height with center rail between top rail and floor. Posts are placed not more than eight feet apart. Toeboards are at least 3" high and placed not more than $\frac{1}{2}$ " above the floor or platform.

ings, whenever material is to be dropped through such working and the drift shall be kept so closed during periods when the working is so in use.

Rule 37—Shaft Protection. The top of all shafts shall be protected by a standard rail and toeboard which may be provided with the necessary gates to give access to the shaft, but such gates shall be kept closed when access to the shaft is not necessary.

*Rule 38—*If hoisting be done by means of a bucket, shaft doors shall be constructed that will prevent any material from falling into the shaft while the bucket is being dumped, and such doors shall be closed while the bucket is being dumped.

*Rule 39—*All stations or levels shall have such a passageway through or around the working shaft so that crossing through the hoisting compartment may be avoided; entering or crossing the hoisting compartment of a shaft except to ascend or descend, or for the purpose of effecting repairs is prohibited; before repairs are commenced the person in charge of or directing the repairs shall inform the hoisting engineer of the nature thereof.

Rule 40—Oiling Cage Safety Catches. The safety catches of cages shall be kept well oiled and in good working order, and shall be tested at least once a month. Such test shall consist of releasing the cage suddenly in some suitable manner so that the safety catches shall have opportunity to grip the guides.

*Rule 41—*Every mine thawing dynamite or other high explosives shall be provided with a separate place for that purpose on the surface, or with a special underground chamber, which shall be a separate drift or crosscut, and explosives shall not be thawed in any other place or in any other manner than as provided by Rules 42 to 44 in this section.

*Rule 42—*Dynamite or other high explosives shall not be thawed by any means other than indirect steam heat or a hot water device, or by manure, or by electric current. If steam or water be the agent employed, the stove, boiler, or other primary source of heat shall not be nearer to the thawing room than ten feet. If electric current be the heating agent, the current shall not be brought closer than three feet of the explosives to be thawed.

*Rule 43—*Dynamite or other high explosives shall ^{not} be thawed by placing it near a fire or near a steam boiler.

*Rule 44—*Dynamite or other high explosives shall not be thawed by direct contact with steam.

*Rule 45—*No person shall knowingly distribute frozen dynamite, or other high explosives to any person working in any mine, unless such explosives are to be thawed in accordance with Rules 42—44 of this section.

*Rule 46—*Explosives shall not be carried on an electric locomotive, or in a trip hauled by an electric locomotive, or on a gasoline locomotive.

*Rule 47—*Explosives shall not be left or placed near live electric wires.

*Rule 48—*No person shall remove any explosive from a mine without the written consent of the superintendent of the mine.

*Rule 49—Fuses—*No fuse shall be used in any mine that burns faster than 3 feet in 80 seconds or slower than 3 feet in 130 seconds. From every case of fuse opened, or from every lot of 24,000 feet, two coils shall be selected at random and pieces cut from such two coils shall be tested for rate of burning.

General Rules.

*Rule 50—*All defects in or damage or injury to machinery or timbering or to apparatus and equipment generally in and about a mine, all unsafe or dangerous conditions in any part of the mine, and all accidents occurring in the course of mining operations, other than those of a purely minor character, even though not resulting in personal injury, shall be promptly reported to the mine foreman or superintendent by the person observing the same.

*Rule 51—*Each workman when employed in the mine when first engaged shall have his attention directed by the mine foreman to the general and special rules provided for in these orders.

III. APPENDIX

SUGGESTIONS AND RECOMMENDATIONS

Safety Committees

The Industrial Commission recommends that safety committees be organized in all mines. In the smaller mines, the superintendent should have charge of the safety work. He should see that proper safety rules and regulations are enforced; should see that new employees are instructed as to the hazards of their work and that all employees are educated in safety methods through safety bulletins, printed rules and oral instructions.

In the larger mines employing over forty men it is necessary to have a General Safety Committee. This committee should be composed of not less than three persons; two practical miners, together with a foreman and shift boss. The committee should devise ways and means to reduce the number of injuries and to carry on safety education among the men by means of literature, posters, and practical safety exhibitions. The committee should hold frequent meetings and should encourage the men to make safety suggestions. All practical suggestions should be acted upon by the committee. All accidents should be investigated and means taken to prevent similar occurrences.

Bulletin Boards

All mines should be provided with suitably located bulletin boards on which safety bulletins shall be posted and changed at least once a month. Safety orders and rules should also be posted on the bulletin board. Bulletins can be obtained from the National Safety Council, Insurance Companies, and from the Industrial Commission when available. It is advisable to post bulletins dealing with accidents that occur in the company's mines.

First Aid

At all mines, at least 5 per cent of the employees should receive thorough First Aid training. The minimum number of

men trained in First Aid work for each mine, regardless of the number of men employed, should be three men. A person shall be considered to be thoroughly trained when they are able to administer first aid treatment for shock, bleeding, burns, cuts, bruises, sprains, fractures and dislocations; they shall be able to administer artificial respiration by the prone or Schaefer method and understand the proper methods of transporting the injured. The superintendent of the mine should provide for instruction of the employees from time to time, not less than once each calendar month, in the proper handling and treatment of injured persons before the arrival of a physician. Such instructions may be given by a physician or by any competent first aid instructor. The United States Bureau of Mines has been providing a source of training in the mines each year. When the Mine Safety Service Car makes its next appearance in the vicinity, the superintendent should see to it that his men receive the proper training.

Safe Practices

The enforcement of the safety rules necessary in a mine is no easy problem. It is easy enough to get up a set of rules that may be practical enough, but quite another matter to enforce their observance. It certainly requires an understanding of human nature by those who administer them. There should be no partiality shown. Preference, if any, should be given the men that make good and then there can be no personal favoritism. Letting one man escape while another is reprimanded for an infraction soon leads to loss of respect for all rules and finally for the boss himself. Any person placed in a position of supervision over others must understand thoroughly that particular work and its principles and try to elucidate these principles for the men intrusted to him. He is then in a position to teach the safest and most efficient manner in which to do the work. This must always be done in such a way as not to induce stubbornness, resentment or a feeling of being humiliated, but by kindly correction and proper guidance aim to make the man a more efficient worker and, at the same time, a safer one. The supervisor must teach his pupil to recognize up-to-date methods and have him see the advisability of cooperating in the enforcement of the rules that have been devised for his own and his fellow workers' safety. Discipline in such an undertaking as mining should be considered indispensable and should be maintained at all times.

IV. EXTRACTS FROM THE STATUTES AND FROM
GENERAL ORDERS OF THE INDUSTRIAL COM-
MISSION OTHER THAN GENERAL ORDERS
ON MINES

EXTRACTS FROM CHILD LABOR LAW.

Section 1728a.*** 3.*** the employments and places of employment designated in the following schedule shall be deemed to be dangerous to the life, health, safety and welfare of minors *** under the ages specified:

* * *

(b) Minors under eighteen years of age

* * *

(9) Mine or quarry; in or about.

Section 1728c. 1. (a) Any employer who shall employ, or permit any minor *** in any employment in violation of any of the provisions of Section 1728a *** of the Statutes *** shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than ten dollars nor more than one hundred dollars for each offense, or imprisoned in the county jail not more than thirty days. Every day during which such violation continues shall constitute a separate and distinct offense.

(b) The penalties specified in paragraph (a) of this section may be recovered by the state against the employer in an action for debt brought before any court of competent jurisdiction.

Note: The employer is charged with the duty of ascertaining, at his peril, the age of minors and of employing persons of lawful age only. False statements of the minor or his parents, as to the age of the minor, are not a defense for the employer. *Peter Stetz vs. F. Mayer Boot & Shoe Co.*, 163 Wis. 151. For their own protection employers should require all minors to furnish documentary proof of age, such as a certified copy of the birth or baptismal record.

EXTRACTS FROM THE GENERAL ORDERS ON SAFETY.

Order 1—Belts—Guards. All belts, ropes or chain driving machinery or shafting, and all secondary belts, ropes or chains; in short, all belts, ropes or chains, exposed to contact, except belts which are so small or those which move so slowly that there is no possibility of danger, must be guarded.

In all cases the point where the belt, rope or chain runs on to the pulley, sheave or sprocket, must be guarded.

All horizontal belts, ropes or chains driving machinery or shafting, seven feet or less from the floor, where exposed to contact, must be guarded.

Note (a): The terms "belts" or "secondary belts" mean belts which transmit power and do not apply to sanding or polishing belts, or belts used for abrasive purposes; such belts must be guarded where possible.

Note (b): In guarding overhead belts or rope drives, unless so guarded that persons cannot pass under them, the width of the guard should not be less than the width of the belt or rope drive and the length should not be less than the distance between the outer faces of the two pulleys. It should cover the outer faces of the two pulleys or sheaves and extend upward to such a point, and be attached in such a way that in case the belt brakes it will withstand the whipping force of the belt.

Note (c): In rooms, or parts of rooms, used exclusively for transmission machinery, such as the ground floor of sawmills and the basements of paper mills or flour mills, it has been found practical to define certain passageways for the use of oilers and millwrights and to guard the pulleys, belts and shafts along these passageways.

Order 2—Pulleys—Guards. All pulleys over 18 inches in diameter, which are exposed to contact, must be guarded.

Order 3—Loose Pulleys. All machines, not individually motor driven, must be equipped with a loose pulley or a clutch or some other adequate means of stopping the machine quickly.

Order 4—Belt-Shifters. All loose pulleys must be furnished with a permanent belt shifter, so located as to be within easy reach of the operator. The belt-shifter must be so constructed as to make it impossible for the belt to creep from the loose pulley back on the tight pulley.

All belt-shifters must be equipped with a lock or some other efficient device which will prevent the shifter from being accidentally shifted.

Order 5—Pulleys Near Shaft Hanger. Pulleys must be so placed as to allow the width of the belt between two pulleys, or between the pulley and the shaft hanger, or a hook must be provided, or a guard placed adjacent to the pulley to prevent the belt from leaving the pulley.

Order 6—Clutches. All clutches must be guarded.

Note: Practically all clutches have protruding parts or shafts which make them as dangerous as set screws on shafts.

Order 8—Emery Wheels, Hoods and Guards. Emery wheels used for grinding purposes must be equipped with a hood connected with an exhaust fan or water system. A guard must be provided, as a part of the hood construction or in addition to the hood, which shall be strong enough to with-

stand the shock of a bursting wheel. This guard must be adjusted close to the wheel and extend over the top of the wheel to a point 30 degrees beyond a vertical line drawn through the center of the wheel. The exhaust or water system is not required on emery wheels which are in general use by all employes in common, to touch up tools or castings, or emery wheels used for sharpening saws.

Order 9—Fly Wheels. All sections of flywheels, with spokes, which are 6 feet or less from the floor and which are exposed to contact must be guarded. Flywheels which run in pits must be provided with toe boards around the pit.

Exception: Where an engine is isolated in a room used exclusively as an engine room the flywheel of such engine may be guarded with a railing. This railing must be not less than 30 inches in height and must be constructed with two rails, the bottom rail of which must be not less than 18 inches from the floor.

Order 10—Friction Drives. The contact faces of all friction drives, when exposed to contact, must be enclosed.

All arm or spoke friction drives and all web friction drives with holes in the web, when such friction drives are over 18 inches in diameter, and exposed to contact, must be entirely enclosed. All friction drives with projecting bolts where exposed to contact, must be guarded.

Order 11—Gears. All gears, where exposed to contact, must be entirely enclosed or equipped with a flange guard which must enclose the teeth of the gears. All arm or spoke gears and all web gears with holes in the web, which are over 18 inches in diameter, where exposed to contact, must be entirely enclosed.

Order 12—Keys and Keyseats. All projecting keys in shafting, where exposed to contact, must be cut off or guarded, and all keyseats in end of shafts, where exposed to contact, must be filled or guarded.

Exception: Keyseats on machines where it is impossible to guard or fill the keyseats without interfering with the operation of the machine, and where such keyseats are in shafts which are so small or run so slowly that there is no danger.

Order 13—Ladder with Steel Points. All portable ladders must be equipped with steel points or steel feet on the bottom or other effective means of preventing slipping.

Note: Where steel points or steel feet are used they should be kept sharp especially when used on concrete floors.

Order 14—Passageways—Keep Clear. All passageways and gangways must be kept smooth and in good repair and free from nails or obstructions over which persons may stumble and fall.

Order 15—Platforms with Stairways or Stationary Ladders. All permanent elevated platforms in frequent use must be equipped with a permanent stairway or stationary ladder. Ladders other than stepladders, used to gain access to elevated platforms not frequently used, must be provided with safety hooks at the top.

Order 16—Runways and Platforms, Rails and Toe Boards. All elevated walks, runways or platforms, except on loading or unloading side of platforms, must be provided with a guard rail. A toe board must be provided to prevent parts from falling off.

Order 17—Set Screws. All set screws on moving parts, where exposed to contact, must be countersunk or protected by a solid collar, or a headless set screw must be used. No part of the set screws must project above the surface.

Order No. 18, Covering Shafting, has been amended to read: "All transmission shafting located in places of employment, where exposed to contact, must be guarded."

Note: The necessity for this amendment is proved by the fact that several accidents have occurred recently on shafting located higher than 6½ feet from the floor near a platform or runway where oilers and millwrights were required to go. The original order required only that shafting less than 6½ feet from the floor should be guarded.

Order 19—Sprockets. All sprockets exposed to contact must be guarded.

Order 20—Stairways—Handrails. All stairways must be equipped with handrails, and the rails must be kept smooth and free from nails and splinters. Where the stairway is not built next to a wall or partition, rails must be provided for both sides.

Order 21—Engine Crank Shaft. The crank shaft and crank disc on all engines, where exposed to contact, must be guarded.

Order 22—Stairs or Platforms Located on Engines. All stair steps and platforms located on engines or large machines for the use of operators and oilers must have a rough or non-slip surface to prevent slipping.

Order 24—Automatic Oilers. All parts of engines and other machines which need frequent oiling when the machine is in motion, and when the oil cup is so located as to make it dangerous to reach while the machine is in motion, must be equipped with automatic oilers, or some other means must be provided to guard the oiler.

Order 25—Projecting Parts on Shafts. All projecting parts on revolving shafts such as collars, clamps, split links, couplings, etc., where such parts are dangerous and are exposed to contact, must be guarded.

Order 26—Means to Disconnect Power. In each room of a place of employment, where machinery is used, means must be provided by which the power can be disconnected from the machines and line shafts.

Order 32—Locks for Tripping Device. All presses, drop hammers, and other machines which are set in motion with a tripping device, must be so equipped that when not in use or when being adjusted or repaired the trip can be locked or blocked so that it cannot be accidentally tripped.

Exception: Where machines are driven with individual motors and where the switch to such motor is so located that it can be conveniently reached by the operator while operating the machine.

Order 33—Revolving Stock. All revolving stock which projects from the end of machines, such as tool and turret lathes, and automatic machines, must be guarded.

Order 34—Fans. All fans, when exposed to contact, must be guarded.

Order 35—Revolving Drums and Cylinders. All revolving barrels, drums or cylinders, such as rattlers, cleaners, churns, etc., where dangerous and where exposed to contact, must be guarded.

Order 36—Counterweights. All counterweights, where exposed to contact, must be guarded.

Order 37—Overhead Trolleys. All overhead trolleys such as are used in shops, must be so constructed, or so guarded, as to make it impossible for the carriage to jump the track or run off the track at the end or at the switch.

Order 38—Valves, Access to. Where valves in daily use which cannot be operated from the floor are located higher than ten feet above the floor, a platform with stairs or stationary ladder must be provided.

Order 40—Crane Truck Wheels. The truck wheels of all overhead traveling cranes must be guarded.

Order 41—Cranes—Runways. All overhead electric traveling cranes must be equipped with a runway on one side which must extend the full length of the crane bridge. Such runways must be equipped with a substantial railing and toe boards. The cracks between the boards of the floor of such runway or platform must not be wider than $\frac{1}{4}$ inch.

Order 42—Cranes—Switch in Cab. In the cab of every overhead electrical traveling crane a switch must be provided which will enable the operator to cut off the current from the crane.

Order 43—Cranes—Stairway. All overhead electrical traveling cranes must be provided with a stairway or permanent ladder which will give safe access to the crane cab. If stairway is used it must be equipped with a substantial railing. If ladder is used it must extend not less than 4 feet above the floor of the crane cab.

Order 44—Crane Cabs Enclosed. The crane cabs of all overhead electrical traveling cranes must have a solid floor and must be enclosed on sides either with a solid enclosure or a railing to a height of not less than 36 inches. If a railing is used toe boards must be provided.

Order 46—Eye Protection. Where men are doing work whereby any substance is thrown off which may injure the eyes, suitable goggles or spectacles or other efficient guard must be provided by the employer.

Note: The compensation law provides for a penalty of 15 per cent where injury results from the employee's willful failure to use safety devices provided by the employer or to obey any reasonable rule adopted by the employer for the safety of the employees. Where properly fitted goggles are furnished by the employer and where the employee refuses to use the goggles and is injured, the employee will be penalized 15 per cent in awarding compensation. By the term "properly fitted" is meant goggles which fit comfortably over the nose and around the eyes and the lenses are properly spaced for the eyes.

Order 52—Rolls, Wheels and Brushes. All rolls, wheels and brushes when exposed to contact and when they revolve in such a way with regard to other revolving or stationary parts that a person may be accidentally caught and drawn in, must be guarded.

Order 53—Excavations. All excavations, when so located that persons may accidentally fall into them must be guarded and at night must be equipped with a red light. All excavations which are located in sandy or wet soil, or any soil which is liable to cave in must be securely shored up.

Order 55—Pits, Openings in Floor, etc. All pits, manholes, and openings in floors, platforms and sidewalks, must be guarded. If trap doors are used the door and hinges must be flush with the floor and the door must have a rough or non-slip surface.

Order 57—Doorways Near Railroad Tracks. When a doorway or corner of a building is located near a railroad or trolley track so that a person is liable to suddenly and unexpectedly walk out onto the track in front of approaching engine or cars an efficient guard must be installed with a warning sign.

Note: One type of efficient guard in use in many plants consists of a strong bar located at the door or corner and extending across the tracks. When cars are being switched the switchman must go ahead and swing the bar back so that it extends across the door or pathway as a guard. A warning sign and a red light are attached to the bar. Where practicable, the uprights which support the guard should be placed not less than six feet from the tracks in order to provide safe clearance.

Order 58—Walks and Platforms for Overhead Work. Where ladders are not used when oiling overhead shafting and machinery, or doing other overhead work, a runway or platform equipped with toe boards and handrails must be provided. The cracks between the boards of the floor of such runway or platform must not be wider than one-fourth inch. Such runway or platform must be so placed as to make it convenient and safe for the workman to do his work. A permanent ladder, or stairway equipped with handrails must be provided to reach such runway or platform.

Order 59—Trestles and Walks. All trestles on which cars run, which are also used as walkways for men must be equipped with a walkway on the outer edge, so located as

to give safe clearance to cars. Such walkways must be equipped with toe boards and handrails. Where a trestle crosses a driveway or passageway the trestle over such points must be solidly boarded over.

Exception to the above order is made on trestles such as those located in coal or ore yards when the cars dump on the side of the trestle. On such trestles the cars must be automatically dumped where practicable.

Order 203—Circular Saws. All circular saws must be guarded and all such saws used for ripping, other than self feed saws, must be equipped with a splitter. All other saws, where possible, must be equipped with a splitter.

Exception: On saws while specific work is being done where it is impossible to do the work when the saw is guarded.

Extracts from the General Orders on Sanitation

Order 2000—Definitions:

"Pure, Fresh and Clean Air" shall mean air that is both stimulating and refreshing to breathe. It shall not contain noxious gases, dust, fumes, vapor, or other materials in such quantities as to be injurious to the health. It does not necessarily mean outside atmosphere, but shall mean air that contains reasonable quantities or the vital constituents of the atmosphere.

"Ventilating System" shall mean any building construction, machinery or equipment so arranged that "pure, fresh and clean air" is provided for breathing purposes.

"Exhaust System" shall mean any building construction, machinery or equipment so arranged that noxious gases, dusts, fumes, vapor or other materials injurious to the health are removed from, or prevented from contaminating the air any employe must breathe.

Order 2010. Purity of Air. The air, which any employe must breathe, shall be pure, fresh and clean.

Order 2020. Ventilating Systems. Ventilating systems shall be provided for all places of employment where smoke, gas, dust, fumes, vapor, foul air, vitiated air, or industrial poisons are used, stored, handled, or are present in the air in sufficient quantities to obstruct the vision, or to be irritating or to be injurious to health, and when there is available less than 1,000 cubic feet of air space per person. Ventilating systems must replace the air twice each hour and supply an additional amount of air to make up for losses or contamina-

tion of air or oxygen due to the nature of the work being carried on. All ventilating systems shall furnish as a minimum requirement 1,800 cubic feet of pure, fresh and clean air per person each hour.

Order 2021. Exhaust Systems. When Required. Exhaust systems shall be provided for all machines, vats, tanks, furnaces, forges, salamanders, and all equipment and processes which create and throw off dust sufficiently light to float in the air or which omit fumes, gas or smoke in such quantities as to be irritating, or injurious to the health, unless the general ventilating system keeps the air which any employe must breathe, pure, fresh and clean.

Order 2200. Toilet Rooms Required. Every place of employment, whether heretofore or hereafter constructed, shall have adequate toilet rooms, completely enclosed, and so arranged as to insure privacy; except that in foundries, rolling mills, blast furnaces, tanneries, and such other similar buildings as are specified by the Industrial Commission, partitions enclosing toilets shall be at least seven feet high, but need not be carried to the ceiling nor enclosed at the top, provided such ceiling is at least 15 feet high, and provided such toilets are located in rooms where females are not allowed to enter.

Note: The above exception will be permitted even though the ceiling is lower than 15 feet, if local ventilation through the closet bowl is provided in a manner approved by the Industrial Commission or the State Board of Health. Toilet rooms should, if possible, be placed on each occupied floor, especially in factories. Much time may thus be saved.

Order 2203. Number of Closets and Urinals. In every place of employment, whether heretofore or hereafter constructed, one water-closet shall be provided for every 20 persons, or fraction thereof, of either sex.

In addition thereto, where more than 10 males are employed, one urinal shall be provided for every 40 males, or fraction. Where not more than 10 males are employed, either a urinal shall be provided or the water-closet shall have a projecting lip and self-rising seat. Where trough urinals are used, each two feet of trough shall constitute one urinal.

Order 2204. Cleanliness. Every toilet room and every part thereof including walls, floors and ceiling, and all fixtures therein, must be kept clean, efficient and in good repair. In each toilet room sufficient toilet paper must be provided, and

it must be made of material which will not obstruct the fixtures in such toilet rooms.

Order 2206. Existing Toilet Rooms—Walls. In toilet rooms at present installed, the walls must not be covered with paper. If the walls and ceiling are constructed of wood, they must be covered with a non-absorbent paint.

Order 2207. Existing Toilet Rooms—Ventilation. Every toilet room heretofore installed, which is not adequately ventilated by outside windows or skylight, shall be provided with a vent flue of size specified in order 5254, in which a fan shall be placed, if necessary, for proper ventilation.

Every toilet room which cannot be kept sanitary shall be moved so as to be open to outside light and air.

Order 2210—Partitions Between Fixtures. Adjoining water-closets or seats of range closets must be separated by partitions not less than 5 feet in height. Each individual urinal or urinal trough must be provided with a partition at each end and at the back to give privacy. Where individual urinals are arranged in batteries, a partition must be placed at each end and at back of the battery.

Order 2211—Existing Outdoor Toilets. Existing outdoor toilets will be permitted, until public water and sewer systems are available, if they comply with orders 2200 to 2210, inclusive, and in addition are:

- (1) Completely enclosed and separate from any other building.
- (2) Advantageously located from the standpoint of convenience, privacy and sanitation.
- (3) Located on ground that is well-drained, and where there is no possibility of contaminating any drinking water supply.
- (4) Provided with suitable approach, such as concrete, gravel or cinder walk.
- (5) The vault must be made tight above the ground so that flies, rats and other vermin cannot get into it.
- (6) All windows, ventilators, and other openings must be screened to exclude flies, and all doors must be self-closing.
- (7) When the vault is filled to the level of the ground, it must be cleaned out. If a new vault is constructed it must be

made in accordance with the requirements for new installations, and the old vault must be properly cleaned, limed and filled with fresh earth.

(8) The entire installation must be kept clean and sanitary. Milk of lime (freshly slaked lime) or other equally effective disinfectant must be used in the vault and in the urinal trough in sufficient quantities and at frequent intervals. The floors, seats, and urinals must be scrubbed as often as necessary.

Order 2212—When Water and Sewer Become Available. Within one year after water and sewer systems become available, water-closets, urinals, and lavatories shall be provided.

Electrical Construction.

All electrical equipment must be constructed, used and maintained in conformity with the Wisconsin State Electrical Code. Copies of this Code will be supplied by the Industrial Commission, on request.

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