

MAINE STATE LEGISLATURE

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EIGHTY-FIFTH LEGISLATURE

Legislative Document

No. 296

S. P. 320

In Senate, Feb. 4, 1931.

Referred to Committee on Labor and 500 copies ordered printed. Sent down for concurrence.

ROYDEN V. BROWN, Secretary.

Presented by Senator Murchie of Washington.

STATE OF MAINE

IN THE YEAR OF OUR LORD ONE THOUSAND NINE
HUNDRED AND THIRTY-ONE

AN ACT to establish rules and regulations governing compressed air work.

Be it enacted by the People of the State of Maine, as follows:

Chapter fifty-four is hereby amended by adding at the end thereof the following new sections:

Section 1. The following rules and regulations of the Department of Labor and Industry shall apply to all work in the prosecution of which tunnels, caissons or other apparatus or means in which compressed air is employed are used.

GENERAL PROVISIONS

Sect. 2. No work in which compressed air is to be used shall be started until seven days after the firm, corporation, commission or person undertaking such work has notified in writing the Department of Labor and Industry of such contemplated work.

Sect. 3. Whenever the construction work is in progress there shall be present at all times at least one competent person representing the employer, who shall, in all respects, be responsible for full compliance of these regulations, and who shall have authority to require all employees to comply with such regulations.

Sect. 4. In every tunnel or section thereof, or other work requiring the use of compressed air as covered by these regulations, there shall be a competent person designated by person in charge to make a regular inspection once every working day of all tunneling appliances, boilers, engines, compressors, magazines, shaft houses, explosives, locks, lighting circuits and gauges, and it shall be his duty to report in writing to the person designating him, on forms approved by the Department of Labor and Industry the result of these inspections, which shall remain on file and shall be subject to the inspection of the Department of Labor and Industry or its representatives.

HOURS OF LABOR

Sect. 5. Pressure, shifts and intervals. The working time in any twenty-four hours shall be divided into two shifts under compressed air with an interval in open air. The minimum rest interval in open air shall not begin until the employee has reached the open air. Persons who have not previously worked in compressed air shall work therein but one shift during the first twenty-four hours. No person shall be subjected to pressure exceeding fifty pounds per square inch except in emergency. The maximum number of hours, to each shift and minimum open air interval between the shifts during any twenty-four hours for any pressure, as given in columns one and two of the following table, shall be that set opposite such pressure in columns three, four, five and six.

Sect. 6.
 PRESSURE SHIFTS AND INTERVALS OF WORK FOR
 EACH TWENTY-FOUR HOUR PERIOD

Gauge pressure per square inch				Hours	
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
Min. number of pounds	Max. number of pounds	Max. total	Max. first shift in com- pressed air	Min. rest inter- val in open air	Max. 2nd shift in compressed air
Normal	18	8	4	1/2	4
18	26	6	3	1	3
26	33	4	2	2	2
33	38	3	1 1/2	3	1 1/2
38	43	2	1	4	1
43	48	1 1/2	3/4	5	3/4
48	50	1	1/2	6	1/2

The employer may determine the time of each shift when the pressure is less than eighteen pounds, provided that the total for the two shifts does not exceed eight hours.

DECOMPRESSION

Sect. 7. No person employed in compressed air shall be permitted to pass from the place in which the work is being done to normal air, except after decompression in the intermediate lock as follows:

A stage decompression shall be used in which a drop of one-half of the maximum gauge pressure shall be at the rate of five pounds per square inch per minute. The remaining decompression shall be at a uniform rate and the total time of decompression shall equal the time specified for the original maximum pressure.

(a) Where the air pressure is greater than normal and less than fifteen pounds to the square inch, decompression shall be at the minimum rate of three pounds per minute.

(b) Where the air pressure is fifteen pounds or over and less than twenty pounds to the square inch, decompression shall be at the minimum rate of two pounds per minute.

(c) Where the air pressure is twenty pounds or over and less than thirty pounds to the square inch, decompression

shall be at the minimum rate of three pounds every two minutes.

(d) Where the air pressure is thirty pounds or over to the square inch, decompression shall be at the minimum rate of one pound per minute.

The time of decompression shall be posted in each man lock. (See form.)

Sect. 8. Decompression lock shall be in charge of a special employee whose duty it shall be to be in attendance at the lock during the periods of decompression and to regulate the valves controlling the supply of air and the rate of pressure.

Sect. 9. A record of men employed under air pressure shall be kept by a special employee who shall remain outside the lock near the entrance. This record shall show the period of stay in the air chamber of each employee and the time taken for decompression.

GAUGES

Sect. 10. When the pressure exceeds seventeen pounds to the square inch, when practicable to do so, a recording gauge to show the rate of decompression shall be attached to the exterior of each man lock. The dial shall be of such size that the amount of rise or fall in the air pressure, within any five minutes, shall be readily shown.

There shall be on the outer side of each working chamber at least one back pressure gauge, which shall be accessible at all times and shall be kept in accurate working order. Additional fittings shall be provided so that test gauges may be attached at all necessary times. Back pressure gauges shall be tested every twenty-four hours and a record kept of such test.

A competent man shall be placed in charge of the valves and gauges which regulate and show the pressure in the working chamber. He shall not be employed more than eight hours in any twenty-four. At no time shall he operate more than two separate air lines.

TEMPERATURE, LIGHTING, SANITATION

Sect. 11. The following provisions shall be observed in the conduct of air pressure work:

(a) The temperature of all working chambers which

are subjected to air pressure shall, by means of after-coolers or other suitable devices, be maintained constantly at a temperature not to exceed 85 degrees Fahrenheit.

(b) All lighting in compressed air chambers shall be by electricity only. In cases of emergency portable electric lamps shall be used, which shall be provided by the contractor. Lighting in tunnels and working chambers shall be supplied from a different circuit from that supplying lights in shafts.

(c) All passages shall be kept clear and properly lighted.

(d) No nuisance shall be tolerated in the air chamber and smoking shall be strictly prohibited. No animal of any kind for any purpose shall be permitted in air chambers.

COMPRESSOR PLANTS

Sect. 12. A good and sufficient air plant for the compression of air shall be provided to meet not only ordinary conditions, but emergencies, and to provide margin for repairs at all times. The plant shall be capable of furnishing to each working chamber a sufficient air supply for all pressures to enable work to be done as nearly as possible in the dry.

Duplicate air feed pipes shall be installed on all caissons.

AIR SUPPLY, EXHAUST VALVE AND TELEPHONE COMMUNICATION

Sect. 13. The air supply pipe shall be carried to and within one hundred feet of face of tunnel or caisson. The air shall be analyzed at least once in every twenty-four hours, and record of such analysis shall be kept at medical officer's office. The amount of CO₂ shall never exceed one part in one thousand.

Exhaust valves shall be operated at intervals, especially after a blast. The men shall not be permitted to resume work after a blast until the smoke and gas have cleared sufficiently.

There shall be means of communicating by telephone at all times between the working chamber, the outside thereof and the power house on the surface.

SHAFTS, LOCKS, BULKHEADS AND SCREENS

Sect. 14. Whenever a shaft is used, such shaft shall be provided, where space permits, with a safe, proper and suitable staircase for its entire length, with landing platforms not more than twenty feet apart. Where this is impracticable suitable ladders shall be installed, subject to the approval of the Commissioner of Labor and Industry or his representative.

Shafts shall be subjected to a hydrostatic pressure of one hundred pounds per square inch, at which pressure they shall be made absolutely tight and stamped on the outside shell about twelve inches from each flange, showing the pressure to which they have been subjected.

All man shafts shall be properly lighted, as required by the Commissioner of Labor and Industry or his representative.

Locks, reducers and shafting used in connection with caissons shall be riveted construction throughout. The material used in the manufacture shall be not less than one-quarter inch steel plate.

All necessary instruments shall be attached to all caissons and air locks showing the actual air pressure to which men employed therein, are subjected. They shall include pressure gauge, timepiece and thermometer, and shall be accessible to and in charge of a competent person and kept in accurate working order.

All outside caisson air locks shall be provided with a platform not less than forty-two inches wide and provided with a guard rail forty-two inches high.

All caissons, whether circular, square or rectangular in form, more than ten feet in diameter or length, shall be provided with a man lock and shaft for the exclusive use of the men; to be equipped with a timepiece and gauge, to be heated to 70 degrees Fahrenheit during the months when heating is necessary, with valves so arranged that the lock can be operated from within and without.

Locks shall be so located that the distance between the bottom door and water level shall be no less than three feet.

MEDICAL ATTENDANCE AND REGULATIONS

Sect. 15. Any person or corporation, carrying on any tunnel, caisson or other work in the prosecution of which men are employed or permitted to work in compressed air, shall, while such men are so employed, also employ and keep in employment one or more duly qualified physicians to act as medical officer or officers, who shall be in attendance at all times while such work is in progress so as to guarantee constant medical supervision of men employed in compressed air work. Said medical officer shall also be charged with the duty of enforcing the following regulations:

(a) No person shall be permitted to work in compressed air until after he has been examined by such medical officer and reported by such officer to the person in charge thereof as found to be qualified, physically, to engage in such work.

(b) No person not having previously worked in compressed air shall be permitted during the first twenty-four hours of his employment to work for longer than one-half day period (as provided in rules for compressed air work adopted by the Department of Labor and Industry), and after so working shall be re-examined and not permitted to work in a place where the gauge pressure is in excess of fifteen pounds unless his physical condition be reported by the medical officer, as heretofore provided, to be such as to qualify him for such work.

(c) In the event of absence from work, by an employee, for ten or more successive days for any cause, he shall not resume work until he shall have been re-examined by the medical officer, and his physical condition reported as heretofore provided, to be such as to permit him to work in compressed air.

(d) No person known to be addicted to the excessive use of intoxicants shall be permitted to work in compressed air.

(e) After a person has been employed continuously in compressed air for a period of two months he shall be re-examined by the medical officer, and he shall not be allowed, permitted or compelled to work until such examination has been made, and he has been reported, as heretofore provided, as physically qualified to engage in compressed air work.

(f) Such medical officer shall at all times keep a complete

and full record of examinations made by him, which record shall contain dates on which examinations are made and a clear and full description of the person examined, his age and physical condition at the time of examination (including height and weight), also the statement as to the time such person has been engaged in like employment. This medical officer shall also keep an accurate record of any caisson or other disease incapacitating any person for work that shall occur in the operation of a tunnel, caisson or other compartment in which compressed air is used; also a record of all loss of life that shall occur in the operation of a tunnel, caisson or other compartment in which compressed air is used. These records shall be open to the inspection of the Department of Labor and Industry or its representatives, and a copy thereof shall be forwarded to said Department within the forty-eight hours following the occurrence of the accident, death, injury or caisson disease, stating as fully as possible the cause of said death or caisson or other disease and the place where the injured or sick person has been taken, and such further information relative thereto as may be required by said Department.

(g) All men shall have individual lockers of reasonable size, preferably metal lockers.

A separate dry room shall be provided where working clothes may be dried within reasonable time. This room shall be well heated.

One shower bath fitted with regulating valves shall be provided for every eight men coming off shift.

One basin and stopper shall be provided for every eight men coming off shift. Running water shall be supplied.

One toilet and one urinal shall be provided for every twenty men employed on each shift, and protection from the weather shall be afforded.

A sufficient amount of hot and cold water shall be supplied at all times.

A minimum temperature of seventy degrees Fahrenheit shall be maintained at all times in wash and dressing rooms.

Coffee and utensils. A sufficient supply of hot coffee and sugar shall be supplied to men working in compressed air at the termination of shifts and during rest periods. Coffee shall be heated by means other than direct steam. Coffee

containers and cups shall be kept in a clean and sanitary condition at all times. All containers shall be kept covered at all times.

(h) Whenever compressed air work is carried on during the period from October 1 to April 1, a covered passageway shall be provided from the opening into the caisson or tunnel to the lockers or dressing rooms of the employees.

(i) A medical lock at least six feet in height shall be established and maintained in connection with all work in compressed air. Such lock shall be kept properly heated, lighted and ventilated, and shall contain proper medical and surgical equipment. Such lock shall be in charge of the medical officer. Said lock shall be divided into two compartments. Each door shall be provided with a bull's eye and fitted with air valves so arranged to be operated from within and without.

The patient's chamber in the medical air lock shall be so arranged that the patients may be kept under constant observation through a non-shatterable glass window without the necessity of the attendant entering the chamber.

(j) Identification badge. An identification badge, such as approved by the Department of Labor and Industry, shall be furnished to all employees, advising police officials that the employee is a compressed air worker, stating the location of medical lock and stating that in cases of emergency an ambulance surgeon shall remove the patient to the medical lock and not to the hospital.

DAILY INSPECTION

Sect. 16. While work is in progress, a competent person designated therefor, shall make a regular inspection at least once every working day of all engines, boilers, steam pipes, drills, air pipes, air gauges, air locks, dynamos, electric wiring, signalling apparatus, brakes, cages, buckets, hoists, cables, ropes, timbers, supports and all other apparatus and appliances; and he shall immediately upon discovery of any defect, report same in writing to the person present in charge.

TRAVEL

Sect. 17. No employee shall ride on any loaded car, cage, or bucket nor walk up or down any incline or shaft while any car, cage or bucket is above.

EXHAUST VALVES

Sect. 18. Exhaust valves shall be provided, having risers extending to the upper part of chamber, if necessary, and shall be operated at such times as may be required and especially after a blast, and men shall not be required to resume work after a blast until the gas and smoke have cleared.

EXPLOSIVES

Sect. 19. Only experienced men who have been selected and regularly designated by the engineer or superintendent in charge and whose names have been posted in the field office or at the magazine, shall handle, transport, prepare or use dynamite or other high explosives.

(a) The composition of explosives shall be such as to cause the least amount of injurious gases.

(b) All explosives shall be stored in a magazine provided for that purpose, and located far enough from the working-shaft, tunnel, boiler house or engine room so that in case the whole quantity should be exploded there would be no danger, and all explosives in excess of what are needed for one shift shall be kept in the magazine. Such magazine should be fireproof, and so constructed that a modern rifle or pistol bullet cannot penetrate it. A suitable place for thawing powder shall be provided and kept in condition for use. The thawing should be done by the hot water or steam bath method; the use of dry heat is absolutely prohibited. A receptacle for carrying explosives shall not be kept in the same room. A suitable place separated from tunnel or caisson, boilers or engine room shall be provided for preparing charges. One man shall have full charge of magazine.

If the conditions under which the work is being performed make it necessary for the storage of explosives in tunnel or caisson, permission may be granted by the Department of Labor and Industry or its representatives on application of engineer in charge of work with good and sufficient reasons; then only in quantities sufficient for one blast. This certificate shall prescribe the limits to the amount of explosives allowed in the tunnels or caissons at any one time and shall expire after being used.

Explosives and detonators shall be taken separately into the caisson.

After blasting is completed, all explosives and detonators shall be returned at once to the magazine, observing the same rules as when conveyed to the work.

(c) Detonators shall be inserted in the explosives only as required for each round of blasting. Detonators shall not be inserted in the explosives without first making a hole in the cartridge with a sharpened stick. No holes shall be loaded except those to be fired at the next round of blasting. All explosives remaining after loading a round must be removed from the caisson before any wires are connected. Blaster shall use only hard wood rods for tamping and he shall not tamp or load any hole with a metal bar, nor shall the wooden rod have any metal parts.

All lights used when loading shall be of an enclosed type. If electric flash lamps are used, they shall be so constructed that it will not be possible to obtain a difference of potential between any two points on the outside of the lamp casing.

(d) There shall be one blaster in charge of blasting and he shall enforce his orders and directions and personally supervise the fixing of all charges and all other blasting operations and shall use every precaution to insure safety.

When firing by electricity from power or lighting wires, a proper switch shall be furnished with lever down when "off".

The switch shall be fixed in a locked box to which no person shall have access except the blaster. There shall be provided flexible leads or connecting wires not less than five feet in length with one end attached to the incoming lines and the other end provided with plugs that can be connected to an effective ground. After blasting, the switch lever shall be pulled out, the wires disconnected and the box locked before any person shall be allowed to return, and shall remain so locked until again ready to blast.

In the working chamber all electric light wires shall be provided with a disconnecting switch, which must be thrown to disconnect all current from the wires in the working chamber before electric light wires are removed or the charge exploded.

The blaster shall cause a sufficient warning to be sounded and shall be responsible that all persons retreat to safe shelter, before he sets off blast, and shall also see that none return until he reports it safe for them.

He shall report to the foreman and furnish names of all persons refusing to obey his caution.

(e) After the blast is fired, loosened pieces of rock shall be scaled from the sides of the excavation and after the blasting is completed, the entire working chamber shall be thoroughly scaled.

(f) The foreman in charge shall inspect the working chamber and have all loose rock or ground removed and the chamber made safe before proceeding with the work.

(g) Drilling must not be started until all remaining butts of old holes are examined for unexploded charges.

SIGNAL CODES

Sect. 20. Any code of signals used shall be printed and copies thereof, in such languages as may be necessary to be understood by all persons affected thereby, shall be kept posted in a conspicuous place near entrances to work places and in such other places as may be necessary to bring them to the attention of all persons affected thereby.

Effective and reliable signaling devices shall be maintained at all times to give instant communication between the bottom and top of the shaft.

The following code of signals shall be used for the operation of any car, cage or bucket:

1 bell—stop if in motion or hoist if not in motion.

2 bells—lower.

3 bells—run slowly and carefully.

On all work in compressed air, where the whistle and repeating rap are used, the following code shall be used:

1 whistle or rap—hoist.

1 whistle or rap with a rattle—hoist slowly.

2 whistles or raps—come to stop at once.

3 whistles or raps with a rattle—lower slowly.

4 whistles or raps—open high pressure.

4 whistles or raps with a rattle—shut off high pressure.

5 whistles or raps—call person in charge.

6 whistles or raps—lights are out.

7 whistles or raps—lights are all right.

8 whistles or raps—emergency call.

In all cases reply signals, repeating the original signals, must be made before proceeding.

Additional signals to meet local conditions may be adopted.

The minimum size of type to be used in notices shall be not less than one inch in height.

BRACING

Sect. 21. All caissons shall be properly and adequately braced before loading with concrete or other weight.

FIRE PREVENTION

Sect. 22. All reasonable precaution shall be taken against fire hazards and such regulations as may be prescribed by the commissioner for protection against fire shall be promptly complied with.

POSTED COPIES OF THE LABOR LAW

Sect. 23. Copies of such sections of the labor law as apply shall be furnished by the Department of Labor and Industry to the person in charge and posted by him in a conspicuous place at the entrance to each work place.

DEFINITION

Sect. 24. Whenever in the foregoing the words "adequate", "suitable", "proper" or "safe" are used, they shall be understood to mean adequate, suitable, proper or safe in the opinion of the Department of Labor and Industry.

MODIFICATION OR SUSPENSION OF REGULATIONS

Sect. 25. These regulations may be modified or suspended in whole or in part by the Department of Labor and Industry if good and sufficient reason therefor is presented to the Department at a hearing where all parties are given an opportunity to be present or represented.

PENALTY

Sect. 26. Whoever violates any reasonable rule, regulation, order or requirement made by the Department of Labor and Industry under authority hereof shall be punished by a fine of not more than \$100.