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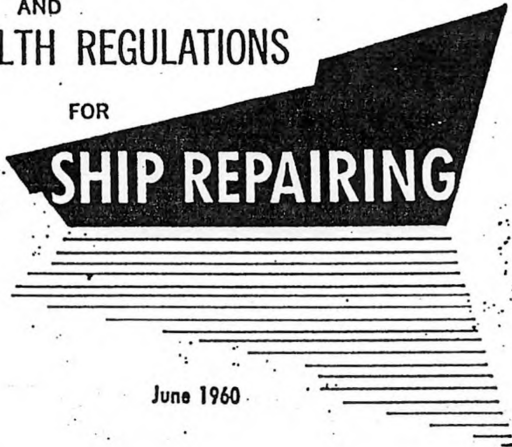
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**SAFETY
AND
HEALTH REGULATIONS**

FOR

SHIP REPAIRING



June 1960

**U.S. DEPARTMENT OF LABOR
James P. Mitchell, Secretary**

**BUREAU OF LABOR STANDARDS
Arthur W. Molley, Director**

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DIVISION OF SAFETY
Robert D. Gidel, Chief

Amendments to these
regulations published in the
Federal Register through
July 28, 1960 are included
in this pamphlet.

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FOREWORD

THIS pamphlet contains safety and health regulations that have been determined by the Secretary of Labor to be reasonably necessary to protect the life, health and safety of employees engaged in longshoring, ship repairing, and related employments covered by section 41 of the Longshoremen's and Harbor Workers' Compensation Act, as amended. These regulations have been issued pursuant to Public Law 85-742, 72 Stat. 835 (amending 44 Stat. 1444; 33 U.S.C. 941), and R.S. 161, 5 U.S.C. 22.

Safety and health regulations for ship repairing have been published in the *Federal Register* and became effective March 21, 1960. For the convenience of all concerned, this pamphlet contains the text of Public Law 85-742, the regulations concerning the granting of variations and the regulations concerning the reporting of injury statistics.

General authority for the administration of these regulations is vested in the Bureau of Labor Standards. Administrative responsibilities are imposed upon the Division of Safety. Functions are carried out through Area, District and Port Offices of the Bureau under the supervision of an Area Supervisor. A current list of such field offices is included in this pamphlet.

These regulations are mandatory with respect to employers subject to the Act, and affected persons should familiarize themselves with the contents of this publication. In this connection, Bureau personnel concerned with the administration of these regulations will extend all possible assistance.

Another function of the Bureau is to provide for the establishment and supervision of programs for the education and training of employers and employees in the recognition, avoidance, and prevention of unsafe work conditions and practices in employments covered by section 41 of the Act, and to consult with and advise employers,

employer organizations, employees, and employee organizations as to the best means of preventing injuries. It is sincerely hoped that management and labor will take cognizance of their responsibilities in this area and fully utilize the services provided by the Bureau. By so doing, it is hoped that the Bureau will be able to assist all concerned in reaching the goal of an accident-free industry.

These regulations were prepared under the direction of the Chief of the Division of Safety, Robert D. Gidel, by Ralph W. Nellerstrom, Chief, Office of Maritime Safety Services, and Patrick F. Cestrone, Assistant Chief, Office of Maritime Safety Services.

ARTHUR W. MOTLEY, DIRECTOR,
BUREAU OF LABOR STANDARDS

Title 29—LABOR

Subtitle A—Office of the Secretary of Labor

PART 8—SAFETY AND HEALTH REGULATIONS FOR SHIP REPAIRING

On July 17, 1959, notice was published in the *Federal Register* (24 F.R. 5742) that the Secretary of Labor proposed to amend Subtitle A of Title 29, Code of Federal Regulations, by adding thereto a new Part 8 promulgating safety and health regulations for ship repairing, pursuant to amended section 41 of the Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1444, 33 U.S.C. 941).

In order that interested persons have opportunity to participate in the rule making process by submission of oral and written data, views and arguments, public hearings for this purpose were held on the proposed regulations at Chicago, Illinois, New Orleans, Louisiana, San Francisco, California, and New York, New York on August 17, August 24, August 31 and September 8, 1959, respectively. After each such hearing, interested parties were afforded copies of the transcript of each hearing and afforded opportunity for the submission of written comments. The time for filing such comments expired October 5, 1959, and the transcript of each hearing, exhibits, written submissions and posthearing proposals and supporting reasons were duly certified by the hearing examiners to the Secretary of Labor on October 6, 1959.

Representatives of 39 employers in the industry, 17 trade associations, 9 labor organizations and the Bureau of Ships, Department of the Navy, the United States Coast Guard and the Maritime Administration participating in the proceedings submitted data, views and arguments. After consideration of all relevant matter submitted, and other information and

materials within my official cognizance, I conclude that the proposed regulations, as hereinafter amended, should be adopted.

The basis and purpose of the regulations of Part 8 is that stated in § 8.1 of Subpart A of Part 8.

Therefore, pursuant to section 4 of the Administrative Procedure Act (60 Stat. 238; 5 U.S.C. 1003), and under authority of Public Law 85-742 (72 Stat. 835), amending section 41 of the Longshoremen's and Harbor Workers' Compensation Act, as amended (44 Stat. 1444; 33 U.S.C. 941), and R.S. 161 (5 U.S.C. 22), Subtitle A of Title 29, Code of Federal Regulations, is hereby amended by adding thereto a new Part 8 to read as follows:

Subpart A—General Provisions

- Sec.
- 8.1 Purpose and authority.
- 8.2 Scope and responsibility.
- 8.3 Definitions.
- 8.4 Penalty.
- 8.5 Variation from the regulations of this part.
- 8.6 Reference specifications, standards, and codes.
- 8.7 Notification of accidents resulting in fatalities or serious injuries.
- 8.8 Amendment of the regulations of this part.

Subpart B—Explosive and Dangerous Atmosphere

- 8.11 Precautions before entering.
- 8.12 Cleaning and other cold work.
- 8.13 Gas freeing before hot work is begun.
- 8.14 Maintaining gas free conditions.
- 8.15 Warning signs.

Subpart C—Surface Preparation and Preservation

- 8.21 Toxic cleaning solvents.
- 8.22 Chemical paint removers.
- 8.23 Mechanical paint removers.
- 8.24 Painting.

Subpart D—Welding, Cutting, and Heating

- Sec.
- 8.31 Ventilation and protection in welding, cutting and heating.
- 8.32 Fire prevention.
- 8.33 Welding, cutting and heating in way of preservative coatings.
- 8.34 Welding, cutting and heating of hollow metal containers and structures not covered by § 8.12 of this part.
- 8.35 Gas welding and cutting.
- 8.36 Arc welding and cutting.
- 8.37 Uses of fissionable material in ship repair.

Subpart E—Scaffolds, Ladders, and Other Working Surfaces

- 8.41 Scaffolds or staging.
- 8.42 Ladders.
- 8.43 Guarding of deck openings.
- 8.44 Access to vessels.
- 8.45 Access to and guarding of dry docks.
- 8.46 Access to cargo spaces.

Subpart F—General Working Conditions

- 8.51 Housekeeping.
- 8.52 Illumination.
- 8.53 Utilities.
- 8.54 Work in confined or isolated spaces.
- 8.55 Work on or in the vicinity of radar and radio.
- 8.56 Work in or on lifeboats.
- 8.57 Health and sanitation.
- 8.58 First aid.

Subpart G—Gear and Equipment for Rigging and Materials Handling

- 8.61 Inspection.
- 8.62 Manila rope and manila rope slings.

- Sec.
 8.63 Wire rope and wire rope slings.
 8.64 Chains and chain slings.
 8.65 Shackles.
 8.66 Hooks.
 8.67 Chain falls.
 8.68 Use of gear.
 8.69 Qualifications of operators.

Subpart H—Tools and Related Equipment

- 8.71 Power tools; general precautions.
 8.72 Portable electric tools.
 8.73 Hand tools.
 8.74 Abrasive wheels.
 8.75 Powder actuated tools.

Subpart I—Personal Protective Equipment

- 8.81 Eye protection.
 8.82 Respiratory protection.
 8.83 Head and foot protection.
 8.84 Life saving equipment.

Appendix I—Threshold Limit Values

AUTHORITY: §§ 8.1 to 8.84 and Appendix I issued under Public Law 85-742, 72 Stat. 835, amending 44 Stat. 1444, 33 U.S.C. 941, and R.S. 161, 5 U.S.C. 22.

SUBPART A—GENERAL PROVISIONS

§ 8.1

PURPOSE AND AUTHORITY

(a) The Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1424; 33 U.S.C. 901 et seq.) provides compensation for injuries suffered by employees when they are working for private employers within the Federal maritime jurisdiction on the navigable waters of the United States, including dry docks. Public Law 85-742, 72 Stat. 835,

approved August 23, 1958, which amends section 41 of the Longshoremen's and Harbor Workers' Compensation Act, as amended (44 Stat. 1444; 33 U.S.C. 941) requires, among other things, that every employer of the aforementioned employees "shall install, furnish, maintain, and use such devices and safeguards with particular reference to equipment used by and working conditions established by such employers as the Secretary may determine by regulation or order to be reasonably necessary to protect the life, health, and safety of such employees, and to render safe such employment and places of employment, and to prevent injury to his employees." It is the purpose of the regulations of this part to carry out the intent of Public Law 85-742.

(b) Pursuant to Public Law 85-742 the regulations of this part do not make determinations with respect to matters under the control of the United States Coast Guard within the scope of Title 52 of the Revised Statutes and Acts supplementary or amendatory thereto (46 U.S.C. 1-1388, passim), including, but not restricted to, the master, ship's officers, crew members, design, construction, and maintenance of the vessel, its gear and equipment; to matters within the regulatory authority of the United States Coast Guard to safeguard vessels, harbors, ports, and waterfront facilities under the provisions of the Espionage Act of June 15, 1917, as amended (40 Stat. 220; 50 U.S.C. 191 et seq.; 22 U.S.C. 401 et seq.); or to matters within the regulatory authority of the United States Coast Guard with respect to lights, warning devices, safety equipment and other matters relating to the promotion of safety of lives and property under section 4(e) of the Outer Continental Shelf Lands Act of August 7, 1953 (67 Stat. 462; 43 U.S.C. 1333).

§ 8.2

SCOPE AND RESPONSIBILITY

(a) The responsibility for compliance with the regulations of

this part is placed upon "employers" as defined in section 8.3(c) of this part.

(b) It is not the intent of the regulations of this part to place additional responsibilities or duties on owners, operators, agents or masters of vessels unless such persons are acting as employers, nor is it the intent of these regulations to relieve such owners, operators, agents or masters of vessels from responsibilities or duties now placed upon them by law, regulation or custom.

§ 8.3

DEFINITIONS

(a) The term "shall" indicates provisions which are mandatory.

(b) The term "Secretary" means the Secretary of Labor.

(c) The term "employer" means an employer any of whose employees are employed, in whole or in part, in ship repair or related employments as defined in this section within the Federal maritime jurisdiction on the navigable waters of the United States, including dry docks and marine railways.

(d) The term "employee" means any ship repairman or other person engaged in ship repair or related employments, within the Federal maritime jurisdiction on the navigable waters of the United States, including dry docks and marine railways, other than the master, ship's officers, crew of the vessel, or any person engaged by the master to repair any vessel under 18 net tons.

(e) The term "gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel including accommodation ladders, gang-planks and brows.

(f) The term "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

(g) For purposes of § 8.44, the term "barge" means an unpowered, flat bottom, shallow draft vessel including scows, catboats and lighters. For purposes of this section, the term does not include ship shaped or deep draft barges.

(h) For purposes of § 8.44, the term "river tow boat" means a shallow draft, low free board, self-propelled vessel designed to tow river barges by pushing ahead. For purposes of this section, the term does not include other towing vessels.

(i) The term "ship repair" means any repair of a vessel including, but not restricted to, alterations, installations, cleaning, painting, and maintenance work.

(j) The term "related employments" means any employments performed as an incident to or in conjunction with ship repair work, including, but not restricted to, inspection, testing and employment as a watchman.

(k) The term "hazardous substance" means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

(l) The term "competent person" means a person who is capable of recognizing and evaluating employee exposure to hazardous substances or to other unsafe conditions and is capable of specifying the necessary protection and precautions to be taken to insure the safety of employees as required by the particular regulation under the condition to which it applies.

(m) The term "confined space" means a compartment of small size and limited access such as a double bottom, tank, cofferdam, or other space which by its confined nature can readily create or aggravate a hazardous exposure.

(n) The term "hot-work" means riveting, welding, burning or other fire or spark producing operations.

(o) The term "cold-work" means any work which does not involve riveting, welding, burning or other fire or spark producing operations.

§ 8.4

PENALTY

(a) As provided in Public Law 85-742, any employer who, willfully, violates or fails or refuses to comply with the provisions of the regulations of this part and any employer or other person who willfully interferes with, hinders, or delays the Secretary or his authorized representative in carrying out his duties under subsection (c) of section 41 of the Act by refusing to admit the Secretary or his authorized representative to any place, or to permit the inspection or examination of any employment or place of employment, or who willfully hinders or delays the Secretary or his authorized representative in the performance of his duties in the enforcement of the regulations of this part, shall be guilty of an offense, and, upon conviction thereof, shall be punished for each offense by a fine of not less than \$100 nor more than \$3,000; and in any case where such employer is a corporation, the officer who willfully permits any such violation to occur shall be guilty of an offense, and, upon conviction thereof, shall be punished also for each offense by a fine of not less than \$100 nor more than \$3,000.

(b) The liability under this provision of Public Law 85-742 shall not affect any other liability of the employer under the Longshoremen's and Harbor Workers' Compensation Act.

§ 8.5

VARIATION FROM THE REGULATIONS OF THIS PART

(a) As provided in Public Law 85-742, in case of practical difficulties or unnecessary hardships, the Secretary in his discretion may grant variations from the regulations of this part or particular provisions thereof, and permit the use of other or different devices if he finds that the purpose of the regulation will be observed by the variation and the safety of employees will be equally secured thereby. Any person af-

ected by such regulations or his agent, may request the Secretary to grant such variation, stating in writing the grounds on which his request is based. Any authorization by the Secretary of a variation shall be in writing, shall describe the conditions under which the variation shall be permitted, and shall be published as provided in section 3 of the Administrative Procedure Act (ch. 324, 60 Stat. 237), as amended. A properly indexed record of all variations shall be kept in the Office of the Secretary and be open to public inspection.

§ 8.6

REFERENCE SPECIFICATIONS, STANDARDS, AND CODES

(a) Specifications, standards, and codes of agencies of the United States Government, to the extent specified in the text, form a part of the regulations of this part. In addition, under the authority vested in the Secretary under the Act, the specifications, standards, and codes of organizations which are not agencies of the United States Government, in effect on the date of the promulgation of the regulations of this part as listed below, to the extent specified in the text, form a part of the regulations of this part:

American Bureau of Shipping, Inc., 45 Broad Street, New York 4, N.Y., Subpart B, § 8.13(a).

Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois, Subpart B, § 8.12(b) and Subpart C, § 8.24(b)(7).

American Standard Safety Code for Portable Wood Ladders, A 14.1—1959, American Standards Association, Inc., 70 East 45th Street, New York 17, N.Y., Subpart E, § 8.42(a)(6).

American Standard Safety Code for Portable Metal Ladders, A 14.2—1956, American Standards Association, Inc., 70 East 45th Street, New York 17, N.Y., Subpart E, § 8.42(a)(4).

American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1—1959, American Standards Association, Inc., 70 East 45th Street, New York 17, N.Y., Subpart I, §§ 8.81(a)(1), 8.83(b).

§ 8.7

NOTIFICATION OF ACCIDENTS RESULTING IN FATALITIES OR SERIOUS INJURIES

(a) Within 48 hours after the occurrence of an accident causing the death of an employee or resulting in an employee's admission to a hospital as a bed patient, the employer shall file a copy of Bureau of Employees' Compensation Form US-202 (approved by Budget Bureau No. 44-R 887.2) with the Field Safety Consultant of the Bureau of Labor Standards serving the area where the accident occurred (in addition to such filing as is required by 20 CFR 31.3) unless prior thereto and as soon after the accident as feasible the employer has given oral or written notice of the accident to the person in charge of such office in sufficient detail to permit the accident to be identified readily. [44 Stat. 1444; 33 U.S.C. 930]

§ 8.8

AMENDMENT OF THE REGULATIONS OF THIS PART

The Secretary may at any time, upon his own motion or upon written petition of any interested person setting forth reasonable grounds therefor, and after opportunity has been given to interested persons to present their views, amend or revoke any of the provisions of the regulations of this part.

SUBPART B—EXPLOSIVE and DANGEROUS ATMOSPHERES

§ 8.11

PRECAUTIONS BEFORE ENTERING

(a) Gassy atmospheres. (1) Before employees are initially permitted to enter any of the following ship's spaces either the atmosphere shall be considered to be immediately dangerous to life and the employees shall be protected in accordance with the provisions of § 8.82(a) and (b) or the

atmosphere shall be tested by a competent person to ensure that it is safe.

(i) Cargo spaces or other spaces containing, or having last contained combustible or flammable liquids or gases in bulk.

(ii) Cargo spaces or other spaces containing or having last contained bulk liquid or gas cargoes of a poisonous, corrosive, or irritant nature.

(iii) Spaces immediately above or adjacent to those described in subdivisions (i) and (ii) of this subparagraph.

(iv) Spaces that have been fumigated.

(2) If the atmosphere is found to be safe, the provisions of § 8.12 shall apply.

(b) Oxygen deficient atmospheres. (1) Before employees are permitted to enter any spaces not covered by paragraph (a)(1) of this section, or any sealed compartments or other spaces which have been in a state of preservation, or any poorly ventilated compartments which have been freshly painted, either the atmosphere shall be considered to be immediately dangerous to life and the employees shall be protected in accordance with the provisions of § 8.82 (a) and (b), or the atmosphere shall be tested with an oxygen indicator or other suitable device to ensure that it contains sufficient oxygen to sustain life.

(2) For purposes of this paragraph, an atmosphere containing 16.5 percent oxygen, or capable of supporting a flame shall be considered to contain sufficient oxygen to sustain life.

(3) Mechanical ventilation which will provide at least one complete change of uncontaminated air may be substituted in lieu of either of the requirements of subparagraph (1) of this paragraph.

§ 8.12

CLEANING AND OTHER COLD WORK

(a) Employees shall be permitted to perform manual cleaning to remove scale and debris or other cold work in

spaces described in § 8.11(a)(1) (i) through (iv) before they have been certified as gas-free only under the following conditions:

(1) A competent person shall determine that the atmosphere is safe and that any hazardous atmospheric condition that might develop would arise only from residues capable of producing dangerous gases but not to the extent of creating an atmosphere immediately dangerous to life.

(2) Either continuous natural or mechanical ventilation shall be provided sufficient to maintain a safe atmosphere in the breathing zone of employees, or the employees shall be protected by suitable filter type respiratory protective equipment meeting the requirements of § 8.82 (a) and (c) while in the space.

(3) Cold work only shall be permitted.

(b) In spaces described in paragraph (a) of this section, only approved explosion-proof, self-contained battery fed portable lamps shall be used. Portable lamps bearing the approval of the Underwriters' Laboratories for use in Class I, Group D, or approved as permissible by the U.S. Bureau of Mines, and lamps listed by the U.S. Coast Guard as approved for such use are deemed to meet the requirements of this paragraph.

§ 8.13

GAS FREEING BEFORE HOT WORK IS BEGUN

(a) Employees shall not be permitted to engage in hot work or the use of powder actuated tools on any vessel in or on the boundaries of cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk, or in spaces adjacent thereto, or on lines and fittings connected to any of the foregoing spaces until a certificate setting forth that the hot work can be done in safety is issued. Such certificate shall be acceptable only if issued by a gas chemist certificated by the American Bureau of Shipping, except that a certificate issued by another person authorized by the U.S. Coast Guard pursuant to the

provisions of 46 CFR 35.01-1(1) for tank vessels, 46 CFR 71.60-1(a)(1) for passenger vessels, and 46 CFR 91.50-1(a)(1) for cargo and miscellaneous vessels is acceptable for a particular inspection.

§ 8.14

MAINTAINING GAS FREE CONDITIONS

The following rules shall apply in maintaining gas free conditions:

(a) Pipe lines which may convey hazardous substances into the spaces certified "Safe For Men—Safe For Fire" shall be disconnected or blanked off, or other positive means shall be used to prevent discharge of hazardous substances from entering the space. Manholes and other closures, which were secured when tests were made shall remain secured. If such manholes or other closures are opened or any manipulation of valves takes place which tends to alter existing conditions, work in the affected spaces or areas shall be stopped and not resumed until such time as the area has been retested and again certified "Safe For Men—Safe For Fire" in accordance with the requirements of § 8.13.

(b) Before hot work is commenced on the weather deck over spaces which, under these regulations, are not required to be gas freed or inerted, all valves, closures and vents, except those which are vented up masts, connecting with non-gas free tanks or compartments below, shall be closed. Valves, closures and vents shall not be opened until hot work is completed unless the hot work is stopped and the work location posted as unsafe for fire. The latter notice shall not be removed nor hot work resumed until the area is again made safe.

(c) The employer shall inform masters and chief engineers of vessels of the provisions of this section and shall confirm that they are aware of their responsibilities for seeing that their crews understand and obey all warning signs, tags, and the limitations stated on the gas free certificates.

(d) When conditions in a tank are such that there is a

possibility of hazardous vapor being released from residues or other sources after a gas-free certificate has been issued; a competent person shall make tests to ensure that the gas-free condition is maintained irrespective of whether hot work is being performed in the tank. When the competent person finds that atmospheric conditions have altered, work shall be stopped and a new gas-free certificate in accordance with the requirements of § 8.13 shall be obtained before work is resumed.

(e) Before hot work is begun on any metal covered with preservative coatings the requirements of § 8.33 shall be met.

(f) When tests for hazardous atmospheres are made by the employer, the employer shall maintain a record of the date, time, location and results of the tests until such time as the work is safely completed.

§ 8.15

WARNING SIGNS

(a) Except as provided in paragraph (c) of this section, all tanks, compartments, or spaces which have been certified "Safe For Men—Not Safe For Fire," or "Not Safe For Men—Not Safe For Fire" shall be plainly and conspicuously marked with paint or signs indicating that no hot work shall be performed on such tanks, compartments, or spaces or in the vicinity thereof.

(b) Except as provided in paragraph (c) of this section, all tanks, compartments, or spaces which have been inerted with gas shall be plainly and conspicuously marked with paint or signs indicating that the tank, compartment, or space contains a gas which will not support life.

(c) The warning marks or signs required by paragraphs (a) and (b) of this section need not be posted on individual tanks, compartments or spaces if the entire vessel has been certified "Safe For Men—Not Safe For Fire," "Not Safe For Men—Not Safe For Fire," or if the entire vessel has been inerted, and if a sign to this effect is conspicuously

posted at the gangway and at all other means of access to the vessel.

SUBPART C—SURFACE PREPARATION and PRESERVATION

§ 8.21

TOXIC CLEANING SOLVENTS

(a) Before any solvents are used, the employer shall ascertain, whenever possible, the toxic properties of such solvents and shall employ at least one of the following measures to safeguard the health of employees exposed to toxic solvents.

(1) The cleaning operation shall be completely enclosed to prevent the escape of vapor into the working space.

(2) Either natural ventilation or mechanical exhaust ventilation shall be used to remove the vapor at the source and to dilute the concentration of vapors in the working space to the point at which an unsafe concentration does not exist.

(3) Employees shall be protected by suitable respiratory protective equipment in accordance with the requirements of § 8.82 (a) and (c).

(b) The Table of Threshold Limit Values set forth in Appendix I shall be used as a guide in determining safe concentrations of vapors.

(c) When the toxic properties of a solvent cannot be ascertained or the concentration of its vapors cannot be determined, employees shall be protected by respiratory protective equipment in accordance with the requirements of § 8.82 (a) and (c).

(d) The employer shall advise the employees who are exposed to solvents of the hazardous nature of the solvents and of the measures taken to safeguard their health.

§ 8.22.

CHEMICAL PAINT REMOVERS

(a) Employees shall be protected against skin contact during the handling and application of chemical paint removers.

Where there is a hazard from flying or splashing particles, employees shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 8.81(a).

(b) The following additional precautions shall be taken when applicable, depending upon the type of solvent used.

(1) When using flammable paint removers with low flash points, such as those containing benzol, amyl acetate and acetone, the following special precautions shall be taken to prevent fire.

(i) Smoking, open flames, arcs and spark-producing equipment shall be prohibited in the area.

(ii) Ventilation shall be provided in sufficient quantities to keep the concentration of vapors below ten (10) percent of their lower explosive limit.

(iii) Solvent soaked rags and scrapings shall be kept in a covered metal container.

(2) When using paint removers which contain volatile and toxic solvents, such as benzol, acetone, and amyl acetate, the provisions of § 8.21 shall be applicable.

(3) When using paint and rust removers containing strong acids or alkalies, employees shall be protected by suitable face shields to prevent chemical burns on the face and neck.

(4) When steam guns are used, all employees working within range of the blast shall be protected by suitable face shields. Metal parts of the steam gun itself shall be insulated to protect the operator against heat burns.

§ 8.23

MECHANICAL PAINT REMOVERS

(a) Power tools. (1) Employees engaged in the removal of paints, preservatives, rusts or other coatings by means of power tools shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 8.81(a).

(2) All portable rotating tools used for the removal of paints, preservatives, rusts or other coatings shall be ade-

quately guarded to protect both the operator and nearby workers from flying missiles.

(3) Portable electric tools shall be grounded in accordance with the requirements of § 8.72.

(4) In a confined space, mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum shall be used, or employees shall be protected by respiratory protective equipment in accordance with the requirements of § 8.82 (a) and (d).

(b) Prohibition of flame removal. (1) Preservative coatings shall not be removed by flame from accessible surfaces. When preservative coatings containing toxic materials specified in § 8.31(c) (1) and (2) must be removed from surfaces which are inaccessible to any method of removal other than by flame, removal by flame is permissible provided that precautions are taken as required by § 8.31(c) (1) and (2).

(c) Abrasive blasting—(1) Equipment. Hoses and fittings used for abrasive blasting shall meet the following requirements:

(i) Hoses. Hose of a type to prevent shocks from static electricity shall be used.

(ii) Hose Couplings. Hose lengths shall be joined by metal couplings secured to the outside of the hose to avoid erosion and weakening of the couplings.

(iii) Nozzles. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally.

(2) Replacement. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

(3) Personal protective equipment.

(i) Abrasive blasters shall be protected by hoods and airline respirators or air helmets of a positive pressure type in accordance with the requirements of § 8.82(a).

(ii) Employees, other than blasters, including machine tenders and abrasive recovery men, working in areas where unsafe concentrations of abrasive materials and dusts are present shall be protected by eye and respiratory protective equipment in accordance with the requirements of §§ 8.81 (a) and (b) and 8.82 (a) and (d).

(iii) The blaster shall be protected against injury from exposure to the blast by appropriate protective clothing, including gloves.

(iv) Since surges from drops in pressure in the hose line can be of sufficient proportions to throw the blaster off the staging, the blaster shall be protected by a safety belt when blasting is being done from elevations where adequate protection against falling cannot be provided by railings.

§ 8.24

PAINTING

(a) *Paints mixed with toxic vehicles or solvents.* (1) When paints mixed with toxic vehicles or solvents are sprayed, the following conditions shall apply:

(i) In confined spaces, employees continuously exposed to such spraying shall be protected by airline respirators in accordance with the requirements of § 8.82(a).

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by airline respirators in accordance with the requirements of § 8.82(a). Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of § 8.82 (a) and (e).

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of § 8.82 (a) and (e).

(2) Where brush application of paints with toxic solvents is done in confined spaces, or other areas where lack of ventilation creates a hazard, employees shall be protected by filter respirators in accordance with the requirements of § 8.82 (a) and (c).

(3) In all cases in which paints produce flammable vapor sufficient ventilation, either mechanical or natural, to keep the concentration of flammable vapors below ten (10) percent of the lower explosive limit shall be provided.

(b) *Paints and tank coatings dissolved in highly volatile, toxic and flammable solvents.* Several organic coatings, adhesives and resins are dissolved in highly toxic, flammable and explosive solvents with flash points below 80° F. Work involving such materials shall be done only when all of the following special precautions have been taken:

(1) Sufficient exhaust ventilation shall be provided to keep the concentration of solvent vapors below ten (10) percent of the lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(2) If the ventilation fails or if the concentration of solvent vapor rises above ten (10) percent of the lower explosive limit, painting shall be stopped and the compartment shall be evacuated until the concentration again falls below ten (10) percent of the lower explosive limit. If the concentration does not fall when painting is stopped, additional ventilation to bring the concentration down to ten (10) percent of the lower explosive limit shall be provided.

(3) Ventilation shall be continued after the completion of painting until the space or compartment is gas free. The final determination as to whether the space or compartment is gas free shall be made after the ventilating equipment has been shut off for at least ten minutes.

(4) Exhaust ducts shall discharge clear of working areas and away from sources of possible ignition. Periodic tests shall be made to ensure that the exhausted vapors are not accumulating in other areas within or around the vessel or dry dock.

(5) All motors and control equipment shall be of the explosion-proof type with non-ferrous fan blades. Air ducts shall also be of non-ferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(6) Only non-sparking paint buckets, spray guns and tools shall be used. Metal parts of paint brushes and rollers shall be insulated. Staging shall be erected in a manner which ensures that it is non-sparking.

(7) Only explosion-proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard, shall be used.

(8) A competent person shall inspect all power cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty (50) feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(9) The face, eyes, head, hands and all other exposed parts of the bodies of employees handling such highly volatile paints shall be protected. All footwear shall be non-sparking, such as rubbers, rubber boots or rubber soled shoes without nails. Coveralls or other outer clothing shall be of cotton. Rubber, rather than plastic, gloves shall be used because of the danger of static sparks.

(10) No matches, lighted cigarettes, cigars, or pipes, and no cigarette lighters or ferrous articles shall be taken into the area where work is being done.

(11) All solvent drums taken into the compartment shall be placed on non-ferrous surfaces and shall be grounded to the vessel. Metallic contact shall be maintained between containers and drums when materials are being transferred from one to another.

(12) Spray guns, paint pots, and metallic parts of connecting tubing shall be electrically bonded, and the bonded assembly shall be grounded to the vessel.

(13) All employees continuously in a compartment in which such painting is being performed, shall be protected by airline respirators in accordance with the requirements of § 8.82(a). Employees entering such compartments for

a limited time shall be protected by filter cartridge type respirators in accordance with the requirements of § 8.82 (a) and (e).

(14) All employees doing exterior paint spraying with such paints shall be protected by suitable filter cartridge type respirators in accordance with the requirements of § 8.82 (a) and (e).

SUBPART D—WELDING, CUTTING, and HEATING

§ 8.31

VENTILATION AND PROTECTION IN WELDING, CUTTING, AND HEATING

(a) *Mechanical ventilation; requirements.* (1) For purposes of this section, mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen from a cylinder or torch shall not be used for ventilation purposes.

(b) *Welding, cutting and heating in confined spaces.* (1) Except as provided in paragraphs (b)(3) and (c)(2) of this section, either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

(2) More than one means of access shall be provided to a confined space except in cases in which the U.S. Coast Guard prohibits, or the structure of the vessel makes impracticable, additional openings. The ventilating ducts shall be of such a type and so arranged as to permit free passage of an employee through at least two of these means of access.

(3) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of § 8.82(a), and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(c) *Welding, cutting or heating of metals of toxic significance.* (1) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section.

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals.

(iii) Cadmium-bearing filler materials.

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(2) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with local exhaust ventilation in accordance with the requirements of paragraph (a) of this

section or employees shall be protected by air-line respirators in accordance with the requirements of § 8.82(a). Employees performing such operations in the open air shall be protected by a filter type respirator in accordance with requirements of paragraph (a) and subdivision (d)(iv) of § 8.82.

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.

(ii) Cadmium-bearing or cadmium coated base metals.

(iii) Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(3) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(d) *Inert-gas metal-arc welding.* (1) Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken:

(i) The use of chlorinated solvents shall be kept at least two hundred (200) feet from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

(ii) Helpers and other employees in the area not protected from the arc by screening as provided in § 8.36(e) shall be protected by filter lenses meeting the requirements of § 8.81 (a) and (c). When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type meeting the requirements of § 8.81 (a) and (c) shall be worn under welding helmets or hand shields to protect the welder against flashes and radiant energy when either the helmet is lifted or the shield is removed.

(iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

(iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of paragraph (c)(2) of this section shall be met to protect against dangerous concentrations of nitrogen dioxide.

(e) General welding, cutting and heating. (1) Welding, cutting and heating not involving conditions or materials described in paragraphs (b), (c) or (d) of this section may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

(2) Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of § 8.81 (a) and (c).

§ 8.32¹

FIRE PREVENTION

(a) When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place.

(b) If the object to be welded, cut or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag and to protect the immovable fire hazards from them.

(c) No welding, cutting or heating shall be done where

¹ 46 CFR 146.02-20 contains Coast Guard regulations pertaining to welding and cutting while explosives and dangerous cargoes are being handled.

the application of flammable paints or the presence of other flammable compounds or of heavy dust concentrations creates a hazard.

(d) Suitable fire extinguishing equipment shall be available and shall be maintained in a state of readiness for instant use.

(e) When the welding, cutting or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting or heating operations are being performed and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists.

(f) When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(g) In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during the lunch hour. Overnight the torch and hose shall be removed from the confined space.

§ 8.33

WELDING, CUTTING AND HEATING IN WAY OF PRESERVATIVE COATINGS

(a) All accessible surfaces, seams and points to be welded, cut or heated shall first be stripped of all toxic or flammable hardened preservative coatings, except platings such as galvanizing, for a distance of at least four (4) inches from the area of heat application.

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(b) When welding, cutting or other heating must be done in locations inaccessible to removal of preservatives containing toxic materials, the precautions specified in section 8.31(c) (1) and (2) shall be taken.

(c) Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken.

(1) A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will insure that the welding, cutting or heating can be performed in safety.

(2) The preservative coatings shall be removed for a sufficient distance from the area to be heated to insure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heated area may be used to limit the size of the area required to be cleaned.

(d) Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapors are being produced by the coatings. If such vapors are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to insure that the operation can be resumed safely.

(e) A record of the date, time, location and results of the tests required by paragraphs (c) and (d) of this section shall be maintained until such time as the work is safely completed.

(f) The application of heat or flame to melt or facilitate the removal of preservative coatings is prohibited.

§ 8.34

WELDING, CUTTING, AND HEATING OF HOLLOW METAL CONTAINERS AND STRUCTURES NOT COVERED BY § 8.12 OF THIS PART

(a) Drums, containers or hollow structures which have contained flammable substances shall be thoroughly cleaned of such substances before welding, cutting or heating is undertaken on them.

(b) If, after being cleaned, a drum, container or hollow structure is filled with water, before heat is applied, a vent or opening located above the water level shall be provided for the release of any built-up pressure during the application of heat.

(c) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

(d) Objects such as those listed in paragraph (c) of this section shall also be inspected to determine whether water or other non-flammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

(e) Jacketed vessels shall be vented before and during welding, cutting or heating operations so as to release any pressure which may build up during the application of heat.

§ 8.35

GAS WELDING AND CUTTING

(a) *Transporting, moving and storing compressed gas cylinders.* (1) Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.

(2) When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings.

(3) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

(4) When cylinders are transported by vehicle, they shall be secured in position.

(5) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(6) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(7) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

(8) The cylinder valves shall be closed before cylinders are moved, when the work is finished, or when the cylinders are empty.

(b) *Placing cylinders.* (1) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(2) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(3) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

(4) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(c) *Treatment of cylinders.* (1) Cylinders, whether full or empty, shall not be used as rollers or supports.

(2) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.

(3) No damaged or defective cylinder shall be used.

(d) *Use of fuel gas.* The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(1) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.

(2) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on acetylene cylinders shall not be opened more than $1\frac{1}{2}$ turns. Where a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of an acetylene cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(3) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off

valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(4) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(5) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.

(6) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

(e) **Manifolds.** (1) Manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(2) All manifolds shall be placed in safe and accessible locations.

(3) Manifold hose connections shall be such that hose cannot be interchanged between fuel gases and oxygen manifolds. Adaptors shall not be used to permit the interchange of hose. Manifold hose connections shall be kept free of grease and oil.

(f) **Hose.** (1) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which

would permit the flow of one gas into the other gas passage, shall not be used.

(2) When parallel sections of oxygen and acetylene hose are taped together, not more than four (4) inches out of eight (8) inches shall be covered by tape.

(3) All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift.

(4) Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used.

(5) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(6) Boxes used for the stowage of gas hose shall be ventilated.

§ 8.36

ARC WELDING AND CUTTING

(a) **Manual electrode holders.** (1) Only manual electrode holders which are specifically designed for arc welding and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used.

(2) Any current carrying parts passing through the portion of the holder which the welder grips in his hand shall be fully insulated against the maximum voltage encountered to ground.

(b) **Welding cables and connectors.** (1) All welding cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the welder is working.

(2) Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(3) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(4) Cables in poor repair shall not be used. When a cable, other than the cable lead referred to in subparagraph (2) of this paragraph, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

(c) *Ground returns and machine grounding.* (1) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the welding unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(2) Structures or pipe lines, except pipe lines containing gases or flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by subparagraph (1) of this paragraph.

(3) When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.

(4) When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

(5) The frames of all arc welding machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(6) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(d) *Operating instructions.* Employers shall instruct employees in the safe means of arc welding as follows:

(1) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(2) Hot electrode holders shall not be dipped in water, since to do so may expose the welder to electric shock.

(3) When the welder has occasion to leave his work or to stop work for any appreciable length of time, or when the welding machine is to be moved, the power supply switch to the equipment shall be opened.

(4) Any faulty or defective equipment shall be reported to the supervisor.

(e) *Shielding.* Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

§ 8.37

USES OF FISSIONABLE MATERIAL IN SHIP REPAIR

(a) In ship repair and related activities involving the use of and exposure to sources of ionizing radiation not only on conventionally powered but also on nuclear powered vessels, the applicable provisions of the Atomic Energy Commission's Standards for Protection Against Radiation (10 CFR Part 20), relating to protection against occupational radiation exposure, shall apply.

(b) Any activity which involves the use of radioactive material, whether or not under license from the Atomic Energy Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

SUBPART E—SCAFFOLDS, LADDERS, and OTHER WORKING SURFACES

§ 8.41

SCAFFOLDS OR STAGING

(a) *General requirements.* (1) All scaffolds and their supports, whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4).

(2) All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine or short fiber lumber is prohibited.

(3) Lumber dimensions as given in this subpart are nominal except where given in fractions of an inch.

(4) All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.

(5) Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.

(6) Barrels, boxes, loose tile blocks, loose piles of bricks or other unstable objects shall not be used for the support of planking intended as scaffolds or working platforms.

(7) No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

(8) No welding, burning, riveting or open flame work shall be performed on any staging suspended by means of fiber rope.

(b) *Independent pole wood scaffolds.* (1) All pole up-rights shall be set plumb. Poles shall rest on a foundation of sufficient size and strength to distribute the load and to prevent displacement.

(2) In light-duty scaffolds not more than 24 feet in height, poles may be spliced by overlapping the ends not less than 4 feet and securely nailing them together. A substantial cleat shall be nailed to the lower section to form a support for the upper section except when bolted connections are used.

(3) All other poles to be spliced shall be squared at the ends of each splice, abutted, and rigidly fastened together by not less than two cleats securely nailed or bolted thereto. Each cleat shall overlap each pole end by at least 24 inches and shall have a width equal to the face of the pole to which it is attached. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the pole.

(4) Ledgers shall extend over two consecutive pole spaces and shall overlap the poles at each end by not less than 4

TABLE E-1
DIMENSIONS AND SPACING OF TOOD INDEPENDENT-POLE SCAFFOLD MEMBERS

Structural Members	Light duty (Up to 25 pds. per square foot)			Heavy duty (25 to 75 pds. per square foot)		
	Height in feet			Height in feet		
	24 or less	24-40	40-60	24 or less	24-40	40-60
Poles or uprights (in inches).....	2x4	3x4 or 2x6	4x4	3x4	4x4	4x6
Bearers (in inches)....	2x6	2x6	2x6	2x6	2x6	2x10
Ledgers (in inches)....	2x6	2x6	2x6	2x6	2x6	2x6
Stringers (not sup- porting bearers) (in inches).....	1x6	1x6	1x6	1x6	1x6	1x6
Braces (in inches)....	1x4	1x6	1x6	1x6	1x6	1x6
Pole spacing - long- itudinally (in ft.)..	7-1/2	7-1/2	7-1/2	7	7	7
Pole spacing - trans- versely (in feet)....	6-1/2 min.	7-1/2 min.	8-1/2 min.	6-1/2	10	10
Ledger spacing - ver- tically (in feet)....	7	7	7	4-1/2	4-1/2	4-1/2

inches. They shall be left in position to brace the poles as the platform is raised with the progress of the work. Ledgers shall be level and shall be securely nailed or bolted to each pole and shall be placed against the inside face of each pole.

(5) All bearers shall be set with their greater dimension vertical and shall extend beyond the ledgers upon which they rest.

(6) Diagonal bracing shall be provided between the parallel poles, and cross bracing shall be provided between the inner and outer poles or from the outer poles to the ground.

(7) Minimum dimensions and spacing of members shall be in accordance with Table E-1.

(8) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(9) Backralls and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(c) Independent pole metal scaffolds. (1) Metal scaffold members shall be maintained in good repair and free of corrosion.

(2) All vertical and horizontal members shall be fastened together with a coupler or locking device which will form a positive connection. The locking device shall be of a type which has no loose parts.

(3) Posts shall be kept plumb during erection and the scaffold shall be subsequently kept plumb and rigid by means of adequate bracing.

(4) Posts shall be fitted with bases supported on a firm foundation to distribute the load. When wooden sills are used, the bases shall be fastened thereto.

(5) Bearers shall be located at each set of posts, at each level, and at each intermediate level where working platforms are installed.

(6) Tubular bracing shall be applied both lengthwise and crosswise as required.

(7) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(8) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(d) Wood trestle and extension trestle ladders. (1) The use of trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet is prohibited. The total height of base and extension may, however, be more than 20 feet.

(2) The minimum dimensions of the side rails of the trestle ladder, or the base sections of the extension trestle ladder, shall be as follows:

(i) Ladders up to and including those 16 feet long shall have side rails of not less than $1\frac{1}{2}$ x $2\frac{1}{4}$ inch lumber.

(ii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than $1\frac{1}{2}$ x 3 inch lumber.

(3) The side rails of the extension section of the extension trestle ladder shall be parallel and shall have minimum dimensions as follows:

(i) Ladders up to and including 12 feet long shall have side rails of not less than $1\frac{1}{2}$ x $2\frac{1}{4}$ inch lumber.

(ii) Ladders over 12 feet long and up to and including those 16 feet long shall have side rails of not less than $1\frac{1}{2}$ x $2\frac{1}{2}$ inch lumber.

(iii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than $1\frac{1}{2}$ x $2\frac{1}{4}$ inch lumber.

(4) Trestle ladders and base sections of extension trestle ladders shall be so spread that when in an open position the spread of the trestle at the bottom, inside to inside, shall be not less than $5\frac{1}{2}$ inches per foot of the length of the ladder.

(5) The width between the side rails at the bottom of the trestle ladder or of the base section of the extension trestle ladder shall be not less than 21 inches for all ladders and

sections 6 feet or less in length. For longer lengths of ladder the width shall be increased at least 1 inch for each additional foot of length. The width between the side rail of the extension section of the trestle ladder shall be not less than 12 inches.

(6) In order to limit spreading, the top ends of the side rails of both the trestle ladder and of the base section of the extension trestle ladder shall be beveled, or of equivalent construction, and shall be provided with a metal hinge.

(7) A metal spreader or locking device to hold the front and back sections in an open position, and to hold the extension section securely in the elevated position, shall be a component of each trestle ladder or extension trestle ladder.

(8) Rungs shall be parallel and level. On the trestle ladder, or on the base section of the extension trestle ladder, rungs shall be spaced not less than 8 inches nor more than 18 inches apart; on the extension section of the extension trestle ladder, rungs shall be spaced not less than 6 inches nor more than 12 inches apart.

(9) Platform planking shall be in accordance with the requirements of paragraph (h) of this section, except that the width of the platform planking shall not exceed the distance between the siderails.

(10) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(e) Painters' suspended scaffolds. (1) The supporting hooks of swinging scaffolds shall be constructed to be equivalent in strength to mild steel or wrought iron, shall be forged with care, shall be not less than $\frac{3}{8}$ inch in diameter, and shall be secured to a safe anchorage at all times.

(2) The ropes supporting a swinging scaffold shall be equivalent in strength to first-grade $\frac{3}{4}$ inch diameter manila rope properly rigged into a set of standard 6 inch blocks consisting of at least one double and one single block.

(3) Manila and wire ropes shall be carefully examined

before each operation and thereafter as frequently as may be necessary to ensure their safe condition.

(4) Each end of the scaffold platform shall be supported by a wrought iron or mild steel stirrup or hanger, which in turn is supported by the suspension ropes.

(5) Stirrups shall be constructed so as to be equivalent in strength to wrought iron $\frac{3}{4}$ inch in diameter.

(6) The stirrups shall be formed with a horizontal bottom member to support the platform, shall be provided with means to support the guardrail and midrail and shall have a loop or eye at the top for securing the supporting hook on the block.

(7) Two or more swinging scaffolds shall not at any time be combined into one by bridging the distance between them with planks or any other form of platform.

(8) No more than two men shall be permitted to work at one time on a swinging scaffold built to the minimum specifications contained in this paragraph. Where heavier construction is used, the number of men permitted to work on the scaffold shall be determined by the size and the safe working load of the scaffold.

(9) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(10) The swinging scaffold platform shall be one of the three types described in subparagraphs (11), (12) and (13) of this paragraph.

(11) The ladder-type platform consists of boards upon a horizontal ladder-like structure, referred to herein as the ladder, the side rails of which are parallel. If this type of platform is used the following requirements shall be met:

(i) The width between the side rails shall be no more than 20 inches.

(ii) The side rails of ladders in ladder-type platforms shall be equivalent in strength to a beam of clear straight-grained spruce of the dimensions contained in Table E-2.

(iii) The side rails shall be tied together with tie rods.

TABLE E-2
SPECIFICATIONS FOR SIDE RAILS OF LADDERS

Length (in feet)	Cross section (in inches)	
	At ends	At center
15.....	1½ x 2¾	1½ x 3¾
16.....	1½ x 2¾	1½ x 3¾
18.....	1½ x 3	1½ x 4
20.....	1½ x 3	1½ x 4
24.....	1½ x 3	1½ x 4½

The tie rods shall be not less than $\frac{1}{2}$ inch in diameter, located no more than 5 feet apart, pass through the rails, and be riveted up tight against washers at both ends.

(iv) The rungs shall be of straight-grained oak, ash, or hickory; not less than $1\frac{1}{2}$ inches diameter, with $\frac{1}{2}$ inch tenons mortised into the side rails not less than $\frac{3}{4}$ inch and shall be spaced no more than 18 inches on centers.

(v) Flooring strips shall be spaced no more than $\frac{3}{4}$ inch apart except at the side rails, where 1 inch spacing is permissible.

(vi) Flooring strips shall be cleated on their undersides.

(12) The plank-type platform consists of planks supported on the stirrups or hangers. If this type of platform is used, the following requirements shall be met:

(i) The planks of plank-type platforms shall be of not less than 2 x 10 inch lumber.

(ii) The platform shall be no more than 24 inches in width.

(iii) The planks shall be tied together by cleats of not less than 1 x 6 inch lumber, nailed on their undersides at intervals of not more than 4 feet.

(iv) The planks shall extend not less than 6 inches nor more than 18 inches beyond the supporting stirrups.

(v) A cleat shall be nailed across the platform on the underside at each end outside the stirrup to prevent the platform from slipping off the stirrup.

(vi) Stirrup supports shall be not more than 10 feet apart.

(13) The beam-type platform consists of longitudinal side stringers with cross beams set on edge and spaced not more than 4 feet apart on which longitudinal platform planks are laid. If this type platform is used the following requirements shall be met:

(i) The side stringers shall be of sound, straight-grained lumber, free from knots, and of not less than 2 x 6 inch lumber, set on edge.

(ii) The stringers shall be supported on the stirrups with a clear span between stirrups of not more than 16 feet.

(iii) The stringers shall be bolted to the stirrups by U-bolts passing around the stirrups and bolted through the stringers with nuts drawn up tight on the inside face.

(iv) The ends of the stringers shall extend beyond the stirrups not less than 6 inches nor more than 12 inches at each end of the platform.

(v) The platform shall be supported on cross beams of 2 x 6 inch lumber between the side stringers securely nailed thereto and spaced not more than 4 feet on centers.

(vi) The platform shall be not more than 24 inches wide.

(vii) The platform shall be formed of boards $\frac{3}{8}$ inch in thickness by not less than 6 inches in width, nailed tightly together, and extending to the outside face of the stringers.

(viii) The ends of all platform boards shall rest on the top of the cross beams, shall be securely nailed, and at no intermediate points in the length of the platform shall there be any cantilever ends.

(f) Horse scaffolds. (1) The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E-3.

(2) Horses constructed of materials other than lumber shall provide the strength, rigidity and security required of horses constructed of lumber.

(3) The lateral spread of the legs shall be equal to not less than one-third of the height of the horse.

TABLE E-3.
SPECIFICATIONS FOR THE CONSTRUCTION OF HORSES

Structural members	Height in feet		
	Up to 10	10 to 16	16 to 20
Legs	Inches 2 x 4	Inches 3 x 4	Inches 4 x 6
Bearers or headers	2 x 6	2 x 8	4 x 6
Crossbraces	2 x 4 or 1 x 8	2 x 4	2 x 6
Longitudinal braces	2 x 4	2 x 6	2 x 6

(4) All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure.

(5) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(6) Backrails and toeboards shall be in accordance with paragraph (i) of this section.

(g) Other types of scaffolds. (1) Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of paragraphs (a), (h) and (i) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

(h) Scaffold or platform planking. (1) Except as otherwise provided in paragraph (e) (11) and (13) of this section, platform planking shall be of not less than 2 x 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

(2) Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

(3) Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no

case shall project more than 12 inches unless the planks are fastened to the supporting members.

(4) Table E-4 shall be used as a guide in determining safe loads for scaffold planks.

(i) Backrails and toeboards. (1) Scaffolding or staging which is supported or suspended more than 8 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of

TABLE E-4
SAFE CENTER LOADS FOR SCAFFOLD PLANK OF 1,100 POUNDS
FIBRE STRESS

Span in Feet	Lumber dimensions in inches									
	A		B		A		B		A	
	2 x 10	1 1/2 x 9 1/2	2 x 12	1 1/2 x 11 1/2	3 x 8	2 1/2 x 7 1/2	3 x 10	2 1/2 x 9 1/2	3 x 12	2 1/2 x 11 1/2
6	256	309	526	667	807					
8	192	232	395	500	605					
10	153	186	316	400	484					
12	128	155	263	333	404					
14	110	133	225	286	346					
16	---	116	197	250	303					

(A)—Rough lumber
(B)—Dressed lumber

the staging, platform or runway and a mid-rail located half way between the upper rail and the staging, platform, or runway.

(2) Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured.

(3) Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted employees working more than 8 feet above solid surfaces shall be protected by safety belts and life lines meeting the requirements of § 8.84(b), and employees working over water shall be protected by buoyant working vests meeting the requirements of § 8.84(a).

(4) Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail.

(5) When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 x 4 inch lumber shall be provided.

(i) Access to staging. (1) Access to fixed staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders or rigid type non-collapsible trestles with parallel and level rungs.

(2) Ramps and stairways shall be provided with 36-inch handrails with midrails.

(3) The side rails of ladders used for access to staging shall extend not less than 36 inches above the top landing. When this is not practical, grab rails which will provide a secure grip for an employee moving from the ladder to the platform shall be installed.

(4) Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than one foot from the ladder to any intermediate landing or platform.

(5) Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

§ 8.42

LADDERS

(a) *General requirements.* (1) The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered they shall be immediately withdrawn from service.

(2) When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of side rails for their total length shall be those specified in paragraphs (b) or (c) of this section.

(3) Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced.

(4) Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the American Standard Safety Code for Portable Metal Ladders, A14.2.

(5) Portable metal ladders shall not be used near electrical conductors.

(6) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the American Standard Safety Code for Portable Wood Ladders, A14.1.

(b) *Construction of portable wood cleated ladders up to 30 feet in length.* (1) Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low density woods is prohibited.

(2) Side rails shall be dressed on all sides, and kept free of splinters.

(3) All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than $\frac{1}{2}$ inch in diameter or within $\frac{1}{2}$ inch of the edge of the rail or nearer than 3 inches to a tread or rung.

(4) Pitch pockets not exceeding $\frac{1}{8}$ inch in width, 2 inches in length and $\frac{1}{2}$ inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

(5) The width between side rails at the base shall be not less than $1\frac{1}{2}$ inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least $\frac{1}{4}$ inch for each additional 2 feet of length.

(6) Side rails shall be at least $1\frac{1}{2}$ x $3\frac{3}{4}$ inches in cross section.

(7) Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails $\frac{1}{2}$ inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

(8) Cleats 20 inches or less in length shall be at least $2\frac{1}{2}$ x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least $2\frac{1}{2}$ x $3\frac{3}{4}$ inches in cross section.

(c) Construction of portable wood cleated ladders from 30 to 60 feet in length. (1) Ladders from 30 to 60 feet in length shall be in accordance with the specifications of paragraph (b) of this section with the following exceptions:

(i) Rails shall be of not less than 2 x 6 inch lumber.

(ii) Cleats shall be of not less than 1 x 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five tenpenny common wire nails or fastened with through bolts or other fastenings of equivalent strength.

§ 8.43

GUARDING OF DECK OPENINGS

(a) When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings shall be suitably covered or guarded to a height of not less than 30 inches, except where the use of such guards is made impracticable by the work actually in progress.

(b) When employees are working around open hatches not protected by coamings to a height of 24 inches or around other large openings, the edge of the opening shall be guarded in the working area to a height of 36 to 42 inches, except where the use of such guards is made impracticable by the work actually in progress.

§ 8.44

ACCESS TO VESSELS

(a) Access to vessels afloat. The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(1) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, main-

tained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of paragraph (d) (1) and (2) of this section may be used.

(2) Each side of such gangway, and the turn table if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface of the stanchion, with a mid-rail. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(3) Gangways on vessels inspected and certificated by the U.S. Coast Guard are deemed to meet the foregoing requirements, except in cases where the vessel's regular gangway is not being used.

(4) The gangway shall be kept properly trimmed at all times.

(5) When a fixed tread accommodation ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duck-boards shall be laid over and secured to the ladder.

(6) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(7) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with mid-rails on both sides.

(8) Supporting bridges shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(9) When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(10) Obstructions shall not be laid on or across the gangway.

(11) The means of access shall be adequately illuminated for its full length.

(12) Unless the construction of the vessel makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event loads shall not be passed over the means of access while employees are on it.

(b) Access to vessels in drydock or between vessels. Gangways meeting the requirements of paragraph (a) (1), (2), (9), (10), (11) of this section shall be provided for access from wing wall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, from one vessel to another.

(c) Access to barges and river towboats. (1) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained and properly secured.

(2) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of paragraph (1) or a safe walkway in accordance with the requirements of paragraph (a) (7) of this section shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder in ac-

cordance with the requirements of paragraph (d) of this section may be used.

(3) The means of access shall be in accordance with the requirements of paragraph (a) (9), (10) and (11) of this section.

(d) Jacob's ladders. (1) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(2) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

§ 8.45

ACCESS TO AND GUARDING OF DRY DOCKS

(a) A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead.

(b) Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a mid-rail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(c) Railings meeting the requirements of paragraph (b) of this section shall be provided on the means of access to and from the floors of graving docks.

(d) Railings approximately 42 inches in height, with a mid-rail, shall be provided on the edges of wing walls of floating dry docks and on the edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering or leaving the dock.

(e) When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42-inch railings with a mid-rail. When such a railing would be impractical or ineffective, other effective means shall be provided to prevent men from falling into the water.

§ 8.46

ACCESS TO CARGO SPACES

(a) There shall be at least one safe and accessible ladder in any cargo space which employees must enter.

(b) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(c) Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of paragraph (a). When conditions are such that a straight ladder cannot be used, a Jacob's ladder meeting the requirements of § 8.44(d) may be used.

(d) When cargo is stowed within 4 inches of the back of ladder rungs, the ladder shall be deemed "unsafe" for the purpose of this section.

SUBPART F—GENERAL WORKING CONDITIONS

§ 8.51

HOUSEKEEPING

(a) Good housekeeping conditions shall be maintained at all times. Adequate aisles and passageways shall be maintained in all work areas. All staging platforms, ramps, stairways, walkways, aisles, and passageways on vessels or dry docks shall be kept clear of all debris such as welding rod tips, bolts, nuts, and similar material. Welding leads, burner hose and air hose in aisles or passageways shall be elevated over or placed under the walkway surfaces or covered by cross-over planks.

(b) All working areas on vessels and dry docks shall be kept reasonably free of debris, and construction material shall be so piled as not to present a hazard to employees.

(c) Slippery conditions on walkways or working surfaces shall be eliminated as they occur.

(d) Free access shall be maintained at all times to all exits and to all fire-alarm boxes or fire-extinguishing equipment.

(e) All oils, paints, thinners, solvents, waste, rags, or other flammable substances shall be kept in fire resistant covered containers when not in use.

§ 8.52

ILLUMINATION

(a) All means of access and walkways leading to working areas as well as the working areas themselves shall be adequately illuminated.

(b) Temporary lights shall meet the following requirements:

(1) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(2) Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension.

(3) Cords shall be kept clear of working spaces and walkways or other locations in which they are readily exposed to damage.

(c) Exposed non-current-carrying metal parts of temporary lights furnished by the employer shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current. Grounding shall be in accordance with the requirements of § 8.72(b).

(d) Where temporary lighting from sources outside the vessel is the only means of illumination, portable emergency lighting equipment shall be available to provide illumination for safe movement of employees.

(e) Employees shall not be permitted to enter dark spaces without a suitable portable light. The use of matches and open flame lights is prohibited. In non-gas free spaces, portable lights shall meet the requirements of § 8.12(b).

§ 8.53

UTILITIES

(a) *Steam supply and hoses.* (1) Prior to supplying a vessel with steam from a source outside the vessel, the employer shall ascertain from responsible vessel's representatives, having knowledge of the condition of the plant, the safe working pressure of the vessel's steam system. The employer shall install a pressure gauge and a relief valve of proper size and capacity at the point where the temporary steam hose joins the vessel's steam piping system or systems. The relief valve shall be set and capable of relieving at a pressure not exceeding the safe working pressure of the vessel's system in its present condition, and there shall be no means of isolating the relief valve from the system which it protects. The pressure gauge and relief valve shall be located so as to be visible and readily accessible.

(2) Steam hose and fittings shall have a safety factor of not less than five (5).

(3) When steam hose is hung in a bight or bights, the weight shall be relieved by appropriate lines. The hose shall be protected against chafing.

(4) Steam hose shall be protected from damage and shall be so shielded where passing through normal work areas as to prevent accidental contact by employees.

(b) *Electric power.* (1) When the vessel is supplied with

electric power from a source outside the vessel, the following precautions shall be taken prior to energizing the vessel's circuits:

(i) If in dry dock, the vessel shall be adequately grounded.

(ii) The employer shall ascertain from responsible vessel's representatives, having a knowledge of the condition of the vessel's electrical system, that all circuits to be energized are in a safe condition.

§ 8.54

WORK IN CONFINED OR ISOLATED SPACES

When any work is performed in a confined space, except as provided in § 8.31(b)(3), or when an employee is working alone in an isolated location, frequent checks shall be made to ensure the safety of the employees.

§ 8.55

WORK ON OR IN THE VICINITY OF RADAR AND RADIO

(a) No employees shall be permitted to work on masts, king posts or other aloft areas unless the radar and radio are secured and tagged.

(b) Testing of radar or radio shall not be done until the employer can schedule such tests at a time when no work is in progress aloft or personnel can be cleared from the danger area according to minimum safe distances established for and based on the type, model, and power of the equipment.

§ 8.56

WORK IN OR ON LIFEBOATS

(a) Before employees are permitted to work in or on a lifeboat, either stowed or in a suspended position, the employer shall ensure that precautions have been taken to prevent the boat from falling due to accidental tripping of the

releasing gear, movement of the davits or capsizing of a boat in chocks.

(b) Employees shall not be permitted to remain in boats while the boats are being hoisted into final stowed position.

§ 8.57

HEALTH AND SANITATION

(a) The employer shall provide adequate washing facilities for employees engaged in the application of paints or coatings or in other operations where contaminants can, by ingestion or absorption, be detrimental to the health of the employee. The employer shall encourage good personal hygiene practices by informing the employees of the need for removing surface contaminants by thorough washing of hands and face prior to eating or smoking.

(b) The employer shall not permit eating or smoking in areas undergoing surface preparation or preservation.

(c) The employer shall not permit employees to work in the immediate vicinity of uncovered garbage and shall insure that employees working beneath or on the outboard side of a vessel are not subject to contamination by drainage or waste from overboard discharges.

§ 8.58

FIRST AID

(a) Unless a first aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close at hand, shall be qualified to administer first aid to the injured.

(b) The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of

item. The contents of such kit shall contain a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch and 2 inch.
Gauze compress bandages, 4 inch.
Adhesive bandages, 1 inch.
Triangular bandage, 40 inch.
Ammonia inhalants and ampules.
Antiseptic applicators or swabs.
Burn dressing.
Eye dressing.
Wire or thin board splints.
Forceps and tourniquet.

(c) The contents of the first aid kit shall be checked before being sent out on each job to insure that the expended items are replaced.

(d) There shall be available for each vessel on which ten (10) or more employees are working one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that no more than two stretchers are required on each job location. Stretchers shall be kept close to the vessels. This paragraph does not apply where ambulance services carry such stretchers.

SUBPART G—GEAR and EQUIPMENT for RIGGING and MATERIALS HANDLING

§ 8.61

INSPECTION

(a) All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each use and, when necessary, at intervals during its use to ensure that it is safe.

(b) The safe working load of gear as specified in §§ 8.62 through 8.66 shall not be exceeded.

§ 8.62

MANILA ROPE AND MANILA ROPE SLINGS

Table G-1 shall be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

§ 8.63

WIRE ROPE AND WIRE ROPE SLINGS

(a) Tables G-2 through G-5 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five (5) is maintained.

(b) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(c) Where U-bolt wire rope clips are used to form eyes, Table G-6 shall be used to determine the number and spacing of clips. The U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(d) Wire rope shall not be secured by knots.

§ 8.64

CHAINS AND CHAIN SLINGS

(a) Tables G-7 and G-8 shall be used to determine the working load limit of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products.

(b) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A

TABLE G-1
MANILA ROPE
(in pounds or tons of 2000 pounds)

Circumference	Diameter in Inches	Single Leg	60°	45°	30°
3/4	1/4	120 lbs.	204 lbs.	170 lbs.	120 lbs.
1	5/16	200	346	282	200
1-1/8	3/8	270	467	380	270
1-1/4	7/16	350	605	493	350
1-3/8	15/32	450	775	635	450
1-1/2	1/2	530	915	758	530
1-3/4	9/16	690	1190	973	690
2	5/8	880	1520	1240	880
2-1/4	3/4	1080	1870	1520	1080
2-1/2	13/16	1300	2250	1830	1300
2-3/4	7/8	1540	2660	2170	1540
3	1	1800	3120	2540	1800
3-1/4	1-1/16	1.0 Tons	1.7 Tons	1.4 Tons	1.0 Tons
3-1/2	1-1/8	1.2	2.1	1.7	1.2
3-3/4	1-1/4	1.35	2.3	1.9	1.35
4	1-5/16	1.5	2.6	2.1	1.5
4-1/2	1-1/2	1.8	3.1	2.5	1.8
5	1-5/8	2.25	3.6	3.2	2.25
5-1/2	1-3/4	2.8	4.5	3.7	2.8
6	2	3.1	5.4	4.4	3.1
6-1/2	2-1/8	3.6	6.2	5.1	3.6

TABLE G-2
RATED CAPACITIES FOR IMPROVED FLOW STEEL INDEPENDENT WIRE ROPE CORE,
WIRE ROPE AND WIRE ROPE SLINGS
(In tons of 2000 pounds)

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4"	.59	.58	.53	.44	.42	.40
3/8"	1.3	1.2	1.1	.98	.93	.88
1/2"	2.3	2.2	2.0	1.7	1.6	1.5
5/8"	3.6	3.4	3.0	2.7	2.5	2.2
3/4"	5.1	4.9	4.2	3.8	3.6	3.1
7/8"	6.9	6.6	5.5	5.2	4.9	4.1
1"	9.0	8.5	7.2	6.7	6.4	5.4
1-1/8"	11.	10.	9.0	8.5	7.8	6.8
6x37 CLASSIFICATION						
1-1/4"	13.	12.	10.	9.9	9.2	7.9
1-3/8"	16.	15.	13.	12.	11.	9.6
1-1/2"	19.	17.	15.	14.	13.	11.
1-3/4"	26.	24.	20.	19.	18.	15.
2"	33.	30.	26.	25.	23.	20.
2-1/4"	41.	38.	33.	31.	29.	25.
(A) - Socket or Swaged Terminal attachment. (B) - Mechanical Sleeve attachment. (C) - Hand Tucked Splice attachment.						

TABLE G-3
RATED CAPACITIES FOR IMPROVED FLOW STEEL INDEPENDENT WIRE ROPE
CUMULATIVE WIRE ROPE SLINGS
(In tons of 2000 pounds)

Rope Dia. Inches	TWO - LEG BRIDLE OR BASKET HITCH											
	Vertical			60°			45°			30°		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4"	1.2	1.1	1.0	1.0	.97	.92	.83	.78	.75	.59	.56	.53
3/8"	2.6	2.5	2.3	2.3	2.1	2.0	1.8	1.8	1.6	1.3	1.2	1.1
1/2"	4.6	4.4	4.0	4.0	3.8	3.4	3.2	3.1	2.8	2.3	2.2	2.0
5/8"	7.2	6.8	6.2	6.2	5.9	5.2	5.1	4.8	4.2	3.6	3.4	3.0
3/4"	10.	9.7	8.4	8.4	8.4	7.3	7.2	6.8	5.8	5.1	4.9	4.2
7/8"	14.	13.	12.	12.	11.	9.6	9.8	9.3	7.8	6.9	6.6	5.5
1"	18.	17.	15.	15.	15.	13.	13.	12.	10.	9.0	8.5	7.2
1-1/8"	23.	21.	18.	18.	16.	16.	16.	15.	13.	11.	10.	9.0
6x37 CLASSIFICATION												
1-1/4"	26.	24.	21.	23.	21.	18.	19.	17.	15.	13.	12.	10.
1-3/8"	32.	29.	25.	28.	25.	22.	22.	21.	18.	16.	15.	13.
1-1/2"	38.	35.	30.	33.	30.	26.	27.	25.	21.	19.	17.	15.
1-3/4"	51.	47.	41.	44.	41.	35.	36.	33.	29.	26.	24.	20.
2"	65.	61.	53.	57.	53.	46.	47.	43.	37.	33.	30.	26.
2-1/4"	83.	78.	68.	72.	68.	57.	58.	54.	47.	41.	38.	33.
(A) - Socket or Swaged Terminal Attachment. (B) - Mechanical Sleeve Attachment. (C) - Hand Tucked Splice Attachment.												

RATED CAPACITIES FOR IMPROVED FLOW STEEL FIDER CORN, WIRE ROPE AND WIRE ROPE BLINDS

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4	.55	.51	.49	.41	.38	.37
3/8	1.2	1.1	1.1	.91	.85	.80
1/2	2.1	2.0	1.8	1.6	1.5	1.4
5/8	3.3	3.1	2.8	2.5	2.3	2.1
3/4	4.8	4.4	3.9	3.6	3.3	2.9
7/8	6.4	5.9	5.1	4.8	4.5	3.9
1	8.4	7.7	6.7	6.3	5.8	5.0
1-1/8	10.	9.5	8.4	7.9	7.1	6.3
6x37 CLASSIFICATION						
1-1/4	12.	11.	9.8	9.2	8.3	7.4
1-3/8	15.	13.	12.	11.	10.	8.9
1-1/2	17.	16.	14.	13.	12.	10.
1-3/4	24.	21.	19.	18.	16.	14.
2	31.	28.	25.	23.	21.	18.

(A) - Socket or Swaged Terminal attachment.
 (B) - Mechanical sleeve attachment.
 (C) - Hand Tucked Splice attachment.

TABLE C-6
RATED CAPACITIES FOR IMPROVED FLOW FIBER CORE WIRE ROPE SLINGS
(In tons of 2000 pounds)

TWO - LEG BRIDLE OR BASKET HITCH												
Rope Dia. Inches	Vertical			60°			45°			30°		
	A	B	C	A	B	C	A	B	C	A	B	C
1/4	1.1	1.0	.99	.95	.88	.85	.77	.72	.70	.55	.51	.49
3/8	2.4	2.2	2.1	2.1	1.9	1.8	1.7	1.6	1.5	1.2	1.1	1.1
1/2	4.3	3.9	3.7	3.7	3.4	3.2	3.0	2.8	2.5	2.1	2.0	1.8
5/8	6.7	6.2	5.9	5.8	5.3	4.8	4.7	4.4	4.0	3.3	3.1	2.8
3/4	9.5	8.8	7.8	8.2	7.6	6.8	6.7	6.2	5.5	4.8	4.4	3.9
7/8	12.	10.	10.	11.	10.	8.9	9.1	8.4	7.3	6.4	5.9	5.1
1	15.	13.	13.	14.	13.	11.	12.	11.	9.4	8.4	7.7	6.7
1-1/8	17.	15.	17.	18.	16.	14.	15.	13.	12.	10.	9.5	8.4
1-1/4	21.	19.										

6x37 CLASSIFICATION												
1-1/4	25.	22.	20.	21.	19.	17.	17.	16.	14.	12.	11.	9.8
1-3/8	30.	27.	24.	28.	23.	21.	21.	19.	17.	15.	13.	12.
1-1/2	35.	32.	28.	30.	27.	24.	25.	22.	20.	17.	16.	14.
1-3/4	48.	43.	38.	41.	37.	33.	34.	30.	27.	24.	21.	18.
2	62.	55.	49.	53.	48.	43.	43.	39.	35.	31.	28.	25.

(A) - Socket or Swaged Terminal attachment.
 (B) - Mechanical Sleeve attachment.
 (C) - Hand Tucked Splice attachment.

TABLE G-6
NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved Plain Steel, Rope Diameter, Inches	Number of Clips		Minimum Spacing, Inches
	Drop Forged	Other Material	
1/2	3	4	3
3/4	3	4	3 3/4
7/8	4	5	4 1/2
1	4	5	5 1/4
1 1/8	4	6	6
1 1/4	5	6	6 3/4
1 1/2	5	7	7 1/2
1 3/4	6	7	8 1/4
2	6	8	9

thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(c) Interlink wear, not accompanied by stretch in excess of 5 percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G-9, has been reached.

(d) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(e) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in paragraph (d) of this section shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

TABLE G-7
WROUGHT IRON CHAIN
(in pounds or tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg 	60° 	45° 	30° 
7/8	1060	1835	1600	1060
1	1655	2885	2340	1655
1 1/8	2385	4115	3310	2385
1 1/4	3260	5485	4440	3260
1 1/2	4285	7115	5760	4285
1 3/4	5465	8985	7280	5465
2	6805	11115	9000	6805
2 1/8	8305	13585	11040	8305
2 1/4	10065	16405	13320	10065
2 1/2	12085	19585	15840	12085
2 3/4	14365	23125	18600	14365
3	16905	27025	21600	16905
3 1/8	20705	32285	25920	20705
3 1/4	24765	37905	30600	24765
3 1/2	29085	43885	35640	29085
3 3/4	33665	50225	40960	33665
4	39505	56925	46560	39505

* These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8
ALLOY STEEL CHAIN
(In tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
1/4	1.62	2.82	2.27	1.62
3/8	3.30	5.70	4.65	3.30
1/2	5.62	9.75	7.90	5.62
5/8	8.25	14.25	11.65	8.25
3/4	11.5	19.9	16.2	11.5
7/8	14.3	24.9	20.3	14.3
1	19.3	33.5	27.3	19.3
1-1/8	22.2	38.5	31.5	22.2
1-1/4	28.7	49.7	40.5	28.7
1-3/8	33.5	58.0	47.0	33.5
1-1/2	39.7	68.5	56.0	39.7
1-5/8	42.5	73.5	59.5	42.5
1-3/4	47.0	81.5	62.0	47.0

TABLE G-9
MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in frac- tion of inches
1/4 (9/32)	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 5/8	11/32

(f) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.

(g) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

§ 8.65

SHACKLES

(a) Table G-10 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

TABLE G-10
SAFE WORKING LOADS FOR SHACKLES
(in tons of 2000 pounds)

Material size (inches)	Pin diam- eter (inches)	Safe work- ing load
1/2	3/4	1.4
5/8	3/4	2.2
3/4	7/8	3.2
7/8	1	4.3
1	1 1/4	5.6
1 1/8	1 1/4	6.7
1 1/4	1 3/4	8.2
1 3/8	1 1/2	10.0
1 1/2	1 3/4	11.9
1 3/4	2	16.2
2	2 1/4	21.2

§ 8.66

HOOKS

(a) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(b) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(c) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

§ 8.67

CHAIN FALLS

(a) Chain falls shall be clearly marked to show the capacity, and the capacity shall not be exceeded.

(b) Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, the sheaves, pinion, and hooks for distortion and wear.

(c) Straps, shackles, and the beam or overhead structure to which a chain fall is secured shall be of adequate strength to support the weight of load and gear which will be applied.

§ 8.68

USE OF GEAR

(a) Loads shall be safely rigged before being hoisted.

(b) Plates shall be handled on and off hulls by means of shackles whenever possible. Clips or pads of ample size shall be welded to the plate to receive the shackle pins when there are no holes in the plate. When it is not possible to make holes in or to weld pads to the plate, alligator tongs, grab hooks, grab clamps or screw clamps may be used. In such cases special precautions shall be taken to keep employees from under such lifts.

(c) Tag lines shall be provided on loads likely to swing or to need guidance.

(d) When slings are secured to eye-bolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.

(e) Slings shall be padded where they pass over sharp edges or corners of loads to prevent cutting or kinking.

(f) Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.

(g) Both ends of idle slings shall be secured to the hooks.

(h) Employees shall not be permitted to ride the hook or the load.

§ 8.69

QUALIFICATIONS OF OPERATORS

(a) When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.

(b) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

(c) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.

(d) No minor under eighteen (18) years of age shall be employed in occupations involving the operation of any power-driven hoisting apparatus or assisting in such operations by work such as hooking on, loading slings, rigging gear, etc.

SUBPART H—TOOLS and RELATED EQUIPMENT

§ 8.71

POWER TOOLS; GENERAL PRECAUTIONS

(a) Hand lines shall be provided to handle tools and materials so that employees can have their hands free when using ladders. The use of hoses or power cables for this purpose shall be prohibited.

(b) When air tools of the reciprocating type are not in use, the dies and tools shall be removed.

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(c) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(d) The moving parts of machinery on dry docks shall be guarded.

§ 8.72

PORTABLE ELECTRIC TOOLS

(a) The frames of portable electric tools and appliances shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(b) Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(c) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.

(d) Worn or frayed electric cables shall not be used.

(e) The employer shall notify the officer in charge of the vessel before using electric power tools operated with the vessel's current.

§ 8.73

HAND TOOLS

(a) Employers shall not issue or permit the use of unsafe hand tools.

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(b) Wrenches, including crescent, pipe, end and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.

(c) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(d) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

§ 8.74

ABRASIVE WHEELS

(a) Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(b) Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed $\frac{1}{8}$ inch from the surface of the wheel.

(c) All portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of paragraph (e) of this section, except as follows:

(1) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in paragraph (f) of this section shall be used.

(2) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(d) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of paragraph (f) of this section, except as follows:

(1) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(2) If the wheel is entirely within the work being ground while in use.

(e) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

(f) When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to insure that the pieces of the wheel will be retained in case of accidental breakage shall be used.

(g) All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.

(h) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(i) The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.

(j) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of § 8.81 (a) and (b), except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

§ 8.75

POWDER ACTUATED TOOLS

(a) **General precautions.** (1) Powder actuated tools shall be tested each day before loading to ensure that the safety devices are in proper working condition. Any tool found not to be in proper working order shall be immediately removed from service until repairs are made.

(2) Powder actuated tools shall not be used in an explosive or flammable atmosphere.

(3) All tools shall be used with the type of shield or muzzle guard appropriate for a particular use.

(4) Fasteners shall not be driven into very hard or brittle materials, such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick or hollow tile.

(5) Fasteners shall not be driven into soft materials unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the opposite side.

(6) Unless a special guard, fixture or jig is used, fasteners shall not be driven directly into materials such as brick or concrete within 3 inches of the unsupported edge or corner, or into steel surfaces within 1/2 inch of the unsupported edge or corner. When fastening other material, such as 2 x 4-inch lumber to a concrete surface, fasteners of greater than 1/2 inch shank diameter shall not be used and fasteners shall not be driven within 2 inches of the unsupported edge or corner of the work surface.

(7) Fasteners shall not be driven through existing holes unless a positive guide is used to secure accurate alignment.

(8) No attempt shall be made to drive a fastener into a spalled area caused by an unsatisfactory fastening.

(9) Employees using powder actuated tools shall be protected by eye protection equipment in accordance with the requirements of § 8.81 (a) and (b).

(b) **Instruction of operators.** Before employees are per-

mitted to use powder actuated tools, they shall have been thoroughly instructed by a competent person with respect to the requirements of paragraph (a) of this section and the safe use of such tools as follows:

(1) Before using a tool, the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstructions.

(2) When a tool develops a defect during use, the operator shall immediately cease to use it and shall notify his supervisor.

(3) Tools shall not be loaded until just prior to the intended firing time and the tool shall not be left unattended while loaded.

(4) The tool, whether loaded or empty, shall not be pointed at any person, and hands shall be kept clear of the open barrel end.

(5) In case of a misfire, the operator shall hold the tool in the operating position for at least 15 seconds and shall continue to hold the muzzle against the work surface during disassembly or opening of the tool and removal of the powder load.

(6) Neither tools nor powder charges shall be left unattended in places where they would be available to unauthorized persons.

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

§ 8.81

EYE PROTECTION

(a) **General precautions.** (1) All eye protection equipment required by these regulations shall meet the specifications prescribed by the American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1.

(2) Eye protection equipment shall be maintained in good condition.

(3) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personal spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

(b) *Protection against impact.* (1) In any operations such as chipping, caulking, drilling, riveting, grinding, and pouring babbitt metal, in which the eye hazard of flying particles, molten metal, or liquid chemical exists, employees shall be protected by suitable face shields or goggles meeting the requirements of paragraph (a) of this section.

(c) *Protection against radiant energy.* (1) In any operation in which the eye hazard of injurious light rays or other radiant energy exists, depending upon the intensity of the radiation to which employees are exposed, they shall be protected by spectacles, cup goggles, helmets or hand shields equipped with filter lenses in accordance with the requirements of paragraphs (a) and (c)(2) of this section.

(2) Filter lenses shall be of a shade number appropriate to the type of work to be performed as indicated in Table I-1, except that variations of one or two shade numbers are permissible to suit individual preferences.

(3) If filter lenses are used in the goggles worn under the helmet, the shade number of the lens in the helmet may be reduced so that the sum of the shade numbers of the two lenses will equal the value shown in Table I-1.

§ 8.82

RESPIRATORY PROTECTION

(a) *General.* (1) All respiratory protective equipment required by these regulations shall carry the U.S. Bureau of

TABLE I-1

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operation	Shade No.
Soldering.....	2
Torch Brazing.....	3 or 4
Light cutting, up to 1 inch.....	3 or 4
Medium cutting, 1-6 inches.....	4 or 5
Heavy cutting, over 6 inches.....	5 or 6
Light gas welding, up to 1/8 inch.....	4 or 5
Medium gas welding, 1/8-1/2 inch.....	5 or 6
Heavy gas welding, over 1/2 inch.....	6 or 8
Shielded Metal-Arc Welding 1/16- to 1/2-inch electrodes.....	10
Inert-gas Metal Arc Welding (Nonferrous) 1/16 to 1/2-inch electrodes.....	11
Inert-gas Metal-Arc Welding (Ferrous) 1/16- to 1/2-inch electrodes.....	12
Shielded Metal-Arc Welding: 1/8 to 1/4 inch electrodes.....	12
1/8 and 1/4 inch electrodes.....	14
Atomic Hydrogen Welding.....	10 to 14
Carbon Arc Welding.....	14

Mines approval for the use for which it is intended. Respiratory protective equipment shall be used only for the purpose intended and no modifications of the equipment shall be made.

(2) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(3) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

(4) Employees required to use respiratory protective equipment approved for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(5) When an air line respirator is used, the air line shall be fitted with a pressure regulating valve and a filter which will remove oil, water, and rust particles. The air intake shall be from a source which is free from all contaminants, such as the exhaust from internal combustion engines.

(b) *Protection in atmospheres immediately dangerous to life.* (1) Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or high concentration of the contaminant, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(2) In atmospheres immediately dangerous to life the only approved types of respiratory protective equipment are the following:

(i) Self-contained breathing apparatus, in which the wearer carries with him a supply of oxygen, air, or an oxygen generating material.

(ii) Hose mask with blower, in which a hand or motor operated blower supplies air at high volume and low pressure through a large diameter hose through which the wearer can draw air in case the blower fails.

(iii) If there is known to be more than 16 percent oxygen and less than 2 percent gas by volume, a gas mask equipped with a canister approved for the particular type gas involved.

Note: A gas mask offers absolutely no protection in an atmosphere deficient in oxygen.

(3) Work in atmospheres immediately dangerous to life shall be performed only in an emergency, as when rescuing a man who has been overcome or when shutting off a source of contamination that cannot otherwise be controlled. When an employee enters such an atmosphere he shall be provided with and use an adequate, attended life line.

(4) In the vicinity of each vessel in which there is a danger of employees being exposed to an atmosphere immediately dangerous to life the employer shall have on hand and ready for use respiratory protective equipment approved for such use. When such equipment is required, one or more persons shall be thoroughly trained in the use of the equipment.

(c) *Protection against gaseous contaminants not immediately dangerous to life.* (1) Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short exposures.

(2) When employees are exposed to a gaseous contaminated atmosphere not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the gaseous contaminant as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator in lower concentrations is permissible.

(ii) In concentrations of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister. Different canisters are approved for specific use against the

following gases or groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide, or combination of the above.

(iii) In low concentrations (less than 0.1 percent by volume), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in subdivision (ii) of this subparagraph.

(d) Protection against particulate contaminants not immediately dangerous to life. (1) When employees are exposed to unsafe concentrations of particulate contaminants, such as dusts and fumes, mists and fogs or combinations of solids and liquids, they shall be protected by either air line or filter respirators, except as otherwise provided in the regulations of this part.

(2) Filter respirators shall be equipped with the proper type of filter. Different filters are approved for specific protection against groups of contaminants, as follows:

(i) Pneumoconiosis-producing dust and nuisance dust filters which provide respiratory protection against pneumoconiosis-producing dusts, such as aluminum, cellulose, cement, charcoal, coal, coke, flour, gypsum, iron ore, limestone and wood.

(ii) Toxic dust filters which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.

(iii) Mist filters which provide respiratory protection against pneumoconiosis-producing mists, chromic acid mists, and nuisance mists.

(iv) Fume filters which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors, such as those from heated metals and other substances).

(v) Filters which provide respiratory protection against

combinations of two or more of the contaminants listed in subdivisions (i) through (iv) of this sub

(e) Protection against combinations of particulate contaminants not immediately dangerous to life. (1) When employees are exposed to combinations of gaseous and particulate contaminants not immediately dangerous to life, as in spray painting, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the contaminants, as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator is permissible in lower concentrations.

(ii) In concentrations of gaseous contaminants of less than 2 percent by volume, a canister type gas mask with a combination canister approved for the particular type of gaseous contaminant as specified in paragraph (c)(2) of this section and a filter for the particular type of particulate contaminant as specified in paragraph (d)(1) of this section.

(iii) In low concentrations of gaseous contaminants (less than 0.1 percent by volume) a respirator equipped with the type of cartridge and filter as specified in subdivision (ii) of this subparagraph.

§ 8.83

HEAD AND FOOT PROTECTION

(a) When employees are working in areas where there is danger of falling objects they shall be protected by protective hats.

(b) Protective hats shall meet the specifications contained in the American Standard Safety Code for Head, Eye and Respiratory Protection, Z-2.1. Hats without dielectric strength shall not be used where there is the possibility of contact with electric conductors.

(c) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

(d) The employer shall arrange through means, such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use. Metal toe caps from which the covering has been worn shall be insulated when employees are working on exposed energized circuits of the vessel's electrical system.

§ 8.84

LIFE SAVING EQUIPMENT

(a) *Buoyant working vests.* (1) When employees are working from small boats or floats, near the unguarded edges of decks, or over water on scaffolds without guard rails, they shall be protected by U.S. Coast Guard approved buoyant working vests.

(b) *Safety belts and life lines.* (1) When employees are working aloft, or over a solid surface on staging more than 8 feet high without guard rails, they shall be protected by safety belts equipped with life lines which are secured with a minimum amount of slack to a fixed structure.

(2) When employees are working in atmospheres immediately dangerous to life, they shall be protected by a safety belt and an adequate, attended life line.

(3) Prior to each use, belts and life lines shall be inspected for dry rot, chemical damage or other defects which may affect their strength. Defective belts and life lines shall not be used.

(c) *Life rings and ladders.* (1) At least three 30-inch Coast Guard approved life rings with lines attached shall be kept in easily visible and readily accessible places aboard each vessel afloat on which work is being performed. Life rings shall be located, one forward, one aft, and one on the gangway, except on vessels under 200 feet in length, in which case one at the gangway will be sufficient.

(2) At least one life ring with a line attached shall be

located on each staging float alongside a vessel on which work is being performed.

(3) At least 90 feet of line shall be attached to each life ring. Life rings and lines shall be maintained in good condition.

(4) In the vicinity of each vessel on which employees are working over water or close to unguarded deck edges there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event that they fall into the water.

Appendix I

THRESHOLD LIMIT VALUES

Threshold limits should be used as guides in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. They represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. The values listed refer to time weighted average concentrations for a normal workday. The amount by which these figures may be exceeded for short periods without injury to health depends upon a number of factors, such as the nature of the contaminant, whether very high concentrations even for short periods produce acute poisoning, whether the effects are cumulative, the frequency with which high concentrations occur, and the duration of such periods. All must be taken into consideration in arriving at a decision as to whether a hazardous situation exists. Special consideration should be given to the application of these values in the evaluation of the health hazards which may be associated with exposure to combinations of two or more substances.

Threshold limits are based on the best available information from industrial experience, from experimental studies, and, when possible, from a combination of the two. These values are based on various criteria of toxic effects or on marked discomfort; thus, they should not be used as a common denominator of toxicity, nor should they be considered as the sole criterion in proving or disproving diagnosis of suspected occupational disease.

These limits are intended for use in the field of industrial hygiene and should be employed by persons trained in this field.

RECOMMENDED VALUES GASES AND VAPORS

Substance	P.p.m. ¹	Approx. mg. per cu. m. ²
Acetaldehyde	200	360
Acetic acid	10	25
Acetic anhydride	5	20
Acetone	1,000	2,400
Acetylene-tetabromide	1	14
Acrolein	0.5	1.2
Acrylonitrile	20	45
Allyl alcohol	5	12
Allyl chloride	5	15
Allyl propyl disulfide	2	12
Ammonia	100	70
Amyl acetate	200	1,050
Amyl alcohol (isoamyl alcohol)	100	360
Aniline	5	19
Arsine	0.05	0.2
Benzene (benzol)	25	80
Benzyl chloride	1	5
Bromine	0.1	0.7
Butadiene (1,3-butadiene)	1,000	2,200
Butanone (methyl ethyl ketone)	250	740
Butyl acetate (n-butyl acetate)	200	950
Butyl alcohol (n-butanol)	100	300
Butylamine	5	15
Butyl cellosolve (2-butoxyethanol)	50	240
Carbon dioxide	5,000	9,000
Carbon disulfide	20	60
Carbon monoxide	100	110
Carbon tetrachloride	25	160
Cellosolve (2-ethoxyethanol)	200	740
Cellosolve acetate (2-ethoxyethyl acetate)	100	540
Chlorine	1	3
Chlorine trifluoride	0.1	0.4
Chlorobenzene (monochlorobenzene)	75	350
Chloroform (trichloromethane)	50	240
1-chloro-1-nitropropane	20	100
Chloropierin	0.1	0.7

¹ Parts of vapor or gas per million parts of air by volume.

² Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES—Continued
GASES AND VAPORS—continued

Substance	P.p.m. ¹	Approx. mg. per cu. m. ²
Chloroprene (2-chloro-1,3-butadiene).....	25	90
Cresol (all isomers).....	5	22
Cyclohexane.....	400	1,400
Cyclohexanol.....	100	410
Cyclohexanone.....	100	400
Cyclohexene.....	400	1,350
Cyclopropane.....	400	690
Decaborane.....	0.05	0.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone).....	50	240
Diborane.....	0.1	0.1
o-Dichlorobenzene.....	50	300
Dichlorodifluoromethane.....	1,000	4,950
1,1-Dichloroethane.....	100	400
1,2-Dichloroethane (ethylene dichloride)....	100	400
1,2-Dichloroethylene.....	200	790
Dichloroethyl ether.....	15	90
Dichloromono-fluoromethane.....	1,000	4,200
1,1-Dichloro-1-nitroethane.....	10	60
Dichlorotetrafluoroethane.....	1,000	7,000
Diethylamine.....	25	75
Difluorodibromomethane.....	100	860
Diisobutyl ketane.....	50	290
Dimethylaniline (N-dimethylaniline).....	5	25
Dimethylsulfate.....	1	5
Dioxane (diethylene dioxide).....	100	360
Ethyl acetate.....	400	1,400
Ethyl acrylate.....	25	100
Ethyl alcohol (ethanol).....	1,000	1,900
Ethylamine.....	25	45
Ethylbenzene.....	200	870
Ethyl bromide.....	200	890
Ethyl chloride.....	1,000	2,600
Ethyl ether.....	400	1,200
Ethyl formate.....	100	300
Ethyl silicate.....	100	850

¹ Parts of vapor or gas per million parts of air by volume.
² Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES—Continued
GASES AND VAPORS—continued

Substance	P.p.m. ¹	Approx. mg. per cu. m. ²
Ethylene chlorohydrin.....	5	16
Ethylenediamine.....	10	30
Ethylene dibromide (1,2-dibromoethane)....	25	190
Ethylene imine.....	5	9
Ethylene oxide.....	50	90
Fluorine.....	0.1	0.2
Fluoro-trichloromethane.....	1,000	5,600
Formaldehyde.....	5	6
Furfural.....	5	20
Gasoline.....	500	2,000
Heptane (n-heptane).....	500	2,000
Hexane (n-hexane).....	500	1,800
Hexanone (methyl butyl ketone).....	100	410
Hydrazine.....	1	1.3
Hydrogen bromide.....	5	17
Hydrogen chloride.....	5	7
Hydrogen cyanide.....	10	11
Hydrogen fluoride.....	3	2
Hydrogen peroxide, 90%.....	1	1.4
Hydrogen selenide.....	0.05	0.2
Hydrogen sulfide.....	20	30
Iodine.....	0.1	1
Isophorane.....	25	140
Isopropylamine.....	5	12
Mesityl oxide.....	25	100
Methyl acetate.....	200	610
Methyl acetylene.....	1,000	1,650
Methyl acrylate.....	10	35
Methyl alcohol (methanol).....	200	260
Methyl bromide.....	20	80
Methyl cellosolve (2-methoxyethanol).....	25	80
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate).....	25	120
Methyl chloride.....	100	210
Methylal (dimethoxymethane).....	1,000	3,100
Methyl chloroform (1,1,1-trichloroethane)...	500	2,700

¹ Parts of vapor or gas per million parts of air by volume.
² Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES—Continued
GASES AND VAPORS—continued

Substance	P.p.m. ¹	Approx. mg. per cu. m. ²
Methylcyclohexane	500	2,000
Methylcyclohexanol	100	470
Methylcyclohexanone	100	460
Methyl formate	100	250
Methylisobutyl carbinol (methyl amyl alcohol)	25	100
α Methyl styrene	100	480
Methylene chloride (dichloromethane)	500	1,750
Monomethyl aniline	2	9
Naphtha (coal tar)	200	800
Naphtha (petroleum)	500	2,000
Nickel carbonyl	0.001	0.007
Nitric acid	10	25
p-Nitroaniline	1	6
Nitrobenzene	1	5
Nitroethane	100	310
Nitrogen dioxide	5	9
Nitroglycerin	0.5	5
Nitramethane	100	250
2-Nitropropane	50	180
Nitrotoluene	5	30
Octane	500	2,350
Ozone	0.1	0.2
Paradichlorobenzene	75	450
Pentane	1,000	2,950
Pentanone (methyl propyl ketone)	200	700
Perchloroethylene (tetrachloroethylene)	200	1,350
Phenol	5	19
Phenylhydrazine	5	22
Phosgene (carbonyl chloride)	1	4
Phosphine	0.05	0.07
Phosphorus trichloride	0.5	3
Propyl acetate	200	840
Propyl alcohol (isopropyl alcohol)	400	980
Propyl ether (isopropyl ether)	500	2,100
Propylene dichloride (1,2-dichloropropane)	75	350

¹ Parts of vapor or gas per million parts of air by volume.
² Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES—Continued
GASES AND VAPORS—continued

Substance	P.p.m. ¹	Approx. mg. p. cu. m.
Propylene imine	25	60
Propylene oxide	100	240
Pyridine	10	30
Quinone	0.1	0.4
Stibine	0.1	0.5
Stoddard solvent	500	2,900
Styrene monomer (phenylethylene)	100	420
Sulfur dioxide	5	13
Sulfur hexafluoride	1,000	6,000
Sulfur monochloride	1	6
Sulfur pentafluoride	0.025	0.2
Tertiary butyl alcohol	100	300
p-Tertiary butyl toluene	10	60
1,1,2,2-Tetrachloroethane	5	35
Tetrahydrofuran	200	590
Tetranitromethane	1	8
Toluene (Toluol)	200	750
o-Toluidine	5	22
Toluene-2,4-diisocyanate	0.1	0.7
Trichloroethylene	200	1,050
Triethylamine	25	100
Trifluoromonobromomethane	1,000	6,100
Turpentine	100	560
Vinyl chloride (chloroethylene)	500	1,300
Vinyl toluene	100	480
Xylene (xylol)	200	870
Xylidine	5	25

¹ Parts of vapor or gas per million parts of air by volume.
² Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES—Continued
TOXIC DUSTS, FUMES AND MISTS

Substance	Mg. per cu. m. ³
Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene).....	0.25
Ammonia (ammonium sulfamate).....	15
Antimony.....	0.5
ANTU (alpha-naphthyl-thiourea).....	0.3
Arsenic.....	0.5
Barium (soluble compounds).....	0.5
Beryllium.....	2 μm ³
Cadmium oxide fume.....	0.1
Calcium arsenate.....	0.1
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanindane).....	2
Chlorinated camphene, 60%.....	0.5
Chlorinated diphenyl oxide.....	0.5
Chlorodiphenyl (42% chlorine).....	1
Chlorodiphenyl (54% chlorine).....	0.5
Chromic acid and chromates (as CrO ₃).....	0.1
Crag herbicide (sodium 2-[2,4-dichlorophenoxy]ethanol hydrogen sulfate).....	15
Cyanide (as CN).....	5
2,4-D(2,4-dichlorophenoxyacetic acid).....	10
DDT (2,2-bis[4-chlorophenyl]-1,1,1-trichloroethane).....	1
Dieldrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene).....	0.25
Dinitrobenzene.....	1
Dinitrotoluene.....	1.5
Dinitro-cresol.....	0.2
EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate).....	0.5
Ferbam (ferrie dimethyl dithiocarbamate).....	15
Ferrocyanide dust.....	1
Fluoride.....	2.5
Hydroquinone.....	2
Iron oxide fume.....	15
Lead.....	0.2

³ Milligrams of dust, fume, or mist per cubic meter of air.

RECOMMENDED VALUES—Continued
TOXIC DUSTS, FUMES AND MISTS—continued

Substance	Mg. per cu. m. ³
Lead arsenate.....	0.15
Lindane (hexachlorocyclohexane, gamma isomer).....	0.5
Magnesium oxide fume.....	15
Malathion (0,0-dimethyl dithiophosphate of diethyl mercaptosuccinate).....	15
Manganese.....	6
Mercury.....	0.1
Mercury (organic compounds).....	0.01
Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1-trichloroethane).....	15
Molybdenum:	
(Soluble compounds).....	5
(Insoluble compounds).....	15
Nicotine.....	0.5
Parathion (0,0-diethyl O-p-nitrophenyl thiophosphate).....	0.1
Pentachloronaphthalene.....	0.5
Pentachlorophenol.....	0.5
Phosphorus (yellow).....	0.1
Phosphorus pentachloride.....	1
Phosphorus pentasulfide.....	1
Picric acid.....	0.1
Pyrethrum.....	2
Rotenone.....	5
Selenium compounds (as Se).....	0.1
Sodium fluoroacetate (1080).....	0.1
Sodium hydroxide.....	2
Strychnine.....	0.15
Sulfuric acid.....	1
TEPP (tetraethyl dithionopyrophosphate).....	0.2
TEPP (tetraethyl pyrophosphate).....	0.05
Tellurium.....	0.1
Tetryl (2,4,6-trinitrophenylmethyl nitramine).....	1.5
Thiram (tetramethyl thiram disulfide).....	5
Thallium (soluble compounds).....	0.1
Titanium dioxide.....	15

³ Milligrams of dust, fume, or mist per cubic meter of air.

RECOMMENDED VALUES—Continued
TOXIC DUSTS, FUMES AND MISTS—continued

Substance	Mg. per cu. m. ^a
Trichloronaphthalene.....	5
Trinitrotoluene.....	1.5
Uranium:	
(Soluble compounds).....	0.05
(Insoluble compounds).....	0.25
Vanadium:	
(V ₂ O ₅ dust).....	0.5
(V ₂ O ₅ fume).....	0.1
Warfarin (3- [acetylbenzyl]-4-hydroxycoumarin).....	0.5
Zinc oxide fumes.....	15
Zirconium compounds (as Zr).....	5

^a Milligrams of dust, fume, or mist per cubic meter of air.

Radioactivity: For permissible concentrations of radioisotopes in air, see "Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water," Handbook 52, U.S. Department of Commerce, National Bureau of Standards, March 1953. In addition, see "Permissible Dose from External Sources of Ionizing Radiation," Handbook 59, U.S. Department of Commerce, National Bureau of Standards, September 24, 1954. Revision of the two publications mentioned above is in progress.

MINERAL DUSTS

Substance	M.p.p.c.f. ^a
Aluminum oxide.....	50
Asbestos.....	5
Dust (nuisance, no free silica).....	50
Mica (below 5% free silica).....	20
Portland cement.....	50
Talc.....	20
Silicas:	
High (above 50% free SiO ₂).....	5
Medium (5 to 50% free SiO ₂).....	20
Low (below 5% free SiO ₂).....	50
Silicon carbide.....	50
Soapstone (below 5% free SiO ₂).....	20

^a Millions of particles per cubic foot of air.

TENTATIVE VALUES

Substance	P.p.m. ^a	Approx. mg. per cu. m. ^b
Allyl glycidyl ether (AGE).....	10	45
Boron trifluoride.....	1	3
n-Butyl glycidyl ether (BGE).....	50	270
Butyl mercaptan.....	10	35
Chlorine dioxide.....	0.1	0.3
Chloroacetaldehyde.....	1	3
Chlorobromomethane (ClBrCH ₂).....	400	2,100
Diglycidyl ether (DGE).....	10	55
Dimethyl formamide.....	20	60
1,1-Dimethyl hydrazine.....	0.5	1
Dipropyleneglycolmethylether.....	100	600
Ethyl mercaptan.....	250	640
Furfuryl alcohol.....	50	200
Glycidol.....	50	150
Sec-Hexyl acetate.....	100	590
Isopropyl glycidyl ether (IGE).....	50	240
Lithium hydride.....		25γ/m ³
Methyl mercaptan.....	50	100
Perchloromethyl mercaptan.....	0.1	0.8
Phenyl glycidyl ether (PGE).....	50	310
Phosphoric acid.....		1
n-Propyl nitrate.....	25	110
1,2,3-Trichloropropane.....	50	300
Triorthocresyl phosphate.....		0.1
Yttrium and inorganic compounds.....		5
Teflon decomposition products.....	(?)	(?)
Pentaborane (B ₅ H ₉).....	(?)	(?)

^a Parts of vapor or gas per million parts of air by volume.

^b Approximate milligrams per cubic meter of air.

^c Until more data are forthcoming, it is important that atmospheric concentrations of these materials to which workers are exposed must be kept as near 0 as possible.

This amendment shall become effective March 21, 1960.

Signed at Washington, D.C., this 12th day of February 1960.

JAMES T. O'CONNELL,
Acting Secretary of Labor.

[F.R. Doc. 60-1497; Filed, Feb. 19, 1960; 8:45 a.m.]

Title 29—LABOR

Subtitle A—Office of the Secretary of Labor

PART 11—PROCEDURE FOR VARIATIONS FROM SAFETY AND HEALTH REGULATIONS UNDER LONGSHOREMEN'S AND HARBOR WORKERS' COMPENSATION ACT

Safety and Health Regulations for Longshoring and Ship Repairing have been promulgated under the amended section 41 of the Longshoremen's and Harbor Workers' Compensation Act (72 Stat. 835, amending 44 Stat. 1444; 33 U.S.C. 941; 29 CFR, Parts 8 and 9 (25 F.R. 1543, 1565)). The Act (Subsection 41(d)) and those regulations (29 CFR 8.5 and 9.5) provide for the exercise of administrative discretion in granting certain types of variations from the safety and health requirements. Upon this basis, it is the purpose of these regulations to provide the procedure for application for such variations and action on such applications, both for the safety and health regulations that have been promulgated and such others as may be promulgated under the same authority. As these are regulations of procedure and practice for relieving restriction, public procedure is deemed to be unnecessary and they will be effective on publication in the Federal Register.

Accordingly, pursuant to section 4 of the Administrative Procedure Act (60 Stat. 238; 5 U.S.C. 1003) Subtitle A of Title 29, Code of Federal Regulations is hereby amended by adding a new Part 11 to read as follows:

Sec.

- 11.1 Scope and application.
- 11.2 Availability.

Sec.

- 11.3 Application.
- 11.4 Approval prerequisite to variation.
- 11.5 Priority.
- 11.6 Contents of order granting variation.
- 11.7 Contents of order denying variation.
- 11.8 Publication in Federal Register.
- 11.9 Supplementary publication of orders granting or denying variation.
- 11.10 Emergency applications.
- 11.11 Terminations and extensions.

AUTHORITY: §§ 11.1 to 11.11 issued under 72 Stat. 835 amending 44 Stat. 1444; 33 U.S.C. 941, and R.S. 161, 5 U.S.C. 22.

§ 11.1

SCOPE AND APPLICATION

The regulations in this part shall govern the availability, effect, and procedure for obtaining variations from safety and health regulations provided in §§ 8.5 and 9.5 of this title and any other safety and health regulations issued under the authority of Section 41 of the Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1444 as amended, 33 U.S.C. 941).

§ 11.2

AVAILABILITY

Variations are to be granted only when the Director of the Bureau of Labor Standards determines that the general regulation or particular provisions thereof imposes practical difficulty or unnecessary hardship in a particular application; that the purpose of the general regulation or particular provisions thereof from which variation is sought will be observed by the use of other or different devices; and, that the safety of employees will be equally secured by the other or different devices.

§ 11.3

APPLICATION

An application requesting a variation from an existing safety or health regulation, or particular provisions thereof may be made by any person or organization affected by such rule or regulation, or particular provisions thereof, or by the lawful agent of such an interested person or organization. The application shall be in triplicate, directed to the Director of the Bureau of Labor Standards, United States Department of Labor, and delivered to the Bureau of Labor Standards field office which services the place in which the variation, if granted, would be effective. Every application shall:

- (a) Be typewritten or printed in ink;
- (b) Appropriately describe the rule or regulation, or particular provisions thereof, from which variation is requested and specifically describe the type of difficulty or hardship arising thereunder and the substitute device for which authorization is sought;
- (c) Contain a certification, together with a detailed and comprehensive outline of the facts upon which the certification is based, that:
 - (1) The variation requested with respect to the rule or regulation, or particular provisions thereof, involved is necessary to avoid practical difficulties or unnecessary hardships;
 - (2) The purpose of the rule or regulation will be observed by the variation; and
 - (3) The safety of employees will be equally secured thereby.
- (d) State whether a temporary or permanent variation is desired; if temporary, an estimate of the length of time for which the variation is required shall be included; and
- (e) Indicate the manner in which the variation is intended to operate.

§ 11.4

APPROVAL PREREQUISITE TO VARIATION

The application for a variation shall not serve as temporary authority for the variation. Adherence to the general regulations is required unless and until such application is approved by the Director of the Bureau of Labor Standards.

§ 11.5

PRIORITY

The Director of the Bureau of Labor Standards shall promptly examine every application for the purpose of determining its appropriate priority for the purpose of avoiding or minimizing any delay of affected operations.

§ 11.6

CONTENTS OF ORDER GRANTING VARIATION

When granting a variation from safety or health regulations or particular provisions thereof, the Director of the Bureau of Labor Standards shall immediately prepare, in triplicate, an order setting forth:

- (a) The name and address of the person or organization requesting the variation;
- (b) The rule or regulation, or particular provisions thereof, with respect to which the variation is effective;
- (c) A description of the conditions under which the variation is permitted, including the extent to which variation from an existing rule or regulation, or particular provisions thereof, will be allowed; and
- (d) The period for which the variation shall be effective.

§ 11.7

CONTENTS OF ORDER DENYING VARIATION

In the event the Director of the Bureau of Labor Standards shall deny an application for a variation, he shall prepare, in triplicate, an order setting forth:

(a) The name and address of the person or organization requesting the variation;

(b) The rule or regulation, or particular provisions thereof, from which the application requested variation;

(c) The extent and duration of the variation requested; and

(d) A concise statement of the reasons for denial of the application for variation.

§ 11.8

PUBLICATION IN FEDERAL REGISTER

Any authorization of a variation by the Director of the Bureau of Labor Standards shall be published in the *Federal Register* as provided in section 3 of the Administrative Procedure Act (60 Stat. 237; 5 U.S.C. 1002).

§ 11.9

SUPPLEMENTARY PUBLICATION OF ORDERS GRANTING OR DENYING VARIATION

One copy of the order granting or denying the variation, whichever is issued, shall be mailed to the person or organization requesting the variation at such address as may be specified in the application; one copy shall be kept in the Office of the Bureau of Labor Standards Area Supervisor for the area in which the variation, if granted, would be made effective, and shall be open to public inspection; and one copy, together with a properly indexed record of all authorized variations, shall be kept in the Office of the Director of the Bureau of Labor Standards and shall be open to public inspection.

§ 11.10

EMERGENCY APPLICATIONS

In any case of extreme urgency, the application for a variation from an existing safety or health regulation, or particular provisions thereof, may be made by telegraph, and shall state the grounds upon which the application is based. This type of application must be confirmed without

delay by a written application for a variation which meets the requirements of § 11.3.

§ 11.11

TERMINATIONS AND EXTENSIONS

The order granting the application for a variation shall remain in effect for the period specified therein; or until such time as it is terminated in accordance with section 9(b) of the Administrative Procedure Act (60 Stat. 238; 5 U.S.C. 1008(b)). Such terminations shall be published as provided in §§ 11.8 and 11.9. Any application for an extended or new variation upon expiration of a temporary one shall be in the form provided in § 11.3, shall explain the need for extension and specify the extended period, and shall be filed not less than 15 days nor more than 30 days prior to the expiration of the temporary authorization.

Signed at Washington, D.C., this 1st day of April 1960.

JAMES P. MITCHELL,
Secretary of Labor.

[F.R. Doc. 60-3212, Filed, Apr. 7, 1960; 8:46 a.m.]

Title 29—LABOR

Subtitle A—Office of the Secretary of Labor

PART 10—RECORDING AND REPORTING WORK-INJURY FREQUENCY AND SEVERITY DATA CONCERNING LONGSHOREMEN, SHIP REPAIRMEN AND OTHER HARBOR WORKERS

Section 41 of the Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1444 as amended; 33 U.S.C. 941) was amended August 23, 1958 (72 Stat. 835) to authorize safety and health regulations for the protection of certain longshoremen, ship repairmen and other harbor workers. Such regulations for longshoring and ship repairing activities have been promulgated (29 CFR 8.5 and 9.5).

The statutory amendment directly requires that "every employer shall furnish and maintain employment and places of employment which shall be reasonably safe for his employees in all employments covered by this Act." It authorizes use of "such other powers and duties as are conferred" by the Act "in enforcing and administering" the amended section 41 and in addition, provides new authority "to make studies * * * with respect to safety provisions and the causes * * * of injuries in employments covered by this Act and from time to time to make to Congress such recommendations" as are deemed "proper as the best means of preventing such injuries," and "to provide for the establishment and supervision of programs for the education and training of employers and employees in the recognition * * * of unsafe working conditions in employments covered by this Act."

Among the "other powers" authorized to be used in enforcing and administering the provisions of the amendment which were not otherwise affected by the 1958 amendments

are sections 29 and 30 of the Act (44 Stat. 1438, 1439 as amended; 33 U.S.C. 929, 930), authorizing regulations requiring records and reports concerning injury or death to employees. Based on this authority, it is the purpose of this amendment to the Code of Federal Regulations to provide for the keeping of the underlying records and the making of necessary reports to permit analysis, study, and publication of standard work-injury frequency and severity data concerning longshoremen, ship repairmen, and other harbor workers as one means of furthering the statutory purpose above quoted. The 1958 amendments did not change the bulk of the Act, which has, for many years, provided a system of longshoremen's and harbor workers' compensation. Sections 29 and 30 (44 Stat. 1438, 1439 as amended; 33 U.S.C. 929, 930) have, since 1938, been implemented by regulations requiring records and reports necessary to administer its compensation features (20 CFR Part 31). These requirements are unaffected by this amendment to the Code of Federal Regulations requiring records and reports for the additional purpose contemplated by the amended section 41.

Though no general notice of a proposal to make the regulations hereinafter set out has been published in the Federal Register, there has been extensive consultation concerning them with the employers who will have obligations under these regulations and their trade associations. As detailed records of injuries and their severity for the first quarter of the calendar year 1960 may not have been kept by all employers of whom reports will be required, accuracy of the reports depends upon submission of them while the matters to be reported are still fresh in the minds of the reporting officers. This cannot be accomplished consistently with the delay incident to formal notice and public procedure thereon. These reasons are deemed to be good cause to, and I do hereby, find that notice and public procedure thereon are impracticable, unnecessary, and contrary to public interest. As the reports required to be filed by April 30 are not bur-

densome to prepare but may depend for accuracy on prompt preparation, and as required recordkeeping should be commenced immediately to assure the accuracy of subsequent reports, I find good cause to, and do, provide that these amendments to the Code of Federal Regulations shall be effective immediately.

Accordingly, pursuant to section 4 of the Administrative Procedure Act (60 Stat. 238, 5 U.S.C. 1003), Subtitle A of Title 29, Code of Federal Regulations, is hereby amended by adding a new Part 10 to read as follows:

Sec.

10.1 Definitions.

10.2 Records.

10.3 Operations and estimating procedure reports.

10.4 Quarterly injury and employment record reports.

10.5 Annual work-injury severity reports.

AUTHORITY: §§ 10.1 to 10.5 issued under 44 Stat. 1438, 1439, as amended, 72 Stat. 835, 33 U.S.C. 929, 930, 941.

§ 10.1

DEFINITIONS

When used in this Part 10—

(a) The term "injury" means accidental injury or death arising out of and in the course of employment, and such occupational disease or infection as arises naturally out of such employment or as naturally or unavoidably results from such accidental injury, and includes an injury caused by the willful act of a third person directed against an employee because of his employment.

(b) The term "disabling injury" includes any injury which results in death or permanent physical impairment or which makes the injured person unable to work throughout the hours corresponding to those of the shift on which he was injured on any day after the day of injury.

(c) The term "death" means any work injury which results in death, regardless of the time which elapses between the injury and death.

(d) The term "permanent-total disability" means an injury which permanently and completely disables a worker. It includes the loss, or complete loss of use, of both arms, or hands, or legs, or feet, or eyes or any combination of these body parts such as one arm and one leg, one hand and one foot, etc.

(e) The term "permanent-partial disability" means an injury which permanently, but only partially disables a worker. It includes the total or partial loss, or loss of use, of an arm, hand, leg, finger, etc., or any permanent impairment of a function of the body or of a part of the body to any degree less than permanent-total disability.

(f) The term "temporary-total disability" means an injury which does not result in death or permanent-total or permanent-partial disability if the injured person, because of his injury, is unable to perform a regularly established job, which is open and available to him, during the entire time interval corresponding to the hours of his regular shift on any one or more days (including Sundays and days off) subsequent to the day of injury.

(g) The term "employee" does not include a master or member of a crew of any vessel, nor any person engaged by the master to load or unload or repair any small vessel under eighteen tons net.

(h) The term "employer" means an employer any of whose employees are employed in maritime employment, in whole or in part, upon the navigable waters of the United States (including any drydock).

(i) The term "injury-frequency rate" means the number of disabling injuries per million employee-hours worked obtained by multiplying the total number of disabling injuries by one million and dividing that product by the total employee-hours worked.

(j) The term "injury-severity rate" means the number of days lost or charged per million employee-hours worked obtained by adding the standard time charges for each case of death and permanent impairment to the total number of days

of incapacity resulting from all other cases of disabling injuries, multiplying that sum by one million and dividing that product by the total number of employee-hours worked.

(k) The term "the Act" means the Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1424, as amended, 33 U.S.C. 902-950).

§ 10.2

RECORDS

Every employer employing any employee in any activity subject to the Act shall make and keep such records as are necessary to compute and permit verification of standard work-injury frequency and severity rates concerning all work subject to the Act. Such records shall be available for inspection on demand by authorized representatives of the Secretary of Labor at the employing establishment for a period of 3 years following every report required to be made thereon pursuant to this Part 10.

(a) The records required by this § 10.2 shall include reasonably contemporaneous entries revealing each disabling injury experienced by an employee arising out of and in the course of his employment in any activity covered by the Act. These records shall be in such detail as will reveal the activity being performed at the time of injury, the manner in which the injury occurred, and a description of the injury and relative severity of the injury as measured by the number of days of inability to work at the employee's usual employment resulting from the injury or by the occurrence of death or permanent physical impairment as a result of the injury.

(b) The records required by this § 10.2 shall also reveal the total number of employee-hours worked by all employees at the employing establishment in activities covered by the Act. If a current description of procedure for estimating such number of employee-hours worked has been filed with the Bureau of Labor Statistics on its forms BLS 2672A and

BLS 2672B, and the Bureau has not notified the employer of its disapproval of such description of estimating procedure, the requirements of this paragraph (b) will be satisfied by the records necessary for application of the estimating procedure.

§ 10.3

OPERATIONS AND ESTIMATING PROCEDURE REPORTS

For the three-month period ending March 31, 1960, and annually thereafter for the first three-month period in each calendar year, every employer employing any employee subject to the Act shall file with the Bureau of Labor Statistics (as collection agency for the Bureau of Labor Standards) at its central office at Washington 25, D.C., on form BLS 2672A, which is available at the central and regional offices of the Bureau of Labor Statistics and the Bureau of Labor Standards, a report of its operations and of its employee-hours worked estimating procedure, if any. A separate report shall be filed for each port in which the employer had operations during the quarter. Form BLS 2672A will require a statement of the major functions or activities performed by the reporting establishment and of the locations at which operations are conducted. If the employee-hours worked in activities subject to the Act are estimated in the reports required by §§ 10.4 and 10.5, this report shall give a description of the estimating procedure used, in sufficient detail to permit a reasonable appraisal of its adequacy. Each report required by this § 10.3 shall be filed within the fourth month in each calendar year.

§ 10.4

QUARTERLY INJURY AND EMPLOYMENT RECORD REPORTS

For the three-month period ending March 31, 1960, and for each three-month period thereafter, every employer employing any employee subject to the Act shall file with the Bureau of Labor Statistics (as collection agency of the Bureau

§ 10.5

For calendar year 1960 and for each calendar year thereafter, every employer employing any employee subject to this Act shall file with the Bureau of Labor Statistics (as collection agency for the Bureau of Labor Standards) at its central office at Washington 25, D.C., on form BLS 2672C, which is available at the central and regional offices of the Bureau of Labor Standards and Bureau of Labor Statistics, an annual work-injury severity report for each port at which any such employee is employed. The report form will require essentially the information requested from reporters in the Bureau of Labor Statistics annual injury rate survey for other industries. Each report shall be filed within 45 days after the end of the calendar year to which the report applies.

JAMES P. MITCHELL,
Secretary of Labor.

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Public Law 85-742
85th Congress, H.R. 13021
August 23, 1958

AN ACT

TO AMEND SECTION 41 OF THE LONGSHOREMEN'S AND HARBOR WORKERS' COMPENSATION ACT SO AS TO PROVIDE A SYSTEM OF SAFETY RULES, REGULATIONS, AND SAFETY INSPECTION AND TRAINING, AND FOR OTHER PURPOSES.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 41 of the Longshoremen's and Harbor Workers' Compensation Act (ch. 509, 44 Stat. 1424), as amended, is amended to read as follows:

"Sec. 41. (a) Every employer shall furnish and maintain employment and places of employment which shall be reasonably safe for his employees in all employments covered by this Act and shall install, furnish, maintain, and use such devices and safeguards with particular reference to equipment used by and working conditions established by such employers as the Secretary may determine by regulation or order to be reasonably necessary to protect the life, health, and safety of such employees, and to render safe such employment and places of employment, and to prevent injury to his employees. However, the Secretary may not make determinations by regulation or order under this section as to matters within the scope of title 52 of the Revised Statutes and Acts supplementary or amendatory thereto, the Act of June 15, 1917 (ch. 30, 40 Stat. 220), as amended, or section 4(e) of the Act of August 7, 1953 (ch. 345, 67 Stat. 462), as amended.

"(b) The Secretary, in enforcing and administering the provisions of this section, is authorized in addition to such other powers and duties as are conferred upon him—

"(1) to make studies and investigations with respect to safety provisions and the causes and prevention of

injuries in employments covered by this Act and from time to time make to Congress such recommendations as he may deem proper as to the best means of preventing such injuries, and in making such studies and investigations to cooperate with any agency of the United States or with any State agency engaged in similar work;

"(2) to utilize the services of any agency of the United States or any State agency engaged in similar work (with the consent of such agency) in connection with the administration of this section;

"(3) to promote uniformity in safety standards in employments covered by this Act through cooperative action with any agency of the United States or with any State agency engaged in similar work;

"(4) to provide for the establishment and supervision of programs for the education and training of employers and employees in the recognition, avoidance, and prevention of unsafe working conditions in employments covered by this Act, and to consult with and advise employers as to the best means of preventing injuries;

"(5) to hold such hearings, issue such orders, and make such decisions, based upon findings of fact, as are deemed to be necessary to enforce the provisions of this section, and for such purposes the Secretary and the district courts shall have the authority and jurisdiction provided by section 5 of the Act of June 30, 1936 (ch. 881, 49 Stat. 2036), as amended, and the Secretary shall be represented in any court proceedings as provided in the Act of May 4, 1928 (ch. 502, 45 Stat. 490), as amended.

"(c) The Secretary or his authorized representative may inspect such places of employment, question such employees, and investigate such conditions, practices, or matters in connection with employment subject to this Act, as he may deem appropriate to determine whether any person has violated

any provision of this section, or any rule or regulation issued thereunder, or which may aid in the enforcement of the provisions of this section. No employer or other person shall refuse to admit the Secretary or his authorized representatives to any such place or shall refuse to permit any such inspection.

"(d) Any employer may request the advice of the Secretary or his authorized representative, in complying with the requirements of any rule or regulation adopted to carry out the provisions of this section. In case of practical difficulties or unnecessary hardships, the Secretary in his discretion may grant variations from any such rule or regulation, or particular provisions thereof, and permit the use of other or different devices if he finds that the purpose of the rule or regulation will be observed by the variation and the safety of employees will be equally secured thereby. Any person affected by such rule or regulation, or his agent, may request the Secretary to grant such variation, stating in writing the grounds on which his request is based. Any authorization by the Secretary of a variation shall be in writing, shall describe the conditions under which the variation shall be permitted, and shall be published as provided in section 3 of the Administrative Procedure Act (ch. 324, 60 Stat. 237), as amended. A properly indexed record of all variations shall be kept in the office of the Secretary and open to public inspection.

"(e) The United States district courts, together with the District Court for the Territory of Alaska, shall have jurisdiction for cause shown, in any action brought by the Secretary, represented as provided in the Act of May 4, 1928 (ch. 502, 45 Stat. 490), as amended, to restrain violations of this section or of any rule, regulation, or order of the Secretary adopted to carry out the provisions of this section.

"(f) Any employer who, willfully, violates or fails or refuses to comply with the provisions of subsection (a) of

this section, or with any lawful rule, regulation, or order adopted to carry out the provisions of this section, and any employer or other person who willfully interferes with, hinders, or delays the Secretary or his authorized representative in carrying out his duties under subsection (c) of this section by refusing to admit the Secretary or his authorized representative to any place, or to permit the inspection or examination of any employment or place of employment, or who willfully hinders or delays the Secretary or his authorized representative in the performance of his duties in the enforcement of this section, shall be guilty of an offense, and, upon conviction thereof, shall be punished for each offense by a fine of not less than \$100 nor more than \$3,000, and in any case where such employer is a corporation, the officer who willfully permits any such violation to occur shall be guilty of an offense, and, upon conviction thereof, shall be punished also for each offense by a fine of not less than \$100 nor more than \$3,000. The liability hereunder shall not affect any other liability of the employer under this Act.

"(g) (1) The provisions of this section shall not apply in the case of any employment relating to the operations for the exploration, production, or transportation by pipeline of mineral resources upon the navigable waters of the United States, nor under the authority of the Act of August 7, 1953 (ch. 345, 67 Stat. 462), nor in the case of any employment in connection with lands (except filled in, made or reclaimed lands) beneath the navigable waters as defined in the Act of May 22, 1953 (ch. 65, 67 Stat. 29) nor in the case of any employment for which compensation in case of disability or death is provided for employees under the authority of the Act of May 17, 1928 (ch. 612, 45 Stat. 600), as amended, nor under the authority of the Act of August 16, 1941 (ch. 357, 55 Stat. 622), as amended.

"(2) The provisions of this section, with the exception of paragraph (1) of subsection (b), shall not be applied under

the authority of the Act of September 7, 1916 (ch. 458, 39 Stat. 742), as amended."

SEC. 2. The term "Secretary" as used in this Act and in amendments made by this Act means the Secretary of Labor.
Approved August 23, 1958.

BUREAU OF LABOR STANDARDS FIELD OFFICES

NORTH ATLANTIC AREA

Area Offices

10th Floor—Warner Building
325 West 44th Street
New York 36, N.Y.
Columbus 5-6224—Ext. 24, 25

18 Oliver Street
Room 504
Boston 10, Mass.
Liberty 2-2115

811 Lafayette Building
5th and Chestnut Streets
Philadelphia, Pa.
WA 3-2400—Ext. 674

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Fayette and St. Paul Streets
Baltimore 2, Md.
Plaza 2-8460—Ext. 750

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Building
Savannah, Ga.
AD 4-8546

Rooms 609-610
126 West Adams Street
Jacksonville 2, Fla.
Elgin 6-3673

Room 231—Franklyn Building
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Madison 7-1019

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Harrison 7-2007, 2008

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1365 Ontario Street
Cleveland 14, Ohio
Cherry 1-7900—Ext. 529

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6731 Harrisburg Street
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Walnut 6-1711

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1927 Post Office Street
Galveston, Tex.
Southfield 3-3114

435 Federal Building
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Mobile 10, Ala.
Hemlock 2-3641—Ext. 220

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593 Market Street
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Long Beach, Calif.
Hemlock 2-9852

401-402 U.S. Court House
Seattle 4, Wash.
Mutual 2-3300—Ext. 504

313A U.S. Court House (Old)
Portland 4, Oreg.
Capital 6-3361—Ext. 798

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