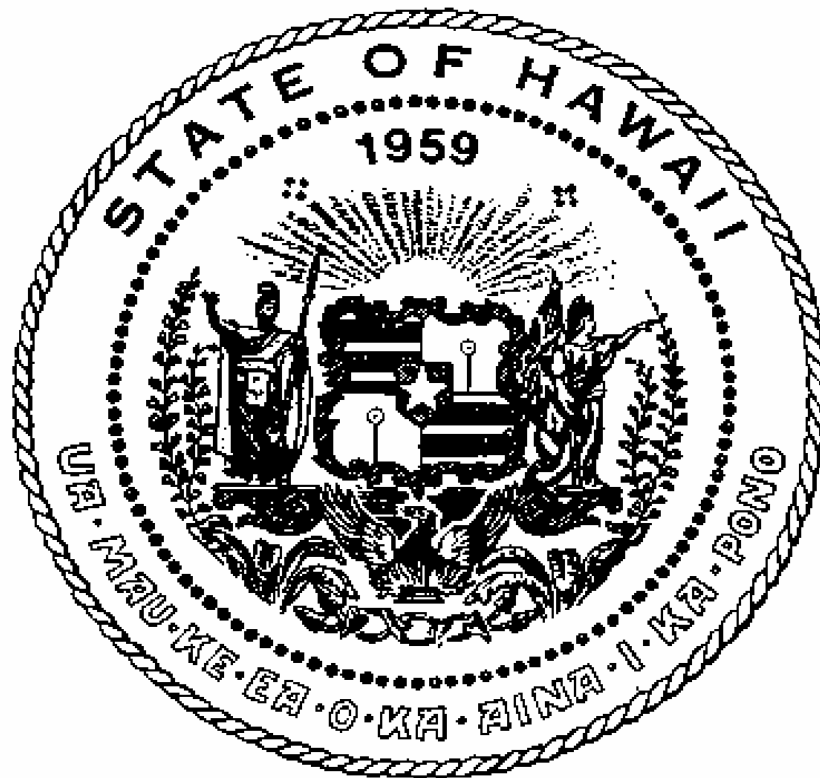


OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS



PART 6  
MARINE TERMINALS

HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

PART 6

OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR MARINE TERMINALS

Chapter 12-180 Marine Terminals

This unofficial copy varies from the administrative rules format in that all sections follow directly after the previous section; small letters designating subsections are in bold type; page numbers have been added to the bottom center of each page; headers do not include the section number, only the title and chapter number; and sections that incorporate federal (Department of Labor, Occupational Safety and Health Administration) standards through reference include the federal standard. These variations facilitate changes to and use of the HIOSH rules and standards. This is an official copy in all other respects.

## HAWAII ADMINISTRATIVE RULES

## TITLE 12

## DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

## SUBTITLE 8

## DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

## PART 6

## MARINE TERMINALS

## CHAPTER 180

## MARINE TERMINALS

§12-180-1 Incorporation of federal standard

**§12-180-1 Incorporation of federal standard.** Title 29, Code of Federal Regulations. Part 1917 entitled "Marine Terminals", published by the Office of the Federal Register, National Archives and Records Administration, on July 5, 1983; and the amendments published on July 13, 1984; August 24, 1987; September 25, 1987; December 4, 1987; December 31, 1987; April 27, 1988; June 7, 1989; February 9, 1994; July 19, 1994; December 22, 1994; February 13, 1996; July 25, 1997; December 1, 1998; August 27, 1999; November 12, 1999; June 30, 2000; February 28, 2006; and November 15, 2007, are made a part of this chapter. [Eff 03/23/01; am 12/21/06; am 5/02/08] (Auth: HRS §396-4) (Imp: HRS §396-4)

**§1917.1 Scope and applicability.**

- (a) The regulations of this part apply to employment within a marine terminal as defined in §1917.2, including the loading, unloading, movement or other handling of cargo, ship's stores or gear within the terminal or into or out of any land carrier, holding or consolidation area, any other activity within and associated with the overall operation and functions of the terminal, such as the use and routine maintenance of facilities and equipment. All cargo transfer accomplished with the use of shore-based material handling devices shall be regulated by this part.
- (1) The provisions of this Part §1917 do not apply to the following:
- (i) Facilities used solely for the bulk storage, handling and transfer of flammable, non-flammable and combustible liquids and gases.
  - (ii) Facilities subject to the regulations of the Office of Pipeline Safety Regulation of the Materials Transportation Bureau, Department of Transportation, to the extent such regulations apply.
  - (iii) Fully automated bulk coal handling facilities contiguous to electrical power generating plants.
- (2) Part §1910 of this chapter does not apply to marine terminals except for the following provisions:
- (i) Abrasive blasting. Subpart G, §1910.94(a)
  - (ii) Access to employee exposure and medical records. Subpart Z, §1910.1020;
  - (iii) Commercial diving operations. Subpart T of part §1910;
  - (iv) Electrical. Subpart S of part §1910;
  - (v) Grain handling facilities. Subpart R, §1910.272;
  - (vi) Hazard communication. Subpart Z, §1910.1200;

- (vii) Ionizing radiation. Subpart Z, §1910.1096;
- (viii) Noise. Subpart G, §1910.95;
- (ix) Nonionizing radiation. Subpart G, §1910.97;
- (x) Respiratory protection. Subpart I, §1910.134;
- (xi) Safety requirements for scaffolding. Subpart D, §1910.28;
- (xii) Servicing multi-piece and single piece rim wheels. Subpart N, §1910.177;
- (xiii) Toxic and hazardous substances. Subpart Z applies to marine cargo handling activities except for the following:
  - (A) When a substance or cargo is contained within a sealed, intact means of packaging or containment complying with Department of Transportation or International Maritime Organization requirements;<sup>(1)</sup>
  - (B) Bloodborne pathogens, §1910.1030;
  - (C) Carbon monoxide, §1910.1000 (See §1917.24(a));
  - (D) Hydrogen sulfide, §1910.1000 (See §1917.73(a)(2))
  - (E) Hexavalent chromium §1910.1026 (See §1915.1026)
- (xiv) Powered industrial truck operator training, Subpart N, §1910.178(l).

**Note to Paragraph(a)(2)(xiv):** The compliance dates of December 1, 1999 set forth in 29 CFR 1910.178(1)(7) are stayed until March 1, 2000 for Marine Terminals.

- (b) Section 1915.1026 applies to any occupational exposures to hexavalent chromium in workplaces covered by this Part.

Footnote (1) The International Maritime Organization publishes the International Maritime Dangerous Goods Code to aid compliance with the international legal requirements of the International Convention for the Safety of Life at Sea, 1960.

### §1917.2 Definitions.

**Apron** means that open portion of a marine terminal immediately adjacent to a vessel berth and used in the direct transfer of cargo between the terminal and vessel.

**Authorized**, in reference to an employee's assignment, means selected by the employer for that purpose.

**Cargo door** (transit shed door) means a door designed to permit transfer of cargo to and from a marine terminal structure.

**Cargo packaging** means any method of containment for shipment, including cases, cartons, crates and sacks, but excluding large units such as intermodal containers, vans or similar devices.

**Confined space** means:

- (1) A space having all of the following characteristics:
  - (i) Small size;
  - (ii) Severely limited natural ventilation;
  - (iii) Capability to accumulate or contain a hazardous atmosphere;
  - (iv) Exits that are not readily accessible; and
  - (v) A design not meant for continuous human occupancy.
- (2) Examples of confined spaces are intermodal tank containers, ballwater tanks and portable tanks.

**Conveyor** means a device designed exclusively for transporting bulk materials, packages or objects in a predetermined path and having fixed or selective points of loading or discharge.

**Danger zone** means any place in or about a machine or piece of equipment where an employee may be struck by or caught between moving parts, caught between moving and stationary objects or parts of the machine, caught between the material and a moving part of the machine, burned by hot surfaces or exposed to electric shock. Examples of danger zones are nip and shear points, shear lines, drive mechanisms, and areas beneath counterweights.

**Designated person** means a person who possesses specialized abilities in a specific area and is assigned by the employer to perform a specific task in that area.

**Dock** means a wharf or pier forming all or part of a waterfront facility, including marginal or quayside berthing facilities; not to be confused with **loading dock** as at a transit shed or container freight station, or with the body of water between piers or wharves.

**Dockboards** (car and bridge plates) mean devices for spanning short distances between rail cars or highway vehicles and loading platforms that do not expose employees to falls greater than 4 feet (1.22 m).

**Enclosed space** means an indoor space other than a confined space, that may contain or accumulate a hazardous atmosphere due to inadequate natural ventilation. Examples of enclosed spaces are trailers, railcars, and storage rooms.

**Examination**, as applied to material handling devices required by this part to be certificated, means a comprehensive survey consisting of the criteria outlined in 29 CFR 1919.71(d) as applicable to the type of gear or device. The examination is supplemented by a unit proof test in the case of a quadrennial survey.

**Flammable atmosphere** means an atmosphere containing more than 10 percent of the lower flammable limit of a flammable or combustible vapor or dust mixed with air.

**Front-end attachments**. As applied to power-operated industrial trucks, means the various devices, such as roll clamps, rotating and sidecarriages, magnets, rams, crane arms or booms, load stabilizers, scoops, buckets and dumping bins, attached to the load end for handling lifts as single or multiple units.

**As applied to cranes**, means various attachments applied to the basic machine for the performance of functions such as lifting, clamshell or magnet services.

**Fumigant** is a substance or mixture of substances, used to kill pests or prevent infestation, which is a gas or is rapidly or progressively transformed to the gaseous state, even though some nongaseous or particulate matter may remain and be dispersed in the treatment space.

**Hazardous cargo, material, substance or atmosphere** means: Any substance listed in 29 CFR Part 1910, Subpart Z; Any material in the Hazardous Materials Table and Hazardous Materials Communications Regulations of the Department of Transportation, 49 CFR Part 172; Any article not properly described by a name in the Hazardous Materials Table and Hazardous Materials Communications Regulations of the Department of Transportation, 49 CFR Part 172 but which is properly classified under the definition of those categories of dangerous articles given in 49 CFR 173; or Any atmosphere with an oxygen content of less than, 19.5%.

**House falls** means spans and supporting members, winches, blocks, and standing and running rigging forming part of a marine terminal and used with a vessel's cargo gear to load or unload by means of married falls.

**Inspection**, as applied to material handling devices required by this part to be certificated, means a complete visual examination of all visible parts of the device.

**Intermodal container** means a reusable cargo container of a rigid construction and rectangular configuration; fitted with devices permitting its ready handling, particularly its transfer from one mode of transport to another; so designed to be readily filled and emptied; intended to contain one or more articles of cargo or bulk commodities for transportation by water and one or more other transport modes. The term includes completely enclosed units, open top units, fractional height units, units incorporating liquid or gas tanks and other variations fitting into the container system. It does not include cylinders, drums, crates, cases, cartons, packages, sacks, unitized loads or any other form of packaging.

**Loose gear** means removable and replaceable components of equipment or devices which may be used with or as a part of assembled material handling units for purposes such as making connections, changing line direction and multiplying mechanical advantage. Examples are shackles and snatch blocks.

**Marine terminal** means wharves, bulkheads, quays, piers, docks and other berthing locations and adjacent storage or adjacent areas and structures associated with the primary movement of cargo or materials from vessel to shore or shore to vessel including structures which are devoted to receiving, handling, holding, consolidating and loading or delivery of waterborne shipments or passengers, including areas devoted to the maintenance of the terminal or equipment. The term does not include production or manufacturing areas nor does the term include storage facilities directly associated with those production or manufacturing areas.

**Ramps** mean other flat-surface devices for passage between levels and across openings not covered under **dockboards**.

**§1917.3 Incorporation by reference.**

- (a) (1) The standards of agencies of the U.S. Government, and organizations which are not agencies of the U.S. Government which are incorporated by reference in this part, have the same force and effect as other standards in this part. Only the mandatory provisions (i.e. provisions containing the word "shall" or other mandatory language) of standards incorporated by reference are adopted as standards under the Occupational Safety and Health Act.
- (2) Any changes in the standards incorporated by reference in this part and an official historic file of such changes are available for inspection at the national office of the Occupational Safety and Health Administration, U.S. Department of Labor, Washington, DC 20210.
- (3) The materials listed in paragraph (b) of this section are incorporated by reference in the corresponding sections noted as they exist on the date of the approval, and a notice of any change in these materials will be published in the Federal Register. These incorporations by reference (IBRs) were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and in 1 CFR part 51.
- (4) Copies of the following standards that are issued by the respective private standards organizations may be obtained from the issuing organizations. The materials are available for purchase at the corresponding addresses of the private standards organizations noted in paragraph (b) of this section. In addition, all are available for inspection at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington DC, and through the OSHA Docket Office, room N2625, U.S. Department of Labor, 200 Constitution Ave., Washington, DC 20210, or any of OSHA's regional offices.
- (b) The following material is available for purchase from the American National Standards Institute (ANSI), 11 West 42nd St., New York, NY 10036:
- (1) ANSI A14.1-1990, Safety Requirements for Portable Wood Ladders; IBR approved for §1917.119(c).
- (2) ANSI A14.2-1990, Safety Requirements for Portable Metal Ladders; IBR approved for §1917.119(c).
- (3) ANSI A14.5-1992, Safety Requirements for Portable Reinforced Plastic Ladders; IBR approved for §1917.119(c).
- (4) ANSI Z-87.1-1989, Practice for Occupational and Educational Eye and Face Protection; IBR approved for §1917.91(a)(1).
- (5) ANSI Z-89.1-1986, Personnel Protection-Protective Headwear for Industrial Workers-Requirements; IBR approved for §1917.93(b).
- (6) ANSI Z-41-1991, American National Standard for Personal Protection-Protective Footwear; IBR approved for §1917.94(b).
- (7) ASME B56.1, 1959, Safety Code for powered Industrial Trucks, pages 8 and 13; IBR approved for §1917.50(j)(1).

**§1917.4 OMB control numbers under the paperwork Reduction Act.**

The following list identifies the 29 CFR citations for sections or paragraphs in this part that contain a collection of information requirement approved by the Office of Management and Budget (OMB). The list also provides the control number assigned by OMB to each approved requirement; control number 1218-0196 expires on May 31, 2002 and control number 1218-0003 expires on July 31, 2001. The list follows:

29 CFR citation	OMB control number
1917.17(n)	1218-0196
1917.17(o)	1218-0196
1917.23(b)(1)	1218-0196
1917.23(b)(2)	1218-0196
1917.23(d)(4)	1218-0196
1917.24(b)	1218-0196

1917.24(d)	1218-0196
1917.25(a)	1218-0196
1917.25(b)	1218-0196
1917.25(c)	1218-0196
1917.25(f)	1218-0196
1917.25(d)(7)	1218-0196
1917.30(a)(1)	1218-0196
1917.30(a)(5)(iii)	1218-0196
1917.42(b)(1)	1218-0196
1917.42(b)(4)	1218-0196
1917.42(c)(1)	1218-0196
1917.42(d)(1)	1218-0196
1917.42(g)(3)	1218-0003
1917.42(h)(1)	1218-0196
1917.42(h)(4)	1218-0003
1917.42(h)(5)	1218-0196
1917.44(e)	1218-0196
1917.44(h)	1218-0196
1917.45(f)(1)(i)	1218-0196
1917.45(f)(4)(iv)	1218-0196
1917.45(f)(6)	1218-0196
1917.45(g)(2)	1218-0196
1917.45(g)(3)(iii)	1218-0196
1917.45(g)(8)	1218-0196
1917.45(k)(l)	1218-0196
1917.45(k)(4)	1218-0196
1917.46(a)(1)(v)	1218-0196
1917.50(c)(1)	1218-0003
1917.50(c)(3)	1218-0003
1917.50(c)(4)(i)	1218-0003
1917.50(c)(5)(ii)	1218-0003
1917.50(c)(5)(iii)	1218-0003
1917.50(e)	1218-0003
1917.50(g)(1)	1218-0003
1917.50(h)	1218-0003
1917.71(a)	1218-0196
1917.71(b)(2)(i)	1218-0196
1917.71(b)(2)(ii)	1218-0196
1917.71(b)(6)(ii)	1218-0196
1917.71(f)(4)	1218-0196
1917.111(b)	1218-0196
1917.113	1218-0196
1917.115(c)	1218-0196
1917.116(e)	1218-0196
1917.116(g)	1218-0196
1917.117(a)	1218-0196
1917.117(b)	1218-0196
1917.117(d)	1218-0196
1917.117(e)	1218-0196
1917.117(f)	1218-0196
1917.117(l)	1218-0196
1917.118(e)(4)(i)	1218-0196
1917.119(e)	1218-0196

1917.122(a)	1218-0196
1917.122(b)	1218-0196
1917.128(b)(1)-(b)(4)	1218-0196
1917.151(e)(5)	1218-0196
1917.152(d)(2)(v)	1218-0196
1917.152(d)(2)(vi)	1218-0196

**§1917.11 Housekeeping.**

- (a) Active work areas shall be kept free of equipment and materials not in use, and clear of debris, projecting nails, strapping and other sharp objects not necessary for the work in progress.
- (b) Hatch beams, covers and pontoons placed in terminal working areas shall be stowed in stable piles with beams secured against tipping or falling. Alternatively, beams may be laid on their sides. When beams and pontoons are stowed in tiers more than one high, dunnage or other suitable material shall be used under and between tiers.
- (c) Cargo and material shall not obstruct access to vessels, cranes, vehicles or buildings. Means of access and egress within the buildings shall be similarly unobstructed.
- (d) Dunnage, lumber, or shoring material in which there are visibly protruding nails shall be removed from the immediate work area or if left in the area, the nails shall be rendered harmless.

**§1917.12 Slippery conditions.**

The employer shall eliminate, to the extent possible, conditions causing slippery working and walking surfaces immediate work areas used by employees.

**§1917.13 Slinging.**

- (a) Drafts shall be safely slung before being hoisted. Loose dunnage or debris hanging or protruding from loads shall be removed.
- (b) Bales of cotton, wool, cork, wood pulp, gunny bags or similar articles shall be hoisted only by straps strong enough to support the weight of the bale. At least two hooks, each in a separate strap, shall be used.
- (c) Unitized loads bound by bands or straps may be hoisted by the banding or strapping only if the banding or strapping is suitable for hoisting and is strong enough to support the weight of the load.
- (d) Additional means of hoisting shall be employed to ensure safe lifting of utilized loads having damaged banding or strapping.
- (e) Case hooks shall be used only with cases designed to be hoisted by these hooks.
- (f) Loads requiring continuous manual guidance during handling shall be guided by guide ropes (tag lines) that are long enough to control the load.
- (g) Intermodal containers shall be handled in accordance with §1917.71(f).
- (h) The employer shall require employees to stay clear of the area beneath overhead drafts or descending lifting gear.
- (i) Employees shall not be permitted to ride the hook or the load.

**§1917.14 Stacking of cargo and pallets.**

Cargo, pallets and other material stored in tiers shall be stacked in such a manner as to provide stability against sliding and collapse.

**§1917.15 Coopering.**

Repair and reconditioning of damaged or leaking cargo packaging (coopering) shall be performed so as not to endanger employees.

**§1917.16 Line handling.**

- (a) In order to provide safe access for handling lines while mooring and unmooring vessels, cargo or material shall not be stowed or vehicles placed where they obstruct the work surface to be used.
- (b) When stringpiece or apron width is insufficient for safe footing, grab lines or rails shall be installed on the sides of permanent structures. (**Stringpiece** means a narrow walkway between the water edge of a berth and a shed or other structure.)

**§1917.17 Railroad facilities.**

- (a) Work shall be performed in railcars only if floors of the railcars are in visibly safe condition for the work activity being conducted and equipment being used.
- (b) A route shall be established to allow employees to pass to and from places of employment without passing under, over or through railcars, or between cars less than 10 feet (3 m) apart on the same track.
- (c) The employer shall direct that no employees remain in railcars after work is concluded.
- (d) Railcars shall be chocked or otherwise prevented from moving:
  - (1) While dockboards or carplates are in position; or
  - (2) While employees are working within, on, or under the railcars or near the tracks at the ends of the cars.
- (e) When employees are working in, on, or under a railcar, positive means shall be taken to protect them from exposure to impact from moving railcars.
- (f) Before cars are moved, unsecured and overhanging stakes, wire straps, banding and similar objects shall be removed or placed so as not to create hazards.
- (g) The employer shall institute all necessary controls during railcar movement to safeguard personnel. If winches or capstans are employed for movement, employees shall stand clear of the hauling rope and shall not stand between the rope and the cars.
- (h) Before being opened fully, doors shall be opened slightly to ensure that the load has not shifted during that the load has not shifted during transit. Special precautions shall be taken if the doors being opened are visibly damaged.
- (i) If power industrial trucks are used to open railcar doors, the trucks or the railcar doors shall be equipped with door opening attachments. Employees shall stand clear of the railcar doors while they are being opened and closed.
- (j) Only railcar door openers or powered industrial trucks equipped with door opening attachments shall be used to open jammed doors.
- (k) Employees shall not remain in or on gondolas or flat cars when drafts that create overhead, caught-in, caught-between or struck-by hazards are being landed in or on the railcar; end gates, if raised, shall be secured.
- (l) Operators of railcar dumps shall have an unrestricted view of dumping operations and shall have emergency means of stopping movement.
- (m) Recessed railroad switches shall be enclosed to provide a level surface.
- (n) Warning signs shall be posted where doorways open onto tracks, at blind corners and at similar places where vision may be restricted.
- (o) Warning signs shall be posted if insufficient clearance for personnel exists between railcars and structures.

**§1917.18 Log handling.**

- (a) The employer shall ensure that structures (bunks) used to contain logs have rounded corners and rounded structural parts to avoid sling damage.
- (b) Two or more binders or equivalently safe means of containment shall remain on logging trucks and railcars to secure logs during movement of the truck or car within the terminal. During unloading, logs shall be prevented from moving while binders are being removed.
- (c) Logs shall be hoisted by two slings or by other gear designed for safe hoisting.
- (d) Logs placed adjacent to vehicle curbs on the dock shall not be over one tier high unless placed in bunks or so stacked as not to roll or otherwise create a hazard to employees.

- (e) Before logs are slung up from the dock, they shall be stably supported to prevent spreading and to allow passage of slings beneath the load. When bunks or similar retaining devices are used, no log shall be higher than the stanchions or retaining members of the device.

**§1917.19 Movement of barges and railcars.**

Barges and railcars shall not be moved by cargo runners (running rigging) from vessel cargo booms, cranes or other equipment not suitable for the purpose.

**§1917.20 Interference with communications.**

Cargo handling operations shall not be carried on when noise-producing, maintenance, construction or repair work interferes with the communication of warnings or instructions.

**§1917.21 Open fires.**

Open fires and fires in drums or similar containers are prohibited.

**§1917.22 Hazardous cargo.<sup>(2)</sup> (See §1917.2(p)).**

- (a) Before cargo handling operations begin, the employer shall ascertain whether any hazardous cargo is to be handled and shall determine the nature of the hazard. The employer shall inform employees of the nature of any hazard and any special precautions to be taken to prevent employee exposure, and shall instruct employees to notify him of any leaks or spills.
- (b) All hazardous cargo shall be slung and secured so that neither the draft nor individual packages can fall as a result of tipping the draft or slacking of the supporting gear.
- (c) If hazardous cargo is spilled or if its packaging leaks, employees shall be removed from the affected area until the employer has ascertained the specific hazards, provided any equipment, clothing and ventilation and fire protection equipment necessary to eliminate or protect against the hazard, and has instructed cleanup employees in a safe method of cleaning up and disposing of a spill and handling and disposing of leaking containers. Actual cleanup or disposal work shall be conducted under the supervision of a designated person.

Footnote <sup>(2)</sup> The Department of Transportation and the United State Coast Guard apply requirements related to handling, storing and transportation of hazardous cargo (see 33 CFR Part 126, 46 CFR, 49 CFR).

**§1917.23 Hazardous atmospheres and substances (See also §1917.2 (r)).**

- (a) Purpose and scope. This section covers areas in which the employer is aware that a hazardous atmosphere or substance may exist, except where one or more of the following sections apply: §1917.22 Hazardous cargo; §1917.24 Carbon monoxide; §1917.25 Fumigants, pesticides, insecticides and hazardous preservatives; §1917.73 Terminal facilities handling menhaden and similar species of fish; §1917.152 Welding, cutting, and heating (hot work); and §1917.153 Spray painting.
- (b) Determination of hazard.
  - (1) When the employer is aware that a room, building, vehicle, railcar or other space contains or has contained a hazardous atmosphere, a designated and appropriately equipped person shall test the atmosphere before employee entry to determine whether a hazardous atmosphere exists.
  - (2) Records of results of any tests required by this section shall be maintained for at least thirty (30) days.
- (c) Testing during ventilation. When mechanical ventilation is used to maintain a safe atmosphere, tests shall be made by a designated person to ensure that the atmosphere is not hazardous.
- (d) Entry into hazardous atmospheres. Only designated persons shall enter hazardous atmospheres, in which case the following shall apply:

- (1) Persons entering a space containing a hazardous atmosphere shall be protected by respiratory and emergency protective equipment meeting the requirement of Subpart E of this part;
  - (2) Persons entering a space containing a hazardous atmosphere shall be instructed in the nature of the hazard, precautions to be taken, and the use of protective and emergency equipment. Standby observers, similarly equipped and instructed, shall continuously monitor the activity of employees within such space;
  - (3) Except for emergency or rescue operations, employees shall not enter into any atmosphere which has been identified as flammable or oxygen deficient (less than 19.5% oxygen). Persons who may be required to enter flammable or oxygen deficient atmospheres in emergency operations shall be instructed in the dangers attendant to those atmospheres and instructed in the use of self-contained breathing apparatus, which shall be utilized.
  - (4) To prevent inadvertent employee entry into spaces that have been identified as having hazardous, flammable or oxygen deficient atmospheres, appropriate warning signs or equivalent means shall be posted at all means of access to those spaces.
- (e) When the packaging of asbestos cargo leaks, spillage shall be cleaned up by designated employees protected from the harmful effects of asbestos as required by §1910.1001 of this chapter.

**§1917.24 Carbon monoxide.**

- (a) Exposure limits. The carbon monoxide content of the atmosphere in a room, building, vehicle, railcar or any enclosed space shall be maintained at not more than 50 parts per million (ppm) (0.005%) as an eight hour average area level and employees shall be removed from the enclosed space if the carbon monoxide concentration exceeds a ceiling of 100 ppm (0.01%).
- (b) Testing. Tests to determine carbon monoxide concentration shall be made when necessary to ensure that employee exposure does not exceed the limits specified in paragraph (a) of this section.
- (c) Instrumentation. Tests for carbon monoxide concentration shall be made by designated persons using gas detector tube units certified by NIOSH under 30 CFR Part 11 or other measuring instruments whose accuracy is as great or greater.
- (d) Records. A record of the date, time, location and results of carbon monoxide tests shall be available for at least thirty (30) days.

**§1917.25 Fumigants, pesticides, insecticides and hazardous preservatives (see also §1917.2 Hazardous cargo, material, substance or atmosphere).**

- (a) At any time that the concentration in any space reaches the level specified as hazardous by the fumigant manufacturer or by Table Z-1 of 29 CFR 1910.1000, whichever is lower, all employees shall be removed from the space and shall not be permitted to re-enter until such time as tests demonstrate that the atmosphere is safe.
- (b) Tests to determine the atmospheric concentration of chemicals used to treat cargo shall be:
  - (1) Appropriate for the hazard involved;
  - (2) Conducted by designated persons; and
  - (3) Performed at the intervals necessary to ensure that employee exposure does not exceed the permissible exposure limit for the chemical involved.
- (c) Results of any tests shall be available for at least 30 days. Such records may be entered on any retrievable medium, and shall be available for inspection.
- (d) Chemicals shall only be applied to cargoes by designated persons.
- (e) Only designated persons shall enter hazardous atmospheres, in which case the following provisions apply.
  - (1) Persons entering a space containing a hazardous atmosphere shall be protected by respiratory and emergency protective equipment meeting the requirement of Subpart E of this part; and

- (2) Persons entering a space containing a hazardous atmosphere shall be instructed in the nature of the hazard, precaution to be taken, and the use of protective and emergency equipment. Standby observers, similarly equipped and instructed, shall continuously monitor the activity of employees within such a space.
- (f) A U.S. Coast Guard approved 30-inch (76.2 cm) life ring, with at least 90 feet (27.43m) of line attached, shall be available at readily accessible points at each waterside work area where the employees' work exposes them to the hazard of drowning. Employees working on any bridge or structure leading to a detached vessel berthing installation shall wear U.S. Coast Guard approved personal flotation devices except where protected by railings, nets, or safety belts and lifelines. A readily available portable or permanent ladder giving access to the water shall also be provided within 200 feet (61 m) of such work areas.
- (g) In the case of containerized shipments of fumigated tobacco, the contents of the container shall be aerated by opening the container doors for a period of 48 hours after the completion of fumigation and prior to loading. When tobacco is within shipping cases having polyethylene or similar bag liners, the aeration period shall be 72 hours. The employer shall obtain a written warranty from the fumigation facility stating that the appropriate aeration period has been met.

**§1917.26 First aid and lifesaving facilities.**

- (a) Employers shall instruct employees to report every injury, regardless of severity, to the employer.
- (b) A first aid kit shall be available at the terminal, and at least one person holding a valid first aid certificate shall be at the terminal when work is in progress.
- (c) First aid kit. First aid kits shall be weatherproof and shall contain individual sealed packages for each item that must be kept sterile. The contents of each kit shall be determined by a person certified in first aid and cognizant of the hazards found in marine cargo handling operations. The contents shall be checked at intervals that allow prompt replacement of expended items.
- (d) Stretchers.
  - (1) There shall be available for each vessel being worked one Stokes basket stretcher, or its equivalent, permanently equipped with bridles for attaching to the hoisting gear.
  - (2) Stretchers shall be kept close to vessels and shall be positioned to avoid damage to the stretcher.
  - (3) A blanket or other suitable covering shall be available.
  - (4) Stretchers shall have at least four sets of effective patient restraints in operable condition.
  - (5) Lifting bridles shall be of adequate strength, capable of lifting 1,000 pounds (454 kg) with a safety factor of five, and shall be maintained in operable condition. Lifting bridles shall be provided for making vertical patient lifts at container berths. Stretchers for vertical lifts shall have foot plates.
  - (6) Stretchers shall be maintained in operable condition. Struts and braces shall be inspected for damage. Wire mesh shall be secured and have no burrs. Damaged stretchers shall not be used until repaired.
  - (7) Stretchers in permanent locations shall be mounted to prevent damage and shall be protected from the elements if located out-of-doors. If concealed from view, closures shall be marked to indicate the location of the life saving equipment.
- (e) Telephone or equivalent means of communication shall be readily available.
- (f) A U.S. Coast Guard approved 30-inch (76.2 cm) life ring, with at least 90 feet (27.43m) of line attached, shall be available at readily accessible points at each waterside work area where the employees' work exposes them to the hazard of drowning. Employees working on any bridge or structure leading to a detached vessel berthing installation shall wear U.S. Coast Guard approved personal flotation devices except where protected by railings, nets, or safety belts and lifelines. A readily available portable or permanent ladder giving access to the water shall also be provided within 200 feet (61 m) of such work areas.

**§1917.27 Personnel.****(a)** Qualifications of machinery operators.

- (1) Only those employees determined by the employer to be competent by reason of training or experience, and 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 cargo handling apparatus, or any power operated vehicle, or give signals to the operator of any hoisting apparatus. Exception: Employees being trained and supervised by a designated person may operate such machinery and give signals to operators during training.
- (2) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments that may suddenly incapacitate the employee, shall be permitted to operate a crane, winch or other power-operated cargo handling apparatus or a power-operated vehicle.

**Note to paragraph (a)(2):** OSHA is defining suddenly incapacitating medical ailments consistent with the Americans with Disabilities Act (ADA), 42 U.S.C. 12101 (1990). Therefore, employers who act in accordance with the employment provisions (Title I) of the ADA (42 U.S.C. 12111-12117), the regulations implementing Title I (29 CFR Part 1630), and the Technical Assistance Manual for Title I issued by the Equal Employment Opportunity Commission (Publication number: EEOC -- M1A), will be considered as being in compliance with this paragraph.

**(b)** Supervisory accident prevention proficiency.

- (1) After October 3, 1985 immediate supervisors of cargo-handling operation of more than five (5) persons, shall satisfactorily complete a course in accident prevention. Employees newly assigned to supervisory duties after that date shall be required to meet the provisions of this paragraph within ninety (90) days of such assignment.
- (2) The course shall consist of instruction suited to the particular operations involved.<sup>(3)</sup>

Footnote <sup>(3)</sup>

The following are recommended topics:

- (i) Safety responsibility and authority;
- (ii) elements of accident prevention;
- (iii) attitudes, leadership and motivation;
- (iv) hazards of longshoring, including peculiar local circumstances;
- (v) hazard identification and elimination;
- (vi) applicable regulations; and
- (vii) accident investigations.

**Appendix A to §1917.28 Subpart B – Health Hazard Definitions (Mandatory)**

Although safety hazards related to the physical characteristics of a chemical can be objectively defined in terms of testing requirements (e.g. flammability), health hazard definitions are less precise and more subjective. Health hazards may cause measurable changes in the body - such as decreased pulmonary function. These changes are generally indicated by the occurrence of signs and symptoms in the exposed employees - such as shortness of breath, a non-measurable, subjective feeling. Employees exposed to such hazards must be apprised of both the change in body function and the signs and symptoms that may occur to signal that change.

The determination of occupational health hazards is complicated by the fact that many of the effects or signs and symptoms occur commonly in non-occupationally exposed populations, so that effects of exposure are difficult to separate from normally occurring illnesses. Occasionally, a substance causes an effect that is rarely seen in the population at large, such as angiosarcomas caused by vinyl chloride exposure, thus making it easier to ascertain that the occupational exposure was the primary causative factor. More often, however, the effects are common, such as lung cancer. The situation is further complicated by the fact that most chemicals have not been adequately tested to determine their health hazard potential, and data do not exist to substantiate these effects.

There have been many attempts to categorize effects and to define them in various ways. Generally, the terms **acute** and **chronic** are used to delineate between effects on the basis of severity or

duration. **Acute** effects usually occur rapidly as a result of short-term exposures, and are of short duration. **Chronic** effects generally occur as a result of long-term exposure, and are of long duration.

The acute effects referred to most frequently are those defined by the American National Standards Institute (ANSI) standard for Precautionary Labeling of Hazardous Industrial Chemicals (Z129.1-1988) - irritation, corrosivity, sensitization and lethal dose. Although these are important health effects, they do not adequately cover the considerable range of acute effects which may occur as a result of occupational exposure, such as, for example, narcosis.

Similarly, the term chronic effect is often used to cover only carcinogenicity, teratogenicity, and mutagenicity. These effects are obviously a concern in the workplace, but again, do not adequately cover the area of chronic effects, excluding, for example, blood dyscrasias (such as anemia), chronic bronchitis and liver atrophy.

The goal of defining precisely, in measurable terms, every possible health effect that may occur in the workplace as a result of chemical exposures cannot realistically be accomplished. This does not negate the need for employees to be informed of such effects and protected from them. Appendix B, which is also mandatory, outlines the principles and procedures of hazard assessment.

For purposes of this section, any chemicals which meet any of the following definitions, as determined by the criteria set forth in Appendix B are health hazards. However, this is not intended to be an exclusive categorization scheme. If there are available scientific data that involve other animal species or test methods, they must also be evaluated to determine the applicability of the HCS.

1. **Carcinogen:** A chemical is considered to be a carcinogen if:
  - (a) It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or
  - (b) It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or,
  - (c) It is regulated by OSHA as a carcinogen.
2. **Corrosive:** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a chemical is considered to be corrosive if, when tested on the intact skin of albino rabbits by the method described by the U.S. Department of Transportation in appendix A to 49 CFR part 173, it destroys or changes irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.
3. **Highly toxic:** A chemical falling within any of the following categories:
  - (a) A chemical that has a median lethal dose (LD(50)) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
  - (b) A chemical that has a median lethal dose (LD(50)) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
  - (c) A chemical that has a median lethal concentration (LC(50)) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.
4. **Irritant:** A chemical, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41 for four hours exposure or by other appropriate techniques, it results in an empirical score of five or more. A chemical is an eye irritant if so determined under the procedure listed in 16 CFR 1500.42 or other appropriate techniques.
5. **Sensitizer:** A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.
6. **Toxic.** A chemical falling within any of the following categories:
  - (a) A chemical that has a median lethal dose (LD(50)) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

- (b) A chemical that has a median lethal dose (LD(50)) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
  - (c) A chemical that has a median lethal concentration (LC(50)) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.
7. **Target organ effects.** The following is a target organ categorization of effects which may occur, including examples of signs and symptoms and chemicals which have been found to cause such effects. These examples are presented to illustrate the range and diversity of effects and hazards found in the workplace, and the broad scope employers must consider in this area, but are not intended to be all - inclusive.
- (a) **Hepatotoxins:** Chemicals which produce liver damage  
Signs & Symptoms: Jaundice; liver enlargement  
Chemicals: Carbon tetrachloride; nitrosamines
  - (b) **Nephrotoxins:** Chemicals which produce kidney damage  
Signs & Symptoms: Edema; proteinuria  
Chemicals: Halogenated hydrocarbons; uranium
  - (c) **Neurotoxins:** Chemicals which produce their primary toxic effects on the nervous system  
Signs & Symptoms: Narcosis; behavioral changes; decrease in motor functions  
Chemicals: Mercury; carbon disulfide
  - (d) **Agents which act on the blood or hemato-poietic system:** Decrease hemoglobin function; deprive the body tissues of oxygen  
Signs & Symptoms: Cyanosis; loss of consciousness  
Chemicals: Carbon monoxide; cyanides
  - (e) **Agents which damage the lung:** Chemicals which irritate or damage pulmonary tissue  
Signs & Symptoms: Cough; tightness in chest; shortness of breath  
Chemicals: Silica; asbestos
  - (f) **Reproductive toxins:** Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)  
Signs & Symptoms: Birth defects; sterility  
Chemicals: Lead; DBCP
  - (g) **Cutaneous hazards:** Chemicals which affect the dermal layer of the body  
Signs & Symptoms: Defatting of the skin; rashes; irritation  
Chemicals: Ketones; chlorinated compounds
  - (h) **Eye hazards:** Chemicals which affect the eye or visual capacity  
Signs & Symptoms: Conjunctivitis; corneal damage  
Chemicals: Organic solvents; acids

#### Appendix B to §1917.28 Subpart B - Hazard Determination (Mandatory)

The quality of a hazard communication program is largely dependent upon the adequacy and accuracy of the hazard determination. The hazard determination requirement of this standard is performance - oriented. Chemical manufacturers, importers, and employers evaluating chemicals are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the chemicals produced or imported in accordance with the criteria set forth in this Appendix.

Hazard evaluation is a process which relies heavily on the professional judgment of the evaluator, particularly in the area of chronic hazards. The performance - orientation of the hazard determination does not diminish the duty of the chemical manufacturer, importer or employer to conduct a thorough evaluation, examining all relevant data and producing a scientifically defensible evaluation. For purposes

of this standard, the following criteria shall be used in making hazard determinations that meet the requirements of this standard.

1. **Carcinogenicity:** As described in paragraph (d)(4) of this section and Appendix A of this section, a determination by the National Toxicology Program, the International Agency for Research on Cancer, or OSHA that a chemical is a carcinogen or potential carcinogen will be considered conclusive evidence for purposes of this section. In addition, however, all available scientific data on carcinogenicity must be evaluated in accordance with the provisions of this Appendix and the requirements of the rule.
2. **Human data:** Where available, epidemiological studies and case reports of adverse health effects shall be considered in the evaluation.
3. **Animal data:** Human evidence of health effects in exposed populations is generally not available for the majority of chemicals produced or used in the workplace. Therefore, the available results of toxicological testing in animal populations shall be used to predict the health effects that may be experienced by exposed workers. In particular, the definitions of certain acute hazards refer to specific animal testing results (see Appendix A).
4. **Adequacy and reporting of data.** The results of any studies which are designed and conducted according to established scientific principles, and which report statistically significant conclusions regarding the health effects of a chemical, shall be a sufficient basis for a hazard determination and reported on any material safety data sheet. In vitro studies alone generally do not form the basis for a definitive finding of hazard under the HCS since they have a positive or negative result rather than a statistically significant finding.  
The chemical manufacturer, importer, or employer may also report the results of other scientifically valid studies which tend to refute the findings of hazard.

#### **Appendix C to §1917.28 Subpart B – Information Sources (Advisory)**

The following is a list of available data sources which the chemical manufacturer, importer, distributor, or employer may wish to consult to evaluate the hazards of chemicals they produce or import:

- Any information in their own company files, such as toxicity testing results or illness experience of company employees.
- Any information obtained from the supplier of the chemical, such as material safety data sheets or product safety bulletins.
- Any pertinent information obtained from the following source list (latest editions should be used):

Condensed Chemical Dictionary

Van Nostrand Reinhold Co., 135 West 50th Street, New York, NY 10020.

The Merck Index: An Encyclopedia of Chemicals and Drugs Merck and Company, Inc., 126 E. Lincoln Ave., Rahway, NJ 07065.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man

Geneva: World Health Organization, International Agency for Research on Cancer, 1972 - Present. (Multivolume work). Summaries are available in supplement volumes. 49 Sheridan Street, Albany, NY 12210.

Industrial Hygiene and Toxicology, by F.A. Patty John Wiley & Sons, Inc., New York, NY (Multivolume work).

Clinical Toxicology of Commercial Products

Gleason, Gosselin, and Hodge.

Casarett and Doull's Toxicology; The Basic Science of Poisons

Doull, Klaassen, and Amdur, Macmillan Publishing Co., Inc., New York, NY.

Industrial Toxicology, by Alice Hamilton and Harriet L. Hardy

Publishing Sciences Group, Inc., Acton, MA.

Toxicology of the Eye, by W. Morton Grant

Charles C. Thomas, 301-327 East Lawrence Avenue, Springfield, IL.

Recognition of Health Hazards in Industry

William A. Burgess, John Wiley and Sons, 605 Third Avenue, New York, NY 10158.

Chemical Hazards of the Workplace

Nick H. Proctor and James P. Hughes, J.P. Lipincott Company, 6 Winchester Terrace, New York, NY 10022.

Handbook of Chemistry and Physics

Chemical Rubber Company, 18901 Cranwood Parkway, Cleveland, OH 44128.

Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment and Biological Exposure Indices with Intended Changes

American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Avenue, Bldg. D-5, Cincinnati, OH 45211.

Information on the physical hazards of chemicals may be found in publications of the National Fire Protection Association, Boston, MA.

**Note:** The following documents may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Occupational Health Guidelines

NIOSH/OSHA (NIOSH Pub. No. 81-123).

NIOSH Pocket Guide to Chemical Hazards

NIOSH Pub. No. 90-117.

Registry of Toxic Effects of Chemical Substances  
(Latest edition)

Miscellaneous Documents published by the National Institute for Occupational Safety and Health:

Criteria documents.

Special Hazard Reviews.

Occupational Hazard Assessments.

Current Intelligence Bulletins.

OSHA's General Industry Standards (29 CFR Part 1910)

NTP Annual Report on Carcinogens and Summary of the Annual Report on Carcinogens. National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; (703) 487-4650.

Bibliographic data bases service provider	File name
Bibliographic Retrieval Services (BRS), 1200 Route 7, Latham, NY 12110	Biosis Previews
	CA Search Medlars NTIS Hazardline American Chemical Society Journal  Excerpta Medica IRCS Medical Science Journal Pre-Med  Intl Pharmaceutical Abstracts Paper Chem Biosis Prev. Files
Lockheed-DIALOG Information Service, Inc., 3460 Hillview Avenue, Paulo Alto 94304	CA Search Files

	<p>CAB Abstracts</p> <p>Chemical Exposure</p> <p>Chemname</p> <p>Chemsis Files</p> <p>Chemzero</p> <p>Embase Files</p> <p>Environmental Bibliographies</p> <p>Enviroline</p> <p>Federal Research in Progress</p> <p>IRL Life Science Collection</p> <p>NTIS</p> <p>Occupational Safety and Health (NIOSH)</p> <p>Paper Chem</p>
SDC-ORBIT, SDC Information Service, 2500 Colorado Avenue, Santa Monica, CA 90406.	<p>CAS Files</p> <p>Chemdex, 2, 3</p> <p>NTIS</p>
National Library of Medicine.....	Hazardous Substances Data Bank (NSDB)
Department of Health and Human Services, Public Health Service, National Institutes of Health, Bethesda, MD 20209	<p>Medline Files</p> <p>Toxline Files</p> <p>Cancerlit</p> <p>RTECS</p> <p>Chemline</p>
Pergamon International Information Corp., 1340 old Chain Bridge R., McLean, VA 22101	Laboratory Hazard Bulletin
Questel, Inc., 1625 Eye Street, NW, Suite 818, Washington, DC 20006	<p>CIS/ILO</p> <p>Cancernet</p>
Chemical Information System ICI (ICIS), Bureau of National Affairs, 1133 15th Street, NW, Suite 300, Washington, DC 20005.	<p>Structure and Nomenclature Search System (SANSS)</p> <p>Acute Toxicity (RTECS)</p> <p>Clinical Toxicology of Commercial Products</p> <p>Oil and Hazardous Materials</p>

Occupational Health Services,	Technical Assistance Data System CCRIS CESARS
400 Plaza Drive, Secaucus, NJ 07094.....	MSDS Hazardline

#### Appendix D to §1917.28 Subpart B - Definition of Trade Secret (Mandatory)

The following is a reprint of the **Restatement of Torts** section 757, comment b (1939):

b. **Definition of trade secret.** A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound, a process of manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers. It differs from other secret information in a business (see s759 of the Restatement of Torts which is not included in this Appendix) in that it is not simply information as to single or ephemeral events in the conduct of the business, as, for example, the amount or other terms of a secret bid for a contract or the salary of certain employees, or the security investments made or contemplated, or the date fixed for the announcement of a new policy or for bringing out a new model or the like. A trade secret is a process or device for continuous use in the operations of the business. Generally it relates to the production of goods, as, for example, a machine or formula for the production of an article. It may, however, relate to the sale of goods or to other operations in the business, such as a code for determining discounts, rebates or other concessions in a price list or catalogue, or a list of specialized customers, or a method of bookkeeping or other office management.

**Secrecy.** The subject matter of a trade secret must be secret. Matters of public knowledge or of general knowledge in an industry cannot be appropriated by one as his secret. Matters which are completely disclosed by the goods which one markets cannot be his secret. Substantially, a trade secret is known only in the particular business in which it is used. It is not requisite that only the proprietor of the business know it. He may, without losing his protection, communicate it to employees involved in its use. He may likewise communicate it to others pledged to secrecy. Others may also know of it independently, as, for example, when they have discovered the process or formula by independent invention and are keeping it secret. Nevertheless, a substantial element of secrecy must exist, so that, except by the use of improper means, there would be difficulty in acquiring the information. An exact definition of a trade secret is not possible. Some factors to be considered in determining whether given information is one's trade secret are:

- (1) The extent to which the information is known outside of his business;
- (2) the extent to which it is known by employees and others involved in his business;
- (3) the extent of measures taken by him to guard the secrecy of the information;
- (4) the value of the information to him and his competitors;
- (5) the amount of effort or money expended by him in developing the information;
- (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

**Novelty and prior art.** A trade secret may be a device or process which is patentable; but it need not be that. It may be a device or process which is clearly anticipated in the prior art or one which is merely a mechanical improvement that a good mechanic can make. Novelty and invention are not requisite for a trade secret as they are for patentability. These requirements are essential to patentability because a patent protects against unlicensed use of the patented device or process even by one who discovers it properly through independent research. The patent monopoly is a reward to the inventor. But such is not the case with a trade secret. Its protection is not based on a policy of rewarding or otherwise encouraging the development of secret processes or devices. The protection is merely against breach of faith and reprehensible means of learning another's secret. For this limited protection it is not appropriate to require also the kind of novelty and invention which is a requisite of patentability. The nature of the

secret is, however, an important factor in determining the kind of relief that is appropriate against one who is subject to liability under the rule stated in this Section. Thus, if the secret consists of a device or process which is a novel invention, one who acquires the secret wrongfully is ordinarily enjoined from further use of it and is required to account for the profits derived from his past use. If, on the other hand, the secret consists of mechanical improvements that a good mechanic can make without resort to the secret, the wrongdoer's liability may be limited to damages, and an injunction against future use of the improvements made with the aid of the secret may be inappropriate.

### **Appendix E to §1917.28 Subpart B– Guidelines for Employer Compliance (Advisory)**

The Hazard Communication Standard (HCS) is based on a simple concept - that employees have both a need and a right to know the hazards and identities of the chemicals they are exposed to when working. They also need to know what protective measures are available to prevent adverse effects from occurring. The HCS is designed to provide employees with the information they need.

Knowledge acquired under the HCS will help employers provide safer workplaces for their employees. When employers have information about the chemicals being used, they can take steps to reduce exposures, substitute less hazardous materials, and establish proper work practices. These efforts will help prevent the occurrence of work - related illnesses and injuries caused by chemicals.

The HCS addresses the issues of evaluating and communicating hazards to workers. Evaluation of chemical hazards involves a number of technical concepts, and is a process that requires the professional judgment of experienced experts. That's why the HCS is designed so that employers who simply use chemicals, rather than produce or import them, are not required to evaluate the hazards of those chemicals. Hazard determination is the responsibility of the producers and importers of the materials. Producers and importers of chemicals are then required to provide the hazard information to employers that purchase their products.

Employers that don't produce or import chemicals need only focus on those parts of the rule that deal with establishing a workplace program and communicating information to their workers. This appendix is a general guide for such employers to help them determine what's required under the rule. It does not supplant or substitute for the regulatory provisions, but rather provides a simplified outline of the steps an average employer would follow to meet those requirements.

#### **1. Becoming Familiar With The Rule.**

OSHA has provided a simple summary of the HCS in a pamphlet entitled **Chemical Hazard Communication**, OSHA Publication Number 3084. Some employers prefer to begin to become familiar with the rule's requirements by reading this pamphlet. A copy may be obtained from your local OSHA Area Office, or by contacting the OSHA Publications Office at (202) 523-9667.

The standard is long, and some parts of it are technical, but the basic concepts are simple. In fact, the requirements reflect what many employers have been doing for years. You may find that you are already largely in compliance with many of the provisions, and will simply have to modify your existing programs somewhat. If you are operating in an OSHA - approved State Plan State, you must comply with the State's requirements, which may be different than those of the Federal rule. Many of the State Plan States had hazard communication or "right-to-know" laws prior to promulgation of the Federal rule. Employers in State Plan States should contact their State OSHA offices for more information regarding applicable requirements.

The HCS requires information to be prepared and transmitted regarding all hazardous chemicals. The HCS covers both physical hazards (such as flammability), and health hazards (such as irritation, lung damage, and cancer). Most chemicals used in the workplace have some hazard potential, and thus will be covered by the rule.

One difference between this rule and many others adopted by OSHA is that this one is performance - oriented. That means that you have the flexibility to adapt the rule to the needs of your workplace, rather than having to follow specific, rigid requirements. It also means that you have to exercise more judgment to implement an appropriate and effective program.

The standard's design is simple. Chemical manufacturers and importers must evaluate the hazards of the chemicals they produce or import. Using that information, they must then prepare labels for containers, and more detailed technical bulletins called material safety data sheets (MSDS).

Chemical manufacturers, importers, and distributors of hazardous chemicals are all required to provide the appropriate labels and material safety data sheets to the employers to which they ship the chemicals. The information is to be provided automatically. Every container of hazardous chemicals you receive must be labeled, tagged, or marked with the required information. Your suppliers must also send you a properly completed material safety data sheet (MSDS) at the time of the first shipment of the chemical, and with the next shipment after the MSDS is updated with new and significant information about the hazards.

You can rely on the information received from your suppliers. You have no independent duty to analyze the chemical or evaluate the hazards of it.

Employers that **use** hazardous chemicals must have a program to ensure the information is provided to exposed employees. **Use** means to package, handle, react, or transfer. This is an intentionally broad scope, and includes any situation where a chemical is present in such a way that employees may be exposed under normal conditions of use or in a foreseeable emergency. The requirements of the rule that deal specifically with the hazard communication program are found in this section in paragraphs (e), written hazard communication program; (f), labels and other forms of warning; (g), material safety data sheets; and (h), employee information and training. The requirements of these paragraphs should be the focus of your attention. Concentrate on becoming familiar with them, using paragraphs (b), scope and application, and (c), definitions, as references when needed to help explain the provisions.

There are two types of work operations where the coverage of the rule is limited. These are laboratories and operations where chemicals are only handled in sealed containers (e.g., a warehouse). The limited provisions for these workplaces can be found in paragraph (b) of this section, scope and application. Basically, employers having these types of work operations need only keep labels on containers as they are received; maintain material safety data sheets that are received, and give employees access to them; and provide information and training for employees. Employers do not have to have written hazard communication programs and lists of chemicals for these types of operations.

The limited coverage of laboratories and sealed container operations addresses the obligation of an employer to the workers in the operations involved, and does not affect the employer's duties as a distributor of chemicals. For example, a distributor may have warehouse operations where employees would be protected under the limited sealed container provisions. In this situation, requirements for obtaining and maintaining MSDSs are limited to providing access to those received with containers while the substance is in the workplace, and requesting MSDSs when employees request access for those not received with the containers. However, as a distributor of hazardous chemicals, that employer will still have responsibilities for providing MSDSs to downstream customers at the time of the first shipment and when the MSDS is updated. Therefore, although they may not be required for the employees in the work operation, the distributor may, nevertheless, have to have MSDSs to satisfy other requirements of the rule.

## 2. **Identify Responsible Staff**

Hazard communication is going to be a continuing program in your facility. Compliance with the HCS is not a **one shot deal**. In order to have a successful program, it will be necessary to assign responsibility for both the initial and ongoing activities that have to be undertaken to comply with the rule. In some cases, these activities may already be part of current job assignments. For example, site supervisors are frequently responsible for on-the-job training sessions. Early identification of the responsible employees, and involvement of them in the development of your plan of action, will result in a more effective program design. Evaluation of the effectiveness of your program will also be enhanced by involvement of affected employees.

For any safety and health program, success depends on commitment at every level of the organization. This is particularly true for hazard communication, where success requires a change in behavior. This will only occur if employers understand the program, and are committed to its success, and if employees are motivated by the people presenting the information to them.

## 3. **Identify Hazardous Chemicals in the Workplace.** The standard requires a list of hazardous chemicals in the workplace as part of the written hazard communication program. The list will eventually serve as an inventory of everything for which an MSDS must be maintained. At this point, however, preparing the list will help you complete the rest of the program since it will give you some idea of the scope of the program required for compliance in your facility.

The best way to prepare a comprehensive list is to survey the workplace. Purchasing records may also help, and certainly employers should establish procedures to ensure that in the future purchasing procedures result in MSDSs being received before a material is used in the workplace.

The broadest possible perspective should be taken when doing the survey. Sometimes people think of **chemicals** as being only liquids in containers. The HCS covers chemicals in all physical forms - liquids, solids, gases, vapors, fumes, and mists - whether they are **contained** or not. The hazardous nature of the chemical and the potential for exposure are the factors which determine whether a chemical is covered. If it's not hazardous, it's not covered. If there is no potential for exposure (e.g., the chemical is inextricably bound and cannot be released), the rule does not cover the chemical.

Look around. Identify chemicals in containers, including pipes, but also think about chemicals generated in the work operations. For example, welding fumes, dusts, and exhaust fumes are all sources of chemical exposures. Read labels provided by suppliers for hazard information. Make a list of all chemicals in the workplace that are potentially hazardous. For your own information and planning, you may also want to note on the list the location(s) of the products within the workplace, and an indication of the hazards as found on the label. This will help you as you prepare the rest of your program.

Paragraph (b) of this section, scope and application, includes exemptions for various chemicals or workplace situations. After compiling the complete list of chemicals, you should review paragraph (b) of this section to determine if any of the items can be eliminated from the list because they are exempted materials. For example, food, drugs, and cosmetics brought into the workplace for employee consumption are exempt. So rubbing alcohol in the first aid kit would not be covered. Once you have compiled as complete a list as possible of the potentially hazardous chemicals in the workplace, the next step is to determine if you have received material safety data sheets for all of them. Check your files against the inventory you have just compiled. If any are missing, contact your supplier and request one. It is a good idea to document these requests, either by copy of a letter or a note regarding telephone conversations. If you have MSDSs for chemicals that are not on your list, figure out why. Maybe you don't use the chemical anymore. Or maybe you missed it in your survey. Some suppliers do provide MSDSs for products that are not hazardous. These do not have to be maintained by you.

You should not allow employees to use any chemicals for which you have not received an MSDS. The MSDS provides information you need to ensure proper protective measures are implemented prior to exposure.

- 4. Preparing and Implementing a Hazard Communication Program** All workplaces where employees are exposed to hazardous chemicals must have a written plan which describes how the standard will be implemented in that facility. Preparation of a plan is not just a paper exercise -all of the elements must be implemented in the workplace in order to be in compliance with the rule. See paragraph (e) of this section for the specific requirements regarding written hazard communication programs. The only work operations which do not have to comply with the written plan requirements are laboratories and work operations where employees only handle chemicals in sealed containers. See paragraph (b) of this section, scope and application, for the specific requirements for these two types of workplaces.

The plan does not have to be lengthy or complicated. It is intended to be a blueprint for implementation of your program - an assurance that all aspects of the requirements have been addressed.

Many trade associations and other professional groups have provided sample programs and other assistance materials to affected employers. These have been very helpful to many employers since they tend to be tailored to the particular industry involved. You may wish to investigate whether your industry trade groups have developed such materials.

Although such general guidance may be helpful, you must remember that the written program has to reflect what you are doing in your workplace. Therefore, if you use a generic program it must be adapted to address the facility it covers. For example, the written plan must list the chemicals present at the site, indicate who is to be responsible for the various aspects of the program in your facility, and indicate where written materials will be made available to employees.

If OSHA inspects your workplace for compliance with the HCS, the OSHA compliance officer will ask to see your written plan at the outset of the inspection. In general, the following items will be considered in evaluating your program.

The written program must describe how the requirements for labels and other forms of warning, material safety data sheets, and employee information and training, are going to be met in your facility. The following discussion provides the type of information compliance officers will be looking for to decide whether these elements of the hazard communication program have been properly addressed:

**A. Labels and Other Forms of Warning**

In-plant containers of hazardous Q chemicals must be labeled, tagged, or marked with the identity of the material and appropriate hazard warnings. Chemical manufacturers, importers, and distributors are required to ensure that every container of hazardous chemicals they ship is appropriately labeled with such information and with the name and address of the producer or other responsible party. Employers purchasing chemicals can rely on the labels provided by their suppliers. If the material is subsequently transferred by the employer from a labeled container to another container, the employer will have to label that container unless it is subject to the portable container exemption. See paragraph (f) of this section for specific labeling requirements.

The primary information to be obtained from an OSHA - required label is an identity for the material, and appropriate hazard warnings. The identity is any term which appears on the label, the MSDS, and the list of chemicals, and thus links these three sources of information. The identity used by the supplier may be a common or trade name (**Black Magic Formula**), or a chemical name (1,1,1,-trichloroethane). The hazard warning is a brief statement of the hazardous effects of the chemical (**flammable, causes lung damage**). Labels frequently contain other information, such as precautionary measures (**do not use near open flame**), but this information is provided voluntarily and is not required by the rule. Labels must be legible, and prominently displayed. There are no specific requirements for size or color, or any specified text.

With these requirements in mind, the compliance officer will be looking for the following types of information to ensure that labeling will be properly implemented in your facility:

1. Designation of person(s) responsible for ensuring labeling of in-plant containers;
2. Designation of person(s) responsible for ensuring labeling of any shipped containers;
3. Description of labeling system(s) used;
4. Description of written alternatives to labeling of in-plant containers (if used); and,
5. Procedures to review and update label information when necessary.

Employers that are purchasing and using hazardous chemicals - rather than producing or distributing them - will primarily be concerned with ensuring that every purchased container is labeled. If materials are transferred into other containers, the employer must ensure that these are labeled as well, unless they fall under the portable container exemption (paragraph (f)(7) of this section). In terms of labeling systems, you can simply choose to use the labels provided by your suppliers on the containers. These will generally be verbal text labels, and do not usually include numerical rating systems or symbols that require special training. The most important thing to remember is that this is a continuing duty - all in-plant containers of hazardous chemicals must always be labeled.

Therefore, it is important to designate someone to be responsible for ensuring that the labels are maintained as required on the containers in your facility, and that newly purchased materials are checked for labels prior to use.

## **B. Material Safety Data Sheets**

Chemical manufacturers and importers are required to obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Distributors are responsible for ensuring that their customers are provided a copy of these MSDSs. Employers must have an MSDS for each hazardous chemical which they use. Employers may rely on the information received from their suppliers. The specific requirements for material safety data sheets are in paragraph (g) of this section. There is no specified format for the MSDS under the rule, although there are specific information requirements. OSHA has developed a non-mandatory format, OSHA Form 174, which may be used by chemical manufacturers and importers to comply with the rule. The MSDS must be in English. You are entitled to receive from your supplier a data sheet which includes all of the information required under the rule. If you do not receive one automatically, you should request one. If you receive one that is obviously inadequate, with, for example, blank spaces that are not completed, you should request an appropriately completed one. If your request for a data sheet or for a corrected data sheet does not produce the information needed, you should contact your local OSHA Area Office for assistance in obtaining the MSDS.

The role of MSDSs under the rule is to provide detailed information on each hazardous chemical, including its potential hazardous effects, its physical and chemical characteristics, and recommendations for appropriate protective measures. This information should be useful to you as the employer responsible for designing protective programs, as well as to the workers. If you are not familiar with material safety data sheets and with chemical terminology, you may need to learn to use them yourself. A glossary of MSDS terms may be helpful in this regard. Generally speaking, most employers using hazardous chemicals will primarily be concerned with MSDS information regarding hazardous effects and recommended protective measures. Focus on the sections of the MSDS that are applicable to your situation.

MSDSs must be readily accessible to employees when they are in their work areas during their workshifts. This may be accomplished in many different ways. You must decide what is appropriate for your particular workplace. Some employers keep the MSDSs in a binder in a central location (e.g., in the pick-up truck on a construction site). Others, particularly in workplaces with large numbers of chemicals, computerize the information and provide access through terminals. As long as employees can get the information when they need it, any approach may be used. The employees must have access to the MSDSs themselves - simply having a system where the information can be read to them over the phone is only permitted under the mobile worksite provision, paragraph (g)(9) of this section, when employees must travel between workplaces during the shift. In this situation, they have access to the MSDSs prior to leaving the primary worksite, and when they return, so the telephone system is simply an emergency arrangement.

In order to ensure that you have a current MSDS for each chemical in the plant as required, and that employee access is provided, the compliance officers will be looking for the following types of information in your written program:

1. Designation of person(s) responsible for obtaining and maintaining the MSDSs;
  2. How such sheets are to be maintained in the workplace (e.g., in notebooks in the work area(s) or in a computer with terminal access), and how employees can obtain access to them when they are in their work area during the work shift;
  3. Procedures to follow when the MSDS is not received at the time of the first shipment;
  4. For producers, procedures to update the MSDS when new and significant health information is found; and,
  5. Description of alternatives to actual data sheets in the workplace, if used.
- For employers using hazardous chemicals, the most important aspect of the written program in terms of MSDSs is to ensure that someone is responsible for obtaining and maintaining the MSDSs for every hazardous chemical in the

workplace. The list of hazardous chemicals required to be maintained as part of the written program will serve as an inventory. As new chemicals are purchased, the list should be updated. Many companies have found it convenient to include on their purchase orders the name and address of the person designated in their company to receive MSDSs.

### C. **Employee Information and Training**

Each employee who may be **exposed** to hazardous chemicals when working must be provided information and trained prior to initial assignment to work with a hazardous chemical, and whenever the hazard changes. **Exposure** or **exposed** under the rule means that **an employee is subjected to a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.) and includes potential (e.g., accidental or possible) exposure.** See paragraph (h) of this section for specific requirements. Information and training may be done either by individual chemical, or by categories of hazards (such as flammability or carcinogenicity). If there are only a few chemicals in the workplace, then you may want to discuss each one individually. Where there are large numbers of chemicals, or the chemicals change frequently, you will probably want to train generally based on the hazard categories (e.g., flammable liquids, corrosive materials, carcinogens). Employees will have access to the substance - specific information on the labels and MSDSs.

Information and training is a critical part of the hazard communication program.

Information regarding hazards and protective measures are provided to workers through written labels and material safety data sheets. However, through effective information and training, workers will learn to read and understand such information, determine how it can be obtained and used in their own workplaces, and understand the risks of exposure to the chemicals in their workplaces as well as the ways to protect themselves. A properly conducted training program will ensure comprehension and understanding. It is not sufficient to either just read material to the workers, or simply hand them material to read. You want to create a climate where workers feel free to ask questions. This will help you to ensure that the information is understood. You must always remember that the underlying purpose of the HCS is to reduce the incidence of chemical source illnesses and injuries. This will be accomplished by modifying behavior through the provision of hazard information and information about protective measures. If your program works, you and your workers will better understand the chemical hazards within the workplace. The procedures you establish regarding, for example, purchasing, storage, and handling of these chemicals will improve, and thereby reduce the risks posed to employees exposed to the chemical hazards involved. Furthermore, your workers' comprehension will also be increased, and proper work practices will be followed in your workplace. If you are going to do the training yourself, you will have to understand the material and be prepared to motivate the workers to learn. This is not always an easy task, but the benefits are worth the effort. More information regarding appropriate training can be found in OSHA Publication No. 2254 which contains voluntary training guidelines prepared by OSHA's Training Institute. A copy of this document is available from OSHA's Publications Office at (202) 219-4667.

In reviewing your written program with regard to information and training, the following items need to be considered:

1. Designation of person(s) responsible for conducting training;
2. Format of the program to be used (audiovisuals, classroom instruction, etc.);
3. Elements of the training program (should be consistent with the elements in paragraph (h) of this section); and,
4. Procedure to train new employees at the time of their initial assignment to work with a hazardous chemical, and to train employees when a new hazard is introduced into the workplace.

The written program should provide enough details about the employer's plans in this area to assess whether or not a good faith effort is being made to train employees. OSHA does not expect that every worker will be able to recite all of the information about each chemical in the workplace. In general, the most important aspects of training under the

HCS are to ensure that employees are aware that they are exposed to hazardous chemicals, that they know how to read and use labels and material safety data sheets, and that, as a consequence of learning this information, they are following the appropriate protective measures established by the employer. OSHA compliance officers will be talking to employees to determine if they have received training, if they know they are exposed to hazardous chemicals, and if they know where to obtain substance - specific information on labels and MSDSs.

The rule does not require employers to maintain records of employee training, but many employers choose to do so. This may help you monitor your own program to ensure that all employees are appropriately trained. If you already have a training program, you may simply have to supplement it with whatever additional information is required under the HCS. For example, construction employers that are already in compliance with the construction training standard (29 CFR 1926.21) will have little extra training to do. An employer can provide employees information and training through whatever means are found appropriate and protective. Although there would always have to be some training on-site (such as informing employees of the location and availability of the written program and MSDSs), employee training may be satisfied in part by general training about the requirements of the HCS and about chemical hazards on the job which is provided by, for example, trade associations, unions, colleges, and professional schools. In addition, previous training, education and experience of a worker may relieve the employer of some of the burdens of informing and training that worker. Regardless of the method relied upon, however, the employer is always ultimately responsible for ensuring that employees are adequately trained. If the compliance officer finds that the training is deficient, the employer will be cited for the deficiency regardless of who actually provided the training on behalf of the employer.

**D. Other Requirements**

In addition to these specific items, compliance officers will also be asking the following questions in assessing the adequacy of the program:

Does a list of the hazardous chemicals exist in each work area or at a central location?

Are methods the employer will use to inform employees of the hazards of non-routine tasks outlined?

Are employees informed of the hazards associated with chemicals contained in unlabeled pipes in their work areas?

On multi-employer worksites, has the employer provided other employers with information about labeling systems and precautionary measures where the other employers have employees exposed to the initial employer's chemicals?

Is the written program made available to employees and their designated representatives?

If your program adequately addresses the means of communicating information to employees in your workplace, and provides answers to the basic questions outlined above, it will be found to be in compliance with the rule.

**5. Checklist for Compliance**

The following checklist will help to ensure you are in compliance with the rule:

- Obtained a copy of the rule. \_\_\_\_\_
- Read and understood the requirements. \_\_\_\_\_
- Assigned responsibility for tasks. \_\_\_\_\_
- Prepared an inventory of chemicals. \_\_\_\_\_
- Ensured containers are labeled. \_\_\_\_\_
- Obtained MSDS for each chemical. \_\_\_\_\_
- Prepared written program. \_\_\_\_\_
- Made MSDSs available to workers. \_\_\_\_\_
- Conducted training of workers. \_\_\_\_\_
- Established procedures to maintain current program. \_\_\_\_\_
- Established procedures to evaluate effectiveness. \_\_\_\_\_

## 6. Further Assistance

If you have a question regarding compliance with the HCS, you should contact your local OSHA Area Office for assistance. In addition, each OSHA Regional Office has a Hazard Communication Coordinator who can answer your questions. Free consultation services are also available to assist employers, and information regarding these services can be obtained through the Area and Regional offices as well.

The telephone number for the OSHA office closest to you should be listed in your local telephone directory. If you are not able to obtain this information, you may contact OSHA's Office of Information and Consumer Affairs at (202) 219-8151 for further assistance in identifying the appropriate contacts.

### §1917.29 Retention of DOT markings, placards and labels.

- (a) Any employer who receives a package of hazardous material which is required to be marked, labeled or placarded in accordance with the U. S. Department of Transportation's Hazardous Materials Regulations (49 CFR Parts 171 through 180) shall retain those markings, labels and placards on the package until the packaging is sufficiently cleaned of residue and purged of vapors to remove any potential hazards.
- (b) Any employer who receives a freight container, rail freight car, motor vehicle, or transport vehicle that is required to be marked or placarded in accordance with the Hazardous Materials Regulations shall retain those markings and placards on the freight container, rail freight car, motor vehicle or transport vehicle until the hazardous materials which require the marking or placarding are sufficiently removed to prevent any potential hazards.
- (c) Markings, placards and labels shall be maintained in a manner that ensures that they are readily visible.
- (d) For non-bulk packages which will not be reshipped, the provisions of this section are met if a label or other acceptable marking is affixed in accordance with the Hazard Communication Standard (29 CFR 1910.1200).
- (e) For the purposes of this section, the term **hazardous material** and any other terms not defined in this section have the same definition as in the Hazardous Materials Regulations (49 CFR Parts 171 through 180).

### §1917.30 Emergency action plans.

- (a) Emergency action plans
  - (1) Scope and application. This paragraph (a) requires all employers to develop and implement an emergency action plan.<sup>3a</sup> The emergency action plan shall be in writing (except as provided in paragraph (a)(5)(iv) of this section) and shall cover those designated actions employers and employees must take to ensure employee safety from fire and other emergencies.
  - (2) Elements. The following elements, at a minimum, shall be included in the plan:
    - (i) Emergency escape procedures and emergency escape route assignments;
    - (ii) Procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
    - (iii) Procedures to account for all employees after emergency evacuation has been completed;
    - (iv) Rescue and medical duties for those employees who are to perform them;
    - (v) The preferred means of reporting fires and other emergencies; and
    - (vi) Names or regular job titles of persons or departments that can be contacted for further information or explanation of duties under the plan.
  - (3) Alarm system. The employer shall establish an employee alarm system that provides warning for necessary emergency action and for reaction time for safe escape of employees from the workplace or the immediate work area.
  - (4) Evacuation. The employer shall establish the types of evacuation to be used in emergency circumstances.
  - (5) Training.

- (i) Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.
- (ii) The employer shall review the plan with each employee covered by the plan at the following times:
  - (A) Initially when the plan is developed;
  - (B) Whenever the employee's responsibilities or designated actions under the plan change; and
  - (C) Whenever the plan is changed.
- (iii) The employer shall review with each employee upon initial assignment those parts of the plan that the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and be made available for employee review.
- (iv) Employers with 10 or fewer employees may communicate the plan orally to employees and need not maintain a written plan

**(b)** [Reserved]

FOOTNOTE <sup>(3a)</sup> When an employer directs his employees to respond to an emergency that is beyond the scope of the Emergency Action Plan developed in accordance with this section, then §1910.120(q) of this chapter shall apply.

**§1917.41 House falls.**

- (a)** Span beams shall be secured to prevent accidental dislodgment.
- (b)** A safe means of access shall be provided for employees working with house fall blocks,
- (c)** Designated employees shall inspect chains, links, shackles, swivels, blocks and other loose gear used in house fall operations before each day's use. Defective gear shall not be used.

**§1917.42 Miscellaneous auxiliary gear.**

- (a)** Routine inspection.
  - (1) At the completion of each use, loose gear such as slings, chains, bridles, blocks and hooks shall be so placed as to avoid damage to the gear. Loose gear shall be inspected and any defects corrected before reuse.
  - (2) All loose gear shall be inspected by the employer or his authorized representative before each use and, when necessary, at intervals during its use, to ensure that it is safe. Any gear which is found upon such inspection to be visibly unsafe shall not be used until it is made safe.
  - (3) Defective gear shall not be used, Distorted hooks, shackles or similar gear shall be discarded.
- (b)** Wire rope and wire rope slings.
  - (1) The employer shall ascertain and adhere to the manufacturer's recommended ratings for wire rope and wire rope slings and shall have such ratings available for inspection. When the manufacturer is unable to supply such ratings, the employer shall use the tables for wire rope and wire rope slings found in American National Safety Standard for Slings, ANSI B30.9-1971. A design safety factor of at least five shall be maintained for the common sizes of running wire used as falls, in purchases or in such uses as light load slings. Wire rope with a safety factor of less than five may be used only:
    - (i) In specialized equipment such as but not limited to cranes, designed to be used with lesser wire rope safety factors;
    - (ii) In accordance with design factors standing rigging applications; or
    - (iii) For heavy lifts or other purposes for which a safety factor of five is impracticable and for which the employer can demonstrate that equivalent safety is ensured.
  - (2) Wire rope or wire rope slings having any of the following conditions shall not be used:
    - (i) Ten randomly distributed broken wires in one rope lay or three or more broken wires in one strand in one rope lay;

- (ii) Kinking, crushing, bird caging or other damage resulting in distortion of the wire rope structure;
  - (iii) Evidence of heat damage;
  - (iv) Excessive wear or corrosion, deformation or other defect in the wire or attachments, including cracks in attachments;
  - (v) Any indication of strand or wire slippage in end attachments; or
  - (vi) More than one broken wire in the close vicinity of a socket or swaged fitting.
- (3) Protruding ends of strands in splices on slings and bridles shall be covered or blunted. Coverings shall be removable so that splices can be examined. Means used to cover or blunt ends shall not damage the wire.
- (4) Where wire rope clips are used to form eyes, the employer shall adhere to the manufacturer's recommendations, which shall be made available for inspection. If **U** bolt clips are used and the manufacturer's recommendations are not available, Table C-1 shall be used to determine the number and spacing of the clips. **U** bolts shall be applied with the **U** section in contact with the dead end of the rope.

Improved plow steel, rope diameter (inches/(cm))	Minimum number of clips		Minimum spacing (inches/(cm))
	Drop forged	Other material	
1/2 or less (1.3)	3	4	3 (7.6)
5/8 (1.6)	3	4	3¾ (9.5)
3/4 (1.9)	4	5	4½ (11.4)
7/8 (2.2)	4	5	5¼ (13.3)
1 (2.5)	5	7	6 (15.2)
1 <sup>1/8</sup> (2.9)	6	7	6¾ (17.1)
1¼ (3.2)	6	8	7½ (19.1)
1 <sup>3/8</sup> (3.5)	7	8	8¼ (21.0)
1½ (3.8)	7	9	9 (22.9)

- (5) Wire rope shall not be secured by knots
  - (6) Eyes in wire rope bridles, slings, bull wires, or in single parts used for hoisting shall not be formed by wire rope clips or knots.
  - (7) Eye splices in wire ropes shall have at least three tucks with a whole strand of the rope and two tucks with a one-half of the wire cut from each strand. Other forms of splices or connections which are shown to be equivalently safe may be used.
  - (8) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in bulling cargo, shall consist of one continuous piece without knot or splice.
- (c) Natural fiber rope.**
- (1) The employer shall ascertain the manufacturers' ratings for the specific natural fiber rope used and have such ratings available for inspection. The manufacturers' ratings shall be adhered to and a minimum design safety factor of five maintained.
  - (2) Eye splices shall consist of at least three full tucks. Short splices consist of at least six full tucks, three on each side of the center line.
- (d) Synthetic rope.**
- (1) The employer shall adhere to the manufacturers' ratings and use recommendations for the specific synthetic fiber rope used and shall make such ratings available for inspection.
  - (2) Unless otherwise recommended by the manufacturer, when synthetic fiber ropes are substituted for fiber ropes of less than three inches (7.62 cm) in circumference, the substitute shall be of equal size. Where substituted for fiber rope of three inches or more in circumference, the size of the synthetic rope shall be determined from the formula:

$$C = \pm \sqrt{0.6C_s^2 + 0.4C_m^2}$$

Where C = the required circumference of the synthetic rope in inches, Cs= the circumference to the nearest one-quarter inch of a synthetic rope having a breaking strength not less than that of the size fiber rope that is required by paragraph (c) of this section and Cm= the circumference of the fiber rope in inches that is required by paragraph (c) of this section.

- (ii) In making such substitution, it shall be ascertained that the inherent characteristics of the synthetic fiber are suitable for hoisting.
- (e)** Removal of natural and synthetic fiber from service. Natural and synthetic rope having any of the following defects shall be removed from service.
  - (1) Abnormal wear;
  - (2) Powdered fiber between strands;
  - (3) Sufficient cut or broken fibers to affect the capability of the rope;
  - (4) Variations in the size or roundness of strands;
  - (5) Discolorations other than stains not associated with rope damage;
  - (6) Rotting; or
  - (7) Distortion or other damage to attached hardware.
- (f)** Thimbles. Properly fitting thimbles shall be used where any rope is secured permanently to a ring, shackle or attachment, where practicable.
- (g)** Synthetic web slings.
  - (1) Slings and nets or other combinations of more than one piece of synthetic webbing assembled and used as a single unit (synthetic web slings) shall not be used to hoist loads in excess of the sling's rated capacity.
  - (2) Synthetic web slings shall be removed from service if they exhibit any of the following defects:
    - (i) Acid or caustic burns;
    - (ii) Melting or charring of any part of the sling surface;
    - (iii) Snags, punctures, tears or cuts;
    - (iv) Broken or worn stitches; or
    - (v) Distortion or damage to fittings.
    - (vi) Display of visible warning threads or markers designed to indicate excessive wear or damage.
  - (3) Defective synthetic web slings removed from service shall not be returned to service unless repaired by a sling manufacturer or similar entity. Each repaired sling shall be proof tested by the repairer to twice the slings rated capacity prior to its return to service. The employer shall retain a certificate of the proof test and make it available for examination.
  - (4) Synthetic web slings provided by the employer shall only be used in accordance with the manufacturer's use recommendations, which shall be available.
  - (5) Fittings shall have a breaking strength at least equal to that of the sling to which they are attached and shall be free of sharp edges.
- (h)** Chains and chain slings used for hoisting.
  - (1) The employer shall adhere to the manufacturer's recommended ratings for safe working loads for the sizes of wrought iron and alloy steel chains and chain slings used and shall have such ratings available. When the manufacturer is unable to provide such ratings, the employer shall use the tables for chains and chain slings found in American National Safety Standard for Slings, ANSI 30.9-1971.
  - (2) Proof coil steel chain, also known as common or hardware chain, and other chain not recommended by the manufacturer for slinging or hoisting shall not be used for slinging or hoisting.

- (3) (i) Sling chains, including end fastenings shall be inspected for visible defects before each day's use and as often as necessary during use to ensure integrity of the sling.
- (ii) Thorough inspections of chains on use shall be made quarterly to detect wear, defective welds, deformation or increase in length or stretch. The month of inspection shall be indicated on each chain by color of paint on a link or by other equally effective means.
- (iii) Chains shall be removed from service when maximum allowable wear, as indicated in Table C-2, is reached at any point of link.
- (iv) Chain slings shall be removed from service when stretch has increased the length of a measured section by more than five percent; when a link is bent, twisted or otherwise damaged; or when a link has a raised scarf or defective weld.
- (v) Only designated persons shall inspect chains used for slinging and hoisting.

**TABLE C-2 MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK**

Chain size		Maximum allowable wear	
Inches	(cm)	Inches	(cm)
1/4 (9/32)	(0.6)	3/64	(0.1)
3/8	(1.0)	5/64	(0.2)
1/2	(1.3)	7/64	(0.3)
5/8	(1.6)	9/64	(0.4)
3/4	(1.9)	5/32	(0.4)
7/8	(2.2)	11/64	(0.4)
1	(2.5)	3/16	(0.5)
1 <sup>1/8</sup>	(2.9)	7/32	(0.6)
1 <sup>1/4</sup>	(3.2)	1/4	(0.6)
1 <sup>3/8</sup>	(3.5)	9/32	(0.7)
1 <sup>1/2</sup>	(3.8)	5/16	(0.8)
1 <sup>3/4</sup>	(4.4)	11/32	(0.9)

- (4) Chains shall be repaired only under qualified supervision. Links or portions of chain defective under any of the criteria of paragraph (h)(3)(iii) of this section shall be replaced with properly dimensioned links or connections of material similar to those of the original chain. Before repaired chains are returned to service, they shall be tested to the proof load recommended by the manufacturer for the original chain. Tests shall be performed by the manufacturer or shall be certified by an agency accredited for the purpose under part 1919 of this chapter. Test certificates shall be available for inspection.
- (5) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months. Heat treatment certificates shall be available for inspection. Alloy chains shall not be annealed.
- (6) Kinked or knotted chains shall not be used for lifting. Chains shall not be shortened by bolting, wiring or knotting. Makeshift links or fasteners such as wire, bolts or rods shall not be used.
- (7) Hooks, rings, links and attachments affixed to sling chains shall have rated capacities at least equal to that of the chains to which they are attached.
- (8) Chain slings shall bear identification of size, grade and rated capacity.
- (i) Shackles.
  - (1) If available, the manufacturer's recommended safe working loads for shackles shall not be exceeded. In the absence of manufacturer's recommendations, Table C-3 shall apply.
  - (2) Screw pin shackles used aloft in house fall or other gear, except in cargo hook assemblies, shall have their pins moused or otherwise effectively secured.

**Table C-3. -- Safe Working Loads for Shackles**

Material size		Pin diameter		Safe working load in 2,000 lb tons
Inches	(cm)	Inches	(cm)	
1/2	(1.3)	5/8	(1.6)	1.4
5/8	(1.6)	3/4	(1.9)	2.2
3/4	(1.9)	7/8	(2.2)	3.2
7/8	(2.2)	1	(2.5)	4.3
1	(2.5)	1 <sup>1/8</sup>	(2.9)	5.6
1 <sup>1/8</sup>	(2.9)	1 <sup>1/4</sup>	(3.2)	6.7
1 <sup>1/4</sup>	(3.2)	1 <sup>3/8</sup>	(3.5)	8.2
1 <sup>3/8</sup>	(3.5)	1 <sup>1/2</sup>	(3.8)	10.0
1 <sup>1/2</sup>	(3.8)	1 <sup>5/8</sup>	(4.1)	11.9
1 <sup>3/4</sup>	(4.4)	2	(5.1)	16.2
2	(5.1)	2 <sup>1/4</sup>	(5.7)	21.2

- (j) Hooks other than hand hooks.
- (1) The manufacturers' recommended safe working loads for hooks shall not be exceeded. Hooks other than hand hooks shall be tested in accordance with §1917.50(c)(6).
  - (2) Bent or sprung hooks shall be discarded.
  - (3) Teeth of case hooks shall be maintained in safe condition.
  - (4) Jaws of patent clamp-type plate hooks shall be maintained in safe condition to grip plates securely.
  - (5) Loads shall be applied to the throat of the hook only.
- (k) Pallets.
- (1) Pallets shall be made and maintained to safely support and carry loads being handled. Fastenings of reusable pallets used for hoisting shall be bolts and nuts, drive screws (helically threaded nails), annular threaded nails or fastenings of equivalent holding strength.
  - (2) Damaged pallets shall be stored in designated areas and identified,
  - (3) Reusable wing or lip-type pallets shall be hoisted by bar bridles or other suitable gear and shall have an overhanging wing or lip of at least three inches (7.62cm). They shall not be hoisted by wire slings alone.
  - (4) Loaded pallets that do not meet the requirements of this paragraph shall be hoisted only after being placed on pallets meeting such requirements or shall be handled by other means providing equivalent safety.
  - (5) Bridles for handling flush end or box-type pallets shall be designed to prevent disengagement from the pallet under load.
  - (6) Pallets shall be stacked or placed to prevent falling, collapsing or otherwise causing a hazard under standard operating conditions.
  - (7) Disposable pallets intended only for one use shall not be reused for hoisting.

**§1917.43 Powered industrial trucks.**

- (a) Applicability. This section applies to every type of powered industrial truck used for material or equipment handling within a marine terminal. It does not apply to over-the-road vehicles.
- (b) General.
- (1) After October 3, 1983 modifications, such as adding counterweights, that might affect the vehicle's capacity or safety shall not be performed without either the manufacturer's prior written approval or the written approval of a professional engineer experienced with the equipment who has consulted with the manufacturer, if available. Capacity, operation and maintenance instruction plates, tags or decals shall be changed to conform to the equipment as modified.
  - (2) Unauthorized personnel shall not ride on powered industrial trucks. A safe place to ride shall be provided when riding is authorized.

- (3) When a powered industrial truck is left unattended, load- engaging means shall be fully lowered, controls neutralized and brakes set. Unless the truck is in view and within 25 feet (7.62 m) of the operator, power shall be shut off. Wheels shall be blocked or curbed if the truck is on an incline.
  - (4) Powered industrial trucks shall not be operated inside highway vehicles or railcars having damage which could affect operational safety.
  - (5) Powered industrial trucks shall be marked with their rated capacities, which shall be visible to the operator.
  - (6) Only stable and safely arranged loads within the rated capacity of the truck shall be handled.
  - (7) The employer shall direct drivers to ascend and descend grades slowly.
  - (8) The employer shall direct drivers to slow down and sound the horn at crossaisles and other locations where visibility is obstructed.
  - (9) If the load obstructs the forward view, the employer shall direct drivers to travel with the load trailing.
  - (10) Steering knobs shall not be used unless the truck is equipped with power steering.
  - (11) When powered industrial trucks use cargo lifting devices that have a means of engagement hidden from the operator, a means shall be provided to enable the operator to determine that the cargo has been engaged.
  - (12) When cargo is being towed on pipe trucks or similar equipment, a safe means shall be provided to protect the driver from sliding loads.
- (c) Maintenance.
- (1) Only designated persons shall perform maintenance and repair.
  - (2) Batteries on all powered trucks shall be disconnected during repairs to the primary electrical system unless power is necessary for testing and repair. On trucks equipped with systems capable of storing residual energy, that energy shall be safely discharged before work on the primary electrical system begins.
  - (3) Replacement parts whose function might affect operational safety shall be equivalent in strength and performance capability to the original parts which they replace.
  - (4) Braking systems or other mechanisms used for braking shall be operable and in safe condition.
  - (5) Powered industrial trucks shall be maintained in safe working order. Safety devices shall not be removed or made inoperative except as otherwise provided in this section. Trucks with a fuel system leak or any other safety defect shall not be operated.
  - (6) Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated as safe for such repairs.
- (d) Approved trucks.
- (1) **Approved power-operated industrial truck** means one listed or approved for the intended use by a nationally recognized testing laboratory.
  - (2) Approved trucks acquired and used after February 15, 1972, shall bear a label or other identification indicating testing laboratory approval.
  - (3) When the atmosphere in an area is hazardous and the provisions of United States Coast Guard regulations at 33 CFR 126.15(e) do not apply, only power-operated industrial trucks approved for such locations shall be used.
- (e) Fork lift trucks.
- (1) Overhead guards.
    - (i) When operators are exposed to overhead falling hazards, fork lift trucks shall be equipped with securely attached overhead guards. Guards shall be constructed to protect the operator from falling boxes, cartons, packages, or similar objects.
    - (ii) Overhead guards shall not obstruct the operator's view, and openings in the top of the guard shall not exceed six inches (15.24 cm) in one of the two directions, width or length. Larger openings are permitted if no opening allows the smallest unit of cargo being handled to fall through the guard.
    - (iii) Overhead guards shall be built so that failure of the vehicle's mast tilting mechanism will not displace the guard.

- (iv) An overhead guard, otherwise required by this paragraph, may be removed only when it would prevent a truck from entering a work space and if the operator is not exposed to low overhead obstructions in the work space.
- (v) Overhead guards shall be large enough to extend over the operator during all truck operations, including forward tilt.
- (2) Load backrest extensions. Where necessary to protect the operator, fork lift trucks shall be fitted with a vertical load backrest extension to prevent the load from hitting the mast when the mast is positioned at maximum backward tilt. For this purpose, a **load backrest extension** means a device extending vertically from the fork carriage frame to prevent raised loads from falling backward.
- (3) Forks. Forks, fork extensions and other attachments shall be secured so that they cannot be accidentally dislodged, and shall be used only in accordance with the manufacturer's recommendations.
- (4) Counterweights. Counterweights shall be so affixed that they cannot be accidentally dislodged.
- (5) Capacities and weights.
  - (i) Forklift truck rated capacities, with and without removable counterweights, shall not be exceeded. Rated capacities shall be marked on the vehicle and shall be visible to the operator. The vehicle weight, with and without counterweight, shall be similarly marked.
  - (ii) If loads are lifted by two or more trucks working in unison, the total weight of the load shall not exceed the combined rated lifting capacity of all trucks involved.
- (6) Lifting of employees. Employees may be elevated by fork lift trucks only when a platform is secured to the lifting carriage or forks. The platform shall meet the following requirements:
  - (i) The platform shall have a railing complying with §1917.112(c).
  - (ii) The platform shall have toeboards complying with §1917.112(d) if tools or other objects could fall on employees below.
  - (iii) An employee shall be at the truck's controls whenever employees are elevated.
  - (iv) Employees on the platform shall be protected from exposure to moving truck parts.
  - (v) The platform floor shall be skid resistant.
  - (vi) When the truck has controls elevated with the lifting carriage, means shall be provided for employees on the platform to shut off power to the vehicle.
  - (vii) While employees are elevated, the truck may be moved only to make minor placement adjustments.
- (f) Bulk cargo-moving vehicles.
  - (1) Where a seated operator may come into contact with projecting overheads, crawler-type bulk-cargo-moving vehicles that are rider operated shall be equipped with operator's guards.
  - (2) Guards and their attachment points shall be so designed as to be able to withstand, without excessive deflection, a load applied horizontally at the operator's shoulder level equal to the drawbar pull of the machine.
  - (3) After July 26, 1999 bulk cargo-moving vehicles shall be equipped with rollover protection of such design and construction as to prevent the possibility of the operator being crushed because of a rollover or upset.
- (g) Straddle trucks.
  - (1) Accessibility. Straddle trucks shall have a permanent means of access to the operator's station, including any handholds necessary for safe ascent and descent.
  - (2) Guarding.
    - (I) Main sprockets and chains to the wheels shall be guarded as follows:
      - (A) The upper sprocket shall be enclosed;
      - (B) The upper half of the lower sprocket shall be enclosed; and
      - (C) The drive chain shall be enclosed to a height of eight feet (2.44 m) except for that portion at the lower half of the lower sprocket.

- (ii) Gears shall be enclosed and revolving parts which may be contacted by the operator shall be guarded.
- (iii) When straddle trucks are used in the vicinity of employees, personnel-deflecting guards shall be provided around leading edges of front and rear wheels.
- (3) Visibility. Operator visibility shall be provided in all directions of movement.
- (h) Trailer-spotting tractors.
  - (1) Trailer-spotting tractors (fifth wheels) shall be fitted with any hand grabs and footing necessary for safe access to the fifth wheel.
  - (2) Rear cab windows shall be of safety glass or of equivalent material

#### §1917.44 General rules applicable to vehicles.

- (a) The requirements of this section apply to general vehicle use within marine terminals. Exception: The provisions of paragraphs (c) and (l) of this section do not apply when preempted by applicable regulations of the Department of Transportation.<sup>(5)</sup>
- (b) Private vehicle parking in marine terminals shall be allowed only in designated areas.
- (c) Trailers shall not be disconnected from tractors at loading docks until the road wheels have been immobilized. The road wheels shall be immobilized from the time the brake system is disconnected until braking is again provided. Supplementary front end support shall be employed as necessary to prevent tipping when a trailer is entered by a material handling vehicle. Rear end support shall be employed if rear wheels are so far forward as to allow tipping when the trailer is entered.
- (d) The employer shall direct motor vehicle operators to comply with any posted speed limits and other traffic control signs or signals, and written traffic instructions.
- (e) Stop signs shall be posted at main entrances and exits of structures where visibility is impaired, and at blind intersections, unless direct traffic control or warning mirror systems or other systems of equivalent safety are provided.
- (f) Vehicular routes, traffic rules, and parking areas shall be established, identified, and used.
- (g) The employer shall direct vehicle drivers to warn employees in traffic lanes of the vehicle's approach.
- (h) Signs indicating pedestrian traffic shall be clearly posted at vehicular check-in and check-out lines and similar locations where employees may be working.
- (i) A distance of not less than 20 feet (6.1 m) shall be maintained between the first two vehicles in a check-in, check-out, roadability, or vessel loading/discharging line. This distance shall be maintained between any subsequent vehicles behind which employees are required to work.
- (j) No unattended vehicle shall be left with its engine running unless secured against movement (see §1917.43(b)(3) for powered industrial trucks).
- (k) When the rear of a vehicle is elevated to facilitate loading or discharging, a ramp shall be provided and secured. The vehicle shall be secured against accidental movement during loading or discharging.
- (l) Only highway vehicle floors in safe condition shall be used.
- (m) When flatbed trucks, platform containers or similar conveyances are loaded or discharged and the cargo consists of pipe or other products which could spread or roll to endanger employees, the cargo shall be contained to prevent movement.
- (n) Vehicles used to transport employees within a terminal shall be maintained in safe working order and safety devices shall not be removed or made inoperative.
- (o) Servicing multi-piece and single piece rim wheels. Servicing of multi-piece and single piece rim wheels is covered by §1910.177 of this chapter.
  - (1) Scope. This paragraph applies to the servicing of vehicle wheels containing tube-type tires mounted on multi-piece rims.
  - (2) Definition. **Multi-piece rim** means a vehicle wheel rim consisting of two or more parts, one of which is a (side) locking ring designed to hold the tire on the rim by tension on interlocking components when the tire is inflated, regardless of the relative sizes of the component parts.
  - (3) Employee training.

- (i) Only employees trained in the procedures required in paragraph (o)(4) of this section and who have demonstrated their ability to service multi-piece rim wheels shall be assigned such duties.
  - (ii) Employees assigned such duties shall have demonstrated their ability by the safe performance of the following tasks.
    - (A) Tire demounting (including deflation);
    - (B) Inspection of wheel components;
    - (C) Mounting of tires;
    - (D) Inflation of tires, including use of a restraining device;
    - (E) Handling of wheels;
    - (F) Inflation of tires when a wheel is mounted on the vehicle; and
    - (G) Installation and removal of wheels.
- (4) Servicing procedures. The following procedures shall be followed:
- (i) Tires shall be completely deflated before demounting by removal of the valve core;
  - (ii) The valve core shall be removed before the wheel is removed from the axle when;
    - (A) The tire has been operated underinflated at 80% or less of its recommended pressure, or
    - (B) There is discernible or suspected damage to the tire or wheel components;
  - (iii) Mating surfaces shall be free of dirt, surface rust, scale and rubber buildup before mounting;
  - (iv) Rubber lubricant shall be applied to bead and rim mating surfaces upon wheel assembly and inflation of the tire;
  - (v) Air pressure shall not exceed 3 psig (0.21 kg/cm<sup>(2)</sup>) when seating the locking ring or rounding out the tube when a tire is being partially inflated without a restraining device;
  - (vi) While the tire is pressurized, components shall not be struck or forced to correct the seating of side or lock rings;
  - (vii) There shall not be any contact between an employee or unit of equipment and a restraining device during tire inflation;
  - (viii) After inflation, tires, rims and rings shall be inspected while within the restraining device to ensure seating and locking. If adjustment is necessary the tire shall first be deflated by valve core removal; and
  - (ix) Before assembly, wheel components shall be inspected, and damaged rim components shall not be reused.
- (5) Charts and manuals.
- (i) The employer shall provide a chart containing as a minimum the instructions and information provided in the United States Department of Transportation, National Highway Traffic Safety Administration (NHTSA) publication *Safety Precautions for Mounting and Demounting Tube-Type Truck/Bus Tires and Multi-Piece Rim Wheel Matching Chart*, and pertinent to the type(s) of multi-piece rim wheels being serviced. The chart shall be available in the terminal's service area.<sup>(6)</sup>
  - (ii) A current rim manual containing the manufacturer's instructions for mounting, demounting, maintenance and safety precautions relating to the multi-piece rim wheels being serviced shall be available in the terminal's service area.
- (6) Restraining devices.
- (i) Except as otherwise noted, inflation shall be done within a restraining device such as a cage, rack or other device capable of withstanding the maximum force that would be transferred to it during an explosive wheel separation occurring at 150% of maximum tire specification pressure for the wheels being serviced. The restraining device shall be capable of preventing rim components from being thrown outside the frame of the device for any wheel position within the device. When the wheel assembly is mounted on a vehicle, tires may be inflated without a restraining device only if they have more than 80% of the recommended

- pressure and if remote control inflation equipment is used and employees are clear of the danger area.
- (ii) Restraining devices shall be kept in good repair and be capable of preventing rim components from being thrown outside the device.
- (7) Inflation hoses. Inflation hoses shall have a manual clip-on chuck with sufficient hose to permit an employee to be clear of the danger zone. An in-line, manually operated valve with gauge or a preset pressure regulator shall be used to inflate tires.
- (8) Other equipment.
- (i) Only tools recommended in the rim manual for the type of wheel being serviced shall be used to service multi-piece rim wheels.
  - (ii) Wheel components shall not be interchanged except as provided in the applicable chart or manual.
- Footnote<sup>(4)</sup> The United States Coast Guard at 33 CFR 126.15(d) and (e) has additional regulations applicable to vehicles in terminals.
- Footnote<sup>(5)</sup> Department of Transportation regulations in 49 CFR Part 393, Subpart C - Brakes, address the immobilization of trailer road wheels prior to disconnection of the trailer and until braking is again provided. Section 49 CFR 393.84 addresses the condition of flooring. These DOT rules apply when the motor carrier is engaged in interstate commerce or in the transport of certain hazardous items wholly within a municipality or the commercial zone thereof.
- Footnote<sup>(6)</sup> NHTSA charts are available from General Services Division, National Highway Traffic Safety Administration, Attention: N48-51, 400 Seventh Street, S.W., Washington, D.C. 20590. Industry charts are available upon request for the manufacturer.

**§1917.45 Cranes and derricks (see also §1917.50).**

- (a) Coverage.
- (1) This section applies to every kind of crane and derrick and to any other type of equipment performing the functions of a crane or derrick except as noted in paragraph (a)(2) of this section.
  - (2) This section does not apply to small industrial truck-type cranes, container handling top-loaders and sideloaders, chain hoists, and mobile straddle-type cranes incapable of straddling two or more intermodal containers (16 feet (4.88 m) in width).
- (b) Ratings.
- (1) Except for bridge cranes covered by paragraph (g) of this section, cranes and derricks having ratings that vary with boom length, radius (outreach) or other variables shall have a durable rating chart visible to the operator, covering the complete range of the manufacturer's (or design) capacity ratings. The rating chart shall include all operating radii (outreach) for all permissible boom lengths and jib lengths as applicable, with and without outriggers, and alternate ratings for optional equipment affecting such ratings. Precautions or warnings specified by the owner or manufacturer shall be included along with the chart.
  - (2) The manufacturer's (or design) rated loads for the conditions of use shall not be exceeded.
  - (3) Designated working loads shall not be increased beyond the manufacturer's ratings or original design limitations unless such increase receives the manufacturer's approval. When the manufacturer's services are not available or where the equipment is of foreign manufacture, engineering design analysis shall be performed or approved by a person accredited for certificating the equipment under Part §1919 of this chapter. Engineering design analysis shall be performed by a registered professional engineer competent in the field of cranes and derricks. Any structural changes necessitated by the change in rating shall be carried out.
- (c) Radius indicator. When the rated load varies with the boom radius, the crane or derrick shall be fitted with a boom angle or radius indicator visible to the operator.

- (d)** Prohibited usage.
  - (1) Equipment shall not be used in a manner that exerts sideloading stresses upon the crane or derrick boom.
  - (2) No crane or derrick having a visible or known defect that affects safe operation shall be used.
- (e)** Protective devices.
  - (1) When exposed moving parts such as gears, chains and chain sprockets present a hazard to employees during crane and derrick operations, those parts shall be securely guarded.
  - (2) Crane hooks shall be latched or otherwise secured to prevent accidental load disengagement.
- (f)** General.
  - (1) Operating controls.
    - (i) Crane and derrick operating controls shall be clearly marked, or a chart indicating their function shall be posted at the operator's position.
    - (ii) After October 3, 1984, overhead bridge and container gantry crane operating control levers shall be self-centering so that they will automatically move to the **off** position when the operator releases the control.
  - (2) Booms. Cranes with elevatable booms and without operable automatic limiting devices shall be provided with boom stops if boom elevation can exceed maximum design angles from the horizontal.
  - (3) Foot pedals. Foot pedals shall have a non-skid surface.
  - (4) Access. Ladders, stairways, stanchions, grab irons, foot steps or equivalent means shall be provided as necessary to ensure safe access to footwalks, cab platforms, the cab and any portion of the superstructure which employees must reach.
    - (i) Footwalks shall be of rigid construction and shall be capable of supporting a load of 100 pounds (4.79 kPa) per square foot.
    - (ii) If more than 20 feet (6.1 m) in height, vertical ladders shall comply with §1917.118 (d), (e)(1), (e)(2)(iii), and (e)(2)(iv).
    - (iii) Stairways on cranes shall be equipped with rigid handrails meeting the requirements of §1917.112(e).
    - (iv) If the top of a ladder or stairway or any position thereof is located where a moving part of a crane, such as a revolving house, could strike an employee ascending or descending the ladder or stairway, a prominent warning sign shall be posted at the foot of the ladder or stairway. A system of communication (such as a buzzer or bell) shall be established and maintained between the foot of the ladder or stairway and the operator's cab.
  - (5) Operator's station.
    - (i) The cab, controls and mechanism of the equipment shall be so arranged that the operator has a clear view of the load or signalman, when one is used. Cab glass, when used, shall be safety plate glass or equivalent. Cranes with missing, broken, cracked, scratched, or dirty glass (or equivalent) that impairs operator visibility shall not be used. Clothing, tools and equipment shall be stored so as not to interfere with access, operation, and the operator's view.
    - (ii) A seat (lap) belt, meeting the requirements of 49 CFR 571.208-210 for a Type 1 seat belt assembly, shall be installed on the operator's seat of high speed container gantry cranes where the seat trolleys.
  - (6) Counterweights or ballast. Cranes shall be operated only with the specified type and amount of ballast or counterweights. Ballast or counterweight shall be located and secured only as provided in the manufacturer's or design specifications, which shall be available.
  - (7) Outriggers. Outriggers shall be used according to the manufacturers' specifications or design data, which shall be available. Floats, when used, shall be securely attached to the outriggers. Wood blocks or other support shall be of sufficient size to support the outrigger, free of defects that may affect safety and of sufficient width and length to prevent the crane from shifting or toppling under load.

- (8) Exhaust gases. Engine exhaust gases shall be discharged away from the normal position of crane operating personnel.
- (9) Electrical equipment shall be so located or enclosed that live parts will not be exposed to accidental contact. Designated persons may work on energized equipment only if necessary during inspection, maintenance, or repair.
- (10) Fire extinguisher.
  - (i) At least one portable fire extinguisher of at least 5 - BC rating or equivalent shall be accessible in the cab of the crane or derrick.
  - (ii) No portable fire extinguisher using carbon tetrachloride or chlorobromomethane extinguishing agents shall be used.
- (11) Rope on drums. At least three full turns of rope shall remain on ungrooved drums, and two turns on grooved drums, under all operating conditions. Wire rope shall be secured to drums by clamps, U-bolts, shackles or equivalent means. Fiber rope fastenings are prohibited.
- (12) Assembly or disassembly of boom sections. Mobile crane booms being assembled or disassembled on the ground with or without the support of the boom harness shall be blocked to prevent dropping of the boom or boom sections.
- (13) Brakes.
  - (i) Each independent hoisting unit of a crane shall be equipped with at least one holding brake, applied directly to the motor shaft or gear train.
  - (ii) Each independent hoisting unit of a crane, except worm geared hoists, the angle of whose worm is such as to prevent the load from accelerating in the lowering direction, shall, in addition to a holding brake, be equipped with a controlled braking means to control lowering speeds.
  - (iii) Holding brakes for hoist units shall have not less than the following percentage of the rated load hoisting torque at the point where the brake is applied:
    - (A) 125 percent when used with an other than mechanically controlled braking means; or
    - (B) 100 percent when used with a mechanically-controlled braking means.
    - (C) 100 percent when two holding brakes are provided.
  - (iv) All power control braking means shall be capable of maintaining safe lowering speeds of rated loads.
- (g) Rail-mounted cranes (excluding locomotive types).**
  - (1) For the purposes of this section, rail-mounted cranes include bridge ,cranes and portal cranes.
  - (2) Rated load marking. The rated loads of bridge cranes shall be plainly marked on each side of the crane and in the cab. If there is more than one hoisting unit, each hoist shall have its rated load marked on it or on its load block. Marking shall be legible from the ground level.
  - (3) Wind-indicating devices.
    - (i) After October 3, 1983, each rail-mounted bridge and portal crane located outside of an enclosed structure shall be fitted with an operable wind-indicating device.
    - (ii) The wind indicating device shall provide a visible or audible warning to alert the operator of high wind conditions. That warning shall be transmitted whenever the following circumstances are present:
      - (A) When wind velocity reaches the warning speed, not exceeding the crane manufacturer's recommendations; and
      - (B) When wind velocity reaches the shutdown speed, not exceeding the crane manufacturer's recommendations, at which work is to be stopped and the crane secured.
    - (iii) Instructions. The employer shall post operating instructions for high wind conditions in the operator's cab of each crane. Operators shall be directed to comply with these instructions. The instructions shall include procedures for responding to high wind alerts and for any coordination necessary with other cranes.
  - (4) Securing of cranes in high winds.

- (i) When the wind reaches the cranes warning speed:
      - (A) Gantry travel shall be stopped; and
      - (B) The crane shall be readied for shutdown.
    - (ii) When the wind reaches the crane's shutdown speed:
      - (A) Any portion of the crane spanning or partially spanning a vessel shall be moved clear of the vessel if safe to do so; and
      - (B) The crane shall be secured against travel, using all available means of securing.
- (5) The employer shall monitor local weather conditions by subscribing to a weather service or using equally effective means.
- (6) Stops and bumpers.
  - (i) The ends of all tracks shall be equipped with stops or bumpers. If a stop engages the tread of the wheel, it shall be of a height not less than the radius of the wheel.
  - (ii) When more than one crane operates on the same runway or more than one trolley on the same bridge, each crane or trolley shall be equipped with bumpers or equivalent devices at adjacent ends subject to impact.
- (7) Employee exposure to crane movement. When employees may be in the vicinity of the tracks, crane trucks shall be equipped with personnel deflecting guards.
- (8) Pedestrian clearance. If the track area is used for employee passage or for work, a minimum clearance of three feet (.91 m) shall be provided between trucks or the structures of rail-mounted cranes and any other structure or obstruction. When the required clearance is not available on at least one side of the crane's trucks, the area shall not be used and shall be marked and identified.
- (9) Warning devices. Rail-mounted cranes shall be equipped with an effective travel warning device which shall be used to warn employees who may be in the path of the moving crane.
- (10) Communications. Means of communication shall be provided between the operator's cab and the base of the gantry of all rail-mounted cranes. This requirement may be met by telephone, radio, sound-signalling system or other effective methods, but not solely by hand-signalling.
- (11) Limit switch bypass systems shall be secured during all cargo operations. Such bypass systems shall not be used except in an emergency or during non-cargo handling operations such as stowing cranes or derricks or performing repairs. When a situation requiring the use of a bypass system or the readjustment of a limit switch arises, it shall be done only under the direction of a crane mechanic.
- (h)** Stabilizing of locomotive cranes. Loads may be hoisted by locomotive cranes only if outriggers are in place, unless means are taken to prevent the load being carried by the truck springs of the crane.
- (i)** Operations.
  - (1) Use of cranes together. When two or more cranes hoist a load in unison, a designated person shall direct the operation and instruct personnel in positioning, rigging of the load and movements to be made.
  - (2) Guarding of swing radius. Accessible areas within the swing radius of the body of a revolving crane shall be physically guarded during operations to prevent an employee from being caught between the body of the crane and any fixed structure or between parts of the crane.
  - (3) Securing mobile crane components in transit. The crane's super structure and boom shall be secured against rotation and carried in line with the direction of travel except when negotiating turns with an operator in the cab or when the boom is supported on a dolly. The empty hook or other attachment shall be secured.
  - (4) Unattended cranes. the following steps shall be taken before leaving a crane unattended between work periods:
    - (i) Suspended loads, such as those hoisted by lifting magnets or clamshell buckets, shall be landed unless the storage position or maximum hoisting of the suspended device will provide equivalent safety;
    - (ii) Clutches shall be disengaged;

- (iii) The power supply shall be shut off;
- (iv) The crane shall be secured against accidental travel; and
- (v) The boom shall be lowered or secured against movement.
- (5) Operating near electric power lines.
  - (i) Clearance. Unless electrical distribution and transmission lines are de-energized and visibly grounded at the point of work, or unless insulating barriers not a part of or attached to the crane have been erected to prevent physical contact with lines, cranes may be operated near power lines only in accordance with the following:
    - (A) For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet (3.05 m);
    - (B) For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be either 10 feet (3.05 m) plus 0.4 inch (10.16 mm) for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet; and
    - (C) In transit with no load and boom lowered, the clearance shall be a minimum of 4 feet (1.22 m).
  - (ii) Boom guards. Cage-type boom guards, insulating links or proximity warning devices may be used on cranes, but they shall not be used in place of the clearances required by paragraph (i)(5)(i) of this section.
  - (iii) Determination of energized lines. Any overhead line shall be presumed to be energized until the owner of the line indicates that it is not energized.
- (j) Protection for employees being hoisted.
  - (1) No employee shall be hoisted by the load hoisting apparatus of a crane or derrick except:
    - (i) On intermodal container spreaders, equipped in accordance with paragraph (j)(8) of this section; or
    - (ii) In a boatswain's chair or other device rigged to prevent it from accidental disengagement from the hook or supporting member; or
    - (iii) On a platform meeting the following requirements:
      - (A) Enclosed by a railing or other means providing protection equivalent to that described in §1917.112(c). If equipped with open railings, the platform shall be fitted with toe boards;
      - (B) Having a safety factor of four based on ultimate strength;
      - (C) Bearing a plate or permanent marking indicating maximum load rating, which shall not be exceeded, and the weight of the platform itself;
      - (D) Equipped with a device to prevent access doors, when used, from opening accidentally;
      - (E) Equipped with overhead protection for employees on the platform if they are exposed to falling objects or overhead hazards;
      - (F) Secured to the load line by means other than wedge and socket attachments, unless the free (bitter) end of the line is secured back to itself by a clamp placed as close above the wedge as possible.
  - (2) Except in an emergency, the hoisting mechanism of all cranes or derricks used to hoist personnel shall operate only in power up and power down, with automatic brake application when not hoisting or lowering.
  - (3) Variable radius booms of a crane or derrick used to hoist personnel shall be so constructed or secured as to prevent accidental boom movement.
  - (4) Platforms or devices used to hoist employees shall be inspected for defects before each day's use and shall be removed from service if defective.
  - (5) Employees being hoisted shall remain in continuous sight of and communication with the operator or signalman.
  - (6) Operators shall remain at the controls when employees are hoisted.
  - (7) Cranes shall not travel while employees are hoisted, except in emergency or in normal tier to tier transfer of employees during container operations.
  - (8) When intermodal container spreaders are used to transfer employees to or from the tops of containers, the spreaders shall be equipped with a personnel platform equipped with

fixed railings, provided that the railings have one or more openings for access. The openings shall be fitted with a means of closure, such as chains with hooks. Existing railings shall be at least 36 inches (0.91 m) in height. New railings installed after October 3, 1983 shall be 42 inches (1.07 m), plus or minus 3 inches (7.62 cm), in height. The provisions of paragraphs (j)(1)(iii)(C), (j)(1)(iii)(D), and (j)(1)(iii)(F) of this section also apply to personnel platforms when such container spreaders are used.

- (9) Employees shall not be hoisted on intermodal container spreaders while a load is engaged.
  - (10) All cranes and derricks used to hoist personnel shall be equipped with an anti-two-blocking device.
- (k) Routine inspection.**
- (1) Designated persons shall visually inspect each crane and derrick on each day of use for defects in functional operating components and shall report any defect found to the employer. The employer shall inform the operator of the findings.
  - (2) A designated person shall thoroughly inspect all functional components and accessible structural features of each crane or device at monthly intervals.
  - (3) Any defects found during such inspections which may create a safety hazard shall be corrected before further equipment use. Repairs shall be performed only by designated persons.
  - (4) A record of monthly inspections shall be maintained for six months in or on the crane or derrick or at the terminal.

**§1917.46 Load indicating devices.**

- (a)** (1) Except as provided in paragraph (a)(1)(viii) of this section, every crane after October 3, 1984 shall be fitted with a load indicating device or alternative device in proper working condition which shall meet the following criteria:
- (i) The type or model or any load indicating or alternate device which is used shall provide:
    - (A) A direct indication in the cab of actual weight hoisted or a means of determining this by referencing a weight indication to crane ratings posted and visible to the operator, except that the use of a dynamometer or simple scale alone will not meet this requirement; or
    - (B) Indications in the cab according to the radius and load at the moment; or
    - (C) A direct means to prevent an overload from occurring.
  - (ii) The accuracy of the load indicating device, weight-moment device, or overload protection device shall be such that any indicated load (or limit), including the sum of actual weight hoisted and additional equipment or **add ons** such as slings, sensors, blocks, etc., is within the range between 95 percent (5 percent underload) and 110 percent (10 percent overload) of the actual true total load. Such accuracy shall be required over the range of daily operating variables reasonably anticipated under the conditions of use.
  - (iii) The device shall permit the operator to determine, before making any lift, that the indicating or substitute system is operative. In the alternative, if a device is so mounted or attached to preclude such a determination, it may not be used unless it has been certified by the manufacturer to remain operable within the limits stated in paragraph (a)(1)(ii) of this section for a specific period of use. Checks for accuracy, using known values of load, shall be performed at the time of every certification survey (see §1917.50) and at such additional times as may be recommended by the manufacturer.
  - (iv) When a load indicating device or alternative system is so arranged in the supporting system (crane structure) that its failure could cause the load to be dropped, its strength shall not be the limiting factor of the supporting system (crane structure).
  - (v) Marking shall be conspicuously placed giving: units of measure in pounds or both pounds and kilograms, capacity of the indicating system, accuracy of the

indicating system, and operating instructions and precautions. In the case of systems utilizing indications other than actual weights, the marking shall include data on: the means of measurement, capacity of the system, accuracy of the system, and operating instructions and precautions. If the system used provides no readout, but is such as to automatically cease crane operation when the rated load limit under any specific condition of use is reached, marking shall be provided giving the make and model of the device installed, a description of what it does, how it is operated, and any necessary precautions regarding the system. All weight indications, other types of loading indications, and other data required shall be readily visible to the operator.

- (vi) All load indicating devices shall be operative over the full operating radius. Overall accuracy shall be based on actual applied load and not on full scale (full capacity) load.  
**EXPLANATORY NOTE:** For example, if accuracy of the load indicating device is based on full scale load and the device is arbitrarily set at plus/minus 10 percent, it would accept a reading between 90,000 and 110,000 lbs., at full capacity of a machine with 100,000 lbs., maximum rating, but would also allow a reading between zero and 20,000 lbs., at that outreach (radius) at which the rating would be 10,000 lbs., capacity - an Unacceptable figure. If, however, accuracy is based on actual applied load under the same conditions, the acceptable range would remain the same with the 100,000 - lb. load but becomes a figure between 9,000 and 11,000 lbs., a much different and acceptable condition, at the 10,000 lb. load.
- (vii) When the device uses the radius as a factor in its use or in its operating indications, the indicated radius (which may be in feet and/or meters, or degrees of boom angle, depending on the system used) shall be a figure which is within the range of a figure no greater than 110 percent of the actual radius to a figure which is no less than 97 percent of the actual (true) radius. A conversion chart shall be provided whenever it is necessary to convert between degrees of radius and feet or meters.
- (viii) The load indicating device requirements of this subparagraph do not apply to a crane:
  - (A) Of trolley equipped bridge type or overhead type while handling intermodal containers known to be identified as empty, or loaded, and in either case in compliance with the provisions of §1917.71, or while hoisting other lifts by means of a lifting beam supplied by the crane manufacturer for the purpose, and in all cases within the crane rating;
  - (B) While handling bulk commodities or cargoes by means of clamshell bucket or magnet;
  - (C) While used to handle or hold hoses in connection with transfer of bulk liquids or other hose handled products; or
  - (D) While the crane is used exclusively to handle cargo or equipment the total actual gross weight of which is known by means of marking of the unit or units hoisted, when such total actual gross weight never exceeds 11,200 lbs., and when 11,200 lbs., is less than the rated capacity of the crane at the maximum outreach that is possible under the conditions of use at the time.

#### **§1917.47 Winches.**

- (a) Moving winch parts which present caught-in hazards to employees shall be guarded.
- (b) Winches shall have clearly identifiable and readily accessible stop controls.
- (c) Portable winches shall be secured against accidental shifting while in use.
- (d) Portable winches shall be fitted with limit switches if employees have access to areas from which it is possible to be drawn into the winch.
- (e) The provisions of §1917.45(f)(11) shall apply to winches.

**§1917.48 Conveyers.**

- (a) Guards.
  - (1) Danger zones at or adjacent to conveyors shall be guarded to protect employees.
  - (2) An elevated walkway with guardrail or equivalent means of protection shall be provided where employees cross over moving conveyors, and suitable guarding shall be provided when employees pass under moving conveyors.
- (b) Moving parts. Conveyor rollers and wheels shall be secured in position.
- (c) Positioning. Gravity conveyor sections shall be firmly placed and secured to prevent them from falling.
- (d) Braking.
  - (1) When necessary for safe operation, provisions shall be made for braking objects at the delivery end of the conveyor.
  - (2) Conveyors using electrically released brakes shall be constructed so that the brakes cannot be released until power is applied, and so that the brakes are automatically engaged if the power fails or the operating control is returned to the "stop" position.
- (e) Stability. Portable conveyors shall be stable within their operating ranges. When used at variable fixed levels, the unit shall be secured at the operating level.
- (f) Emergency stop devices. Readily accessible stop controls shall be provided for use in an emergency. Whenever the operation of any power conveyor requires personnel to work in the immediate vicinity of the conveyor, the Conveyor or controls shall not be left unattended while the conveyor is in operation.
- (g) Starting powered conveyors. Powered conveyors shall not be started until all employees are clear of the conveyor or have been warned that the conveyor is about to start.
- (h) Loading and unloading. The area around conveyor loading and unloading points shall be kept clear of obstructions during conveyor operations.
- (i) Lockout/Tagout.
  - (1) Conveyors shall be stopped and their power sources locked out and tagged out during maintenance, repair, and servicing, unless power is necessary for testing.
  - (2) The starting device shall be locked out and tagged out in the stop position before an attempt is made to remove the cause of a jam or overload of the conveying medium, unless it is necessary to have the power on to remove the jam.
- (j) Safe practices.
  - (1) Only designated persons shall operate, repair or service powered conveyors.
  - (2) The employer shall direct employees to stay off operating conveyors.
  - (3) Conveyors shall be operated only with all overload devices, guards and safety devices in place and operable.

**§1917.49 Spouts, chutes, hoppers, binds, and associated equipment.**

- (a) Standing and running rigging and associated gear used as a permanent part of spouts, chutes or similar devices shall be inspected before each use and shall not be used if it has any functional defects. (See also §1917.50(c)(2) for certification requirements.)
- (b) Direct communication shall be provided between the discharge or shipboard control end of loading spouts and chutes and the point in the terminal from which the flow of cargo is controlled.
- (c) Chute and hopper openings which present a hazard shall be guarded to prevent employees from falling through them.
- (d) When employees are working on hoppers, the hopper shall be equipped with a safe walkway and means of access.
- (e) When necessary for the safety of employees, chutes shall be equipped with sideboards to afford protection from falling objects.
- (f) Chutes shall be firmly placed and secured to prevent them from falling.
- (g) When necessary for the safety of employees, provisions shall be made for braking objects other than bulk commodities at the delivery end of the chute.
- (h) Before an employee enters an empty bin:

- (1) Personnel controlling the flow of cargo into the bin shall have been notified of the entry; and
- (2) The power supply to the equipment carrying the cargo to the bin shall be turned off, locked out and tagged.
- (i) Before an employee enters a bin containing a bulk commodity such as coal or sugar, the employer shall ensure that:
  - (1) Personnel controlling the flow of cargo into the bin have been notified of the entry;
  - (2) The power supply to the equipment carrying the cargo to the bin is turned off, locked out, and tagged.
  - (3) The employee entering the bin wears a lifeline and safety harness; and
  - (4) A standby attendant equipped to perform a rescue is continuously stationed outside the bin until the employee has left the bin.
- (j) Bin top openings that present a hazard to employees shall be covered to prevent employees from falling into bins.
- (k) Chutes and hoppers shall be repaired only by designated persons.
- (l)
  - (1) Before power shoveling operations begin, a designated person shall inspect the equipment to be used. The inspection shall include at least the eye bolts, wires, and sheaves.
  - (2) Power shovels and associated equipment with defects affecting safe operation shall not be used.
  - (3) Before adjustments are made to a power shovel, wire, or associated equipment, the power supply to the shovel shall be turned off, locked out, and tagged, the belt stopped, and the hopper closed.

**§1917.50 Certification of marine terminal material handling devices (See also mandatory appendix I, of this part).**

- (a) The employer shall not use any material handling device listed in paragraph (c) of this section until he has ascertained that the device has been certificated, as evidenced by current and valid documents attesting to compliance with the requirements of paragraph (b) of this section.
  - (1) Certification surveys are to be completed for the conditions of use found at the time such surveys are completed, with the understanding that equipment owners/users can change the configurations of the equipment according to the manufacturer's specifications without affecting the established certification status for the equipment.
  - (2) In cases of foreign manufactured cranes, there shall be an owner's warranty that the design is adequate for the intended use. The warranty shall be based on a thorough examination of the design specifications by a registered professional engineer familiar with the equipment.
- (b) The certifications required by this section shall be performed
  - (1) In accordance with Part §1919 of this chapter, by persons then currently accredited by the Occupational Safety and Health Administration as provided in that part; or
  - (2) In accordance with standards established and enforced by the state in which the device is located or by a political subdivision thereof, which have been found by the Secretary to be compatible with Part §1919 of this chapter, by persons designated as competent to perform such certification by competent state authority and recognized as such by the Secretary.
- (c) The marine terminal material handling devices listed below shall be certificated in the following manner:
  - (1) Each crane and derrick shall be tested as a unit quadrennially, and shall be examined annually. Certificates of tests and examinations shall be made readily available for inspection.
  - (2) Bulk cargo spouts and suckers, together with any portable extensions and rigging or outriggers supporting them vertically, shall be examined annually. Certificates attesting to the required examination shall be made readily available for inspection.
  - (3) Vertical pocket or bucket conveyors such as banana, sugar, and grain marine legs (other than those within a grain elevator structure) used within a marine terminal facility shall be

examined annually. The annual examination shall include all supporting structures, rigging and mechanical components and observation of all steps of operations. Certificates attesting to the required examinations shall be readily available for inspection.

- (4) House fall cargo-handling gear in use shall be proof load tested as a unit upon initial certification and every fourth year thereafter. An examination shall be carried out in conjunction with each unit proof load test and annually thereafter. The unit test shall consist of a proof load of 25 percent in excess of the rated safe working load. Examinations shall include all supporting structures and components. Certificates attesting to the required tests and examinations shall be readily available for inspection.

- (i) House fall span beams or other house fall block supports shall be marked with the safe working load, which shall not be exceeded.

- (5) Special gear.

- (i) Special stevedoring gear provided by the employer, the strength of which depends upon components other than commonly used stock items such as shackles, ropes, or chains, and that has a Safe Working Load (SWL) greater than five short tons (10,000 lbs or 4.54 metric tons) shall be inspected and tested as a unit before initial use (see Table A in paragraph (c)(5)(ii) of this section). In addition, any special stevedoring gear that suffers damage necessitating structural repair shall be inspected and retested after repair and before being returned to service.

- (ii) Special stevedoring gear provided by the employer that has a SWL of five short tons (10,000 lbs or 4.54 metric tons) or less shall be inspected and tested as a unit before initial use according to paragraphs (d) and (e) of this section or by a designated person (see Table A in this paragraph (c)(5)(ii)).

Table A	
Safe working load	Proof load
Up to 20 short tons (18.1 metric tons)	25 percent in excess
From 20 through 50 tons (18.1 to 45.4 metric tons)	5 short tons in excess
Over 50 short tons (45.4 metric tons)	10 percent in excess

- (iii) Every spreader that is not a part of ship's gear and is used for handling intermodal containers shall be inspected and tested before initial use to a proof load equal to 25 percent greater than its rated capacity. In addition, any spreader that suffers damage necessitating structural repair shall be inspected and retested after repair and before being returned to service.

- (iv) All cargo handling gear covered by this section with a SWL greater than five short tons (10,000 lbs. or 4.54 metric tons) shall be proof load tested according to Table A of this section every 4 years in accordance with paragraph (b) of this section or by a designated person.

- (v) Certificates and inspection and test records attesting to the tests required by this section shall be available for inspection.

- (6) Wire rope and loose gear obtained after October 3, 1983, and used for material handling shall have been tested and certificated before being placed into use in accordance with the provisions of paragraphs (a), (c), and (d) of §1919.31 and §1919.32 through §1919.34 of this chapter as applicable. Certificates attesting to the required tests, inspections and examinations shall be available.

- (d) Disassembly and reassembly of equipment does not require recertification of the equipment provided that the equipment is reassembled and used in a manner consistent with its certification.
- (e) For equipment certificated in accordance with paragraph (b)(2) of this section and transferred to a job site in another state, the current certification shall remain valid until the next inspection or examination becomes due.

- (f) Certification procedures shall not be construed as a substitute for, or cause for elimination of, normal operational inspection and maintenance routine throughout the year.
- (g) (1) Every unit of equipment requiring quadrennial certification shall have had such quadrennial certification within the previous 48 months. Equipment requiring annual certification shall have had such annual certification within the previous 12 months, except that no annual certification is required within 12 months after any required quadrennial certification. Annual examinations for certification may be accomplished up to one month early without effect on subsequent due dates.
- (2) When certificated equipment is out of service for 6 months or more beyond the due date of a certification inspection, an examination equivalent to an initial certification, including unit proof load test, shall be performed before the equipment re-enters service.
- (h) Loose gear obtained after October 3, 1983 shall bear a legible mark indicating that it has been tested (see paragraph (c)(6) of this section). Single sheave blocks shall be marked with safe working loads and proof test loads. Marks relating to testing shall be identifiable on the related certificates, which shall be available.
- (i) Safe working load.
  - (1) The safe working load of gear as specified in this section shall not be exceeded.
  - (2) All cargo handling gear provided by the employer with a safe working load greater than five short tons (10,000 lbs. or 4.54 metric tons) shall have its safe working load plainly marked on it.
- (j) Exceptions: The certification requirements of this section do not apply to the following equipment:
  - (1) Small industrial crane trucks as described on page 8 and illustrated on page 13 of ASME B56.1, 1959, *Safety Code for Powered Industrial Trucks*, and powered industrial trucks;
  - (2) Any straddle truck not capable of straddling two or more intermodal containers 16 feet (4.88 m) in width; and
  - (3) Gear used only for handling or holding hoses, handling ship's stores or handling the gangway.

#### **§1917.51 Hand tools.**

- (a) Hand tools used by employees shall be maintained in safe operating condition.
- (b) (1) Hand-held portable electric tools shall be equipped with switches that must be manually held in a closed position to operate the tool.
- (2) 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 needed 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 needed 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.
- (c) Only cutting tools shall be used to cut metal strapping or banding used to secure cargo.

#### **§1917.70 General.**

The provisions of this Subpart D shall apply to specialized terminals in addition to any other applicable requirements of this part.

#### **§1917.71 Terminals handling intermodal containers or roll-on roll-off operations.**

- (a) Every intermodal container shall be legibly and permanently marked with:
  - (1) The weight of the container when empty, in pounds;
  - (2) The maximum cargo weight the container is designed to carry, in pounds; and
  - (3) The sum of the weight of the container and the cargo, in pounds.
- (b) No container shall be hoisted by any crane or derrick unless the following conditions have been met:

- (1) The employer shall ascertain from the carrier whether a container to be hoisted is loaded or empty. Empty containers shall be identified before loading or discharge in such a manner as will inform every supervisor and foreman on the site and in charge of loading or discharging, or every crane or other hoisting equipment operator and signalman, if any, that such container is empty. Methods of identification may include cargo plans, manifests or markings on the container.
- (2) In the case of a loaded container:
  - (i) The actual gross weight shall be plainly marked so as to be visible to the crane or other hoisting equipment operator or signalman, or to every supervisor and foreman on the site and in charge of the operation; or
  - (ii) the cargo stowage plan or equivalent permanently recorded display serving the same purpose, containing the actual gross weight and the serial number or other positive identification of that specific container, shall be provided to the crane or other hoisting equipment operator and signalman, if any, and to every supervisor and foreman on the site and in charge of the operation.
- (3) Every outbound loaded container which is received at a marine terminal ready to load aboard a vessel without further consolidation or loading shall be weighed to obtain the actual gross weight, either at the terminal or elsewhere, before being hoisted.
- (4)
  - (i) When container weighing scales are located at a marine terminal, any outbound container with a load consolidated at that terminal shall be weighed to obtain an actual weight before being hoisted.
  - (ii) If the terminal has no scales, the actual gross weight may be calculated on the basis of the container's contents and the container's empty weight. The weights used in the calculation shall be posted conspicuously on the container, with the name of the person making the calculation and the date.
- (5) Open type vehicle carrying containers and those built specifically and used solely for the carriage of compressed gases are excepted from paragraphs (b)(3) and (b)(4) of this section.
- (6) Closed dry van containers carrying vehicles are exempted from paragraph (b)(4) of this section provided that:
  - (i) The container carries only completely assembled vehicles and no other cargo;
  - (ii) The container is marked on the outside in such a manner that an employee can readily discern that the container is carrying vehicles; and
  - (iii) The vehicles were loaded into the container at the marine terminal.
- (7) The weight of loaded inbound containers from foreign ports shall be determined by weighing or by the method of calculation described in paragraph (b)(4)(ii) of this section or by shipping documents.
- (8) Any scale used within the United States to weigh containers for the purpose of the requirements of this section shall meet the accuracy standards of the state or local public authority in which the scale is located.
- (c) No container or containers shall be hoisted if their actual gross weight exceeds the weight marked as required in paragraph (a)(2) of this section, or if it exceeds the capacity of the crane or other hoisting device intended to be used.
- (d)
  - (1) Marked or designated areas shall be set aside within a container or roll-on roll-off terminal for passage of employees to and from active cargo transfer points, except where transportation to and from those points is provided by the employer.
  - (2) The employer shall direct employees to stay clear of the area beneath a suspended container.
- (e) Each employee working in the immediate area of container handling equipment or in the terminal's traffic lanes shall wear a high visibility vest (or equivalent protection).<sup>(7)</sup>

**Note to paragraph (e):** High visibility vests or equivalent protection means high visibility/retro-reflective materials which are intended to make the user clearly visible by day through the use of high visibility (fluorescent) material and in the dark by vehicle headlights through the use of retro-reflective material. For example, an acceptable area of material for a vest or equivalent protection is .5 m<sup>2</sup> (760 in.<sup>2</sup>) for fluorescent (background) material and .13<sup>2</sup> (197 in.<sup>2</sup>) for retro-reflective material. Vests or equivalent

protection, such as high visibility/retro-reflective coveralls, that are available for industrial use, may also be acceptable.

- (f)** Containers shall be handled using lifting fittings or other arrangements suitable and intended for the purpose as set forth in paragraphs (f)(1) through (f)(4) of this section, unless damage to an intermodal container makes special means of handling necessary.
- (1) Loaded intermodal containers of 20 feet (6.1 m) or more in length shall be hoisted as follows:
- (i) When hoisting containers by the top fittings, the lifting forces shall be applied vertically from at least four such fittings. A less than vertical lift is permitted only under the following conditions:
    - (A) The container being lifted is an ISO closed box container;
    - (B) The condition of the box is sound;
    - (C) The speed of hoisting and lowering is moderated when heavily laden containers<sup>(8)</sup> are encountered;
    - (D) The lift angle is at 80 to 90 degrees;
    - (E) The distance between the lifting beam and the load is at least 8 feet and 2.4 inches (2.5m); and
    - (F) The length of the spreader beam is at least 16.3 feet (5 m) for a 20-foot container, and at least 36.4 feet (11.1 m) for a 40-foot container.
  - (ii) If hoisted from bottom fittings, the hoisting connections shall bear on the fittings only, making no other contact with the container. The angles of the four bridle legs shall not be less than 30 degrees to the horizontal in the case of 40 foot (12.2 m) containers, 37 degrees in the case of 30 foot (9.1 m) containers, and 45 degrees in the case of 20 foot (6.1 m) containers.
  - (iii) Lifting containers by fork lift trucks or by grappling arms from above or from one side may be done only if the container is designed for this type of handling.
  - (iv) Other means of hoisting may be used only if the containers and hoisting means are designed for such use.
- (2) (i) When using intermodal container spreaders that employ lanyards for activation of load disengagement, all possible precautions shall be taken to prevent accidental release of the load.
- (ii) Intermodal container spreader twistlock systems shall be designed and used so that a suspended load cannot accidentally be released.
- (3) Flat bed trucks or container chassis used to move intermodal containers shall be equipped with pins, flanges, or other means to prevent the container from shifting.
- (4) After July 27, 1998, flat bed, low boy trailers (mafis) and other similar equipment used to transport containers shall be marked with their cargo capacities and shall not be overloaded.
- (5) Each tractor shall have all brake air lines connected when pulling trailers equipped with air brakes and shall have the brakes tested before commencing operations.
- (g)** (1) Intermodal containers shall be inspected for defects in structural members or fittings before handling.
- (2) Any intermodal container found to be unsafe shall be identified as such, promptly removed from service and repaired before being returned to service.
- (h)** Containers shall not be hoisted unless all engaged chassis twist locks are released.

Footnote <sup>(7)</sup> Decals on hard hats will not be considered equivalent protection for the purposes of this paragraph.

Footnote <sup>(8)</sup> A heavily laden container is one that is loaded to within 20 percent of its rated capacity.

**§1917.73 Terminal facilities handling menhaden and similar species of fish (See also §1917.2, definition of hazardous cargo, materials, substance or atmosphere).**

- (a)** (1) Tanks in terminal areas used for receiving or storing bailwater for recirculating into vessel holds in discharging operations shall be opened or ventilated to minimize contamination of water circulated to the vessel. Bailwater tanks shall be thoroughly drained upon

- completion of each day's operations and shall be left open to the air. Drainage is unnecessary when bailwater has been treated to remove hydrogen sulfide-producing contaminants and the efficiency of such treatment has been established by the employer.
- (2) Before employees enter a dock tank, it shall first be drained, rinsed and tested for hydrogen sulfide and oxygen deficiency. Employees shall not enter the tank when the hydrogen sulfide level exceeds 20 ppm or oxygen content is less than 19.5 percent, except in emergencies.
  - (3) Tests shall be conducted by designated personnel with suitable test equipment and respiratory protective equipment complying with the provisions of §1910.134 of this chapter.
- (b) Pipelines and hoses on the dock or terminal used for receiving and circulating used bailwater shall be completely drained upon completion of each day's operation and left open to the air.
  - (c) At least four units of respiratory protective equipment consisting of supplied-air respirators or self-contained breathing apparatus complying with the requirements of §1910.134 of this chapter shall be available in a suitably labeled cabinet for immediate use in case of emergency caused by oxygen deficiency or hydrogen sulfide. Any employee entering a tank in an emergency shall, in addition to respiratory protective equipment, wear a lifeline and safety harness to facilitate rescue. At least two other employees, similarly equipped, shall be continuously stationed outside the tank to observe and to provide rescue services.
  - (d) The plant superintendent and foremen shall be trained and knowledgeable about the hazards of hydrogen sulfide and oxygen deficiency. They shall be trained in the use of appropriate respiratory and other protective equipment, and in rescue procedures. Other supervisory plant personnel shall be informed of these hazards and instructed in the necessary safety measures, including use of respiratory and rescue equipment.
  - (e) Supervisory personnel shall be on hand at dockside to supervise discharging of bailwater from vessels.

#### **§1917.91 Eye and face protection.**

- (a) (1) The employer shall ensure that each affected employee uses appropriate eye and/or face protection where there are exposures to eye and/or face hazards. Such equipment shall comply with American National Standards Institute, ANSI Z-87.1-1989, *Practice for Occupational and Educational Eye and Face Protection*.
  - (2) For employees wearing corrective spectacles, eye protection equipment required by paragraph (a)(1) of this section must be of a type which can be worn over spectacles. Prescription ground safety lenses may be substituted if they provide equivalent protection.
  - (3) For additional requirements covering eye protection against radiant energy, see §1917.152(h).
- (b) Eye protection equipment shall be maintained in good condition.
  - (c) Used eye protection equipment shall be cleaned and disinfected before reissuance to another employee.

#### **§1917.92 Respiratory protection.**

(See §1917.1(a)(2)(x))

#### **§1917.93 Head protection.**

- (a) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.
- (b) Such equipment shall comply with American National Standards Institute, ANSI Z-89.1-1986, *Personnel Protection-Protective Headwear for Industrial Workers-Requirements*.
- (c) Protective hats previously worn shall be cleaned and disinfected before issuance by the employer to another employee.

**§1917.94 Foot protection.**

- (a) The employer shall ensure that each affected employee wears protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects or objects piercing the sole.
- (b) Such equipment shall comply with American National Standards Institute, ANSI Z-41-1991, *American National Standard for Personal Protection-Protective Footwear*.

**§1917.95 Other protective measures.**

- (a) Protective clothing.
  - (1) Employees performing work that requires special protective clothing shall be directed by the employer to wear the necessary special protective clothing.
  - (2) When necessary, protective clothing previously worn shall be cleaned and disinfected before reissuance.
- (b) Personal flotation devices (PFDs).
  - (1) The employer shall provide, and shall direct the wearing of PFDs for those employees, such as line handlers, who are engaged in work in which they may be pulled into the water:
    - (i) when such employees are working in isolation, or
    - (ii) where physical limitations of available working space creates a hazard of falling into the water, or
    - (iii) where the work area is obstructed by cargo or other obstacles so as to prevent employees from obtaining safe footing for their work.
  - (2) PFDs (life preservers, life jackets, or work vests) worn by each affected employee must be United States Coast Guard (USCG) approved pursuant to 46 CFR part 160 (Type I, II, III, or V PFD) and marked for use as a work vest, for commercial use, or for use on vessels.
  - (3) Personal flotation devices shall be maintained in safe condition and shall be considered unserviceable when damaged so as to affect buoyancy or fastening capability.
- (c) Emergency facilities. When employees are exposed to hazardous substances which may require emergency bathing, eye washing or other facilities, the employer shall provide such facilities and maintain them in good working order.

**§1917.96 Payment for protective equipment.**

- (a) Except as provided by paragraphs (b) through (f) of this section, the protective, including personal protective equipment (PPE), used to comply with this part, shall be provided by the employer at no cost to employees.
- (b) The employer is not required to pay for non-specialty safety-toe protective footwear (including steel-toe shoes or steel-toe boots) and non-specialty prescription safety eyewear, provided that the employer permits such items to be worn off the job-site.
- (c) When the employer provides metatarsal guards and allows the employee, at his or her request, to use shoes or boots with built-in metatarsal protection, the employer is not required to reimburse the employee for the shoes or boots.
- (d) The employer is not required to pay for:
  - (1) Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots; or
  - (2) Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats raincoats, ordinary sunglasses, and sunscreen.
- (e) The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.
- (f) Where an employee provides adequate protective equipment he or she owns, the employer may allow the employee to use it and is not required to reimburse the employee for that equipment. The employer shall not require an employee to provide or pay for his or her own PPE, unless the PPE is excepted by paragraphs (b) through (e) of this section.

- (g) This section shall become effective on February 13, 2008. Employers must implement the PPE payment requirements no later than May 15, 2008.

**§1917.111 Maintenance and load limits.**

- (a) The structural integrity of docks, piers, wharves, terminals and working surfaces shall be maintained.
- (b) Maximum safe load limits, in pounds per square foot (kilograms per square meter), of floors elevated above ground level, and pier structures over the water shall be conspicuously posted in all cargo areas.
- (c) Maximum safe load limits shall not be exceeded.
- (d) All walking and working surfaces in the terminal area shall be maintained in good repair.

**§1917.112 Guarding of edges.**

- (a) Vehicle protection.
- (1) Vehicle curbs, bull rails, or other effective barriers at least six inches (15.24 cm) in height shall be provided at the waterside edges of aprons and bulkheads, except where vehicles are prohibited. Curbs or bull rails installed after October 3, 1983, shall be at least 10 inches (25.4 cm) in height.
  - (2) The provisions of paragraph (a)(1) of this section also apply at the edge of any fixed level above the common floor area from which vehicles may fall, except at loading docks, platforms and skids where cargo is moved by vehicles.
- (b) Employee protection.
- (1) Guardrails shall be provided at locations where employees are exposed to floor or wall openings or waterside edges, including bridges or gangway-like structures leading to pilings or vessel mooring or berthing installations, which present a hazard of falling more than 4 feet (1.22 m) or into the water, except as specified in paragraph (b)(2) of this section.
  - (2) Guardrails are not required:
    - (i) At loading platforms and docks;
    - (ii) At waterside edges used for cargo handling;
    - (iii) On the working sides of work platforms, skids or similar workplaces; or
    - (iv) On railroad rolling stock, highway vehicles, intermodal containers or similar equipment.
- (c) Criteria for guardrails. Guardrails shall meet the following criteria:
- (1) They shall be capable of withstanding a force of at least 200 pounds (890 N) applied in any direction at mid-span of the top rail (when used), or at the uppermost point if there is no top rail.
  - (2) If not of solid baluster, grillwork, slatted or similar construction, guardrails shall consist of top rails and midrails. Midrails, when used, shall be positioned at approximately half the height of the top rail.
  - (3) The top surface of guardrails installed before October 3, 1983, shall be at least 36 inches (0.91 m) high. Those installed after October 3, 1983, shall be 42 inches (1.07 m), plus or minus 2 inches (5.1 cm), high.
  - (4) Any non-rigid railing such as chain or wire rope shall have a maximum sag limit at the mid-point between posts of not more than 6 inches (15.24 cm).
  - (5) Top rails shall be free of puncture and laceration hazards.
  - (6) Rail ends shall not overhang to constitute a hazard, but this does not prohibit scrollwork, boxed ends or similar non-hazardous projections.
- (d) Toeboards. Toeboards shall be provided when employees below could be exposed to falling objects such as tools. Toeboards shall be at least 3½ inches (8.9 cm) in height from top edge to floor level, and be capable of withstanding a force of 50 pounds (222 N) applied in any direction. Drainage clearance under toeboards is permitted.
- (e) Stair railings shall be capable of withstanding a force of at least 200 pounds (890 N) applied in any direction, and shall not be more than 36 inches (0.91 m) nor less than 32 inches (0.81 m) in height from the upper top rail surface to the tread surface in line with the leading edge of the

tread. Railings and midrails shall be provided at any stairway having four or more risers, as follows:

- (1) For stairways less than 44 inches (1.12 m) wide, at least one railing; and
  - (2) For stairways more than 44 inches (1.12 m) but less than 88 inches (2.24 m) wide, a stair rail or handrail on each side, and if 88 or more inches wide, an additional intermediate handrail.
- (f) Condition. Railings shall be maintained free of sharp edges and in good repair.

**§1917.113 Clearance heights.**

Clearance heights shall be prominently posted where the height is insufficient for vehicles and equipment.

**§1917.114 Cargo doors.**

- (a) Mechanically operated.
- (1) Cargo door counterweights shall be guarded.
  - (2) Lift trucks and cranes shall not be used to move mechanically operated doors except when necessary during repair on the doors, in which case ropes or other guarding shall be provided to prevent entry into the area where the door may fall or slide.
  - (3) Vertically operated doors partially opened for work or ventilation shall be secured to prevent accidental closing.
- (b) Tackle operated.
- (1) The door shall be connected to its lifting tackle with shackles or equally secure means.
  - (2) Lifting bridles and tackles shall have a safety factor of five, based upon maximum anticipated static loading conditions.
  - (3) Devices shall be provided to hold overhead doors in the open position and to secure them when closed.
  - (4) Lifting gear and hardware shall be maintained in safe condition.
  - (5) Lifting ropes, when used, shall be placed out of the work area and off the floor.
- (c) Horizontal sliding.
- (1) Horizontal sliding door rollers shall be constructed to prevent the door from jumping from overhead tracks.
  - (2) Sliding doors shall be secured to prevent them from swinging.

**§1917.115 Platforms and skids.**

- (a) Platforms and skids extending from piers, transit sheds or lofts and used for landing or hooking on drafts shall be provided at the open sides with guardrails meeting the requirements of §1917.112(c) or alternate means, such as nets, to protect employees against falls.
- (b) Any employee working below a second-story platform or skid shall be protected from falling objects by a net stretched from the platform or skid to the vessel.
- (c) Platforms and skids shall be strong enough to bear the loads handled and shall be maintained in safe condition. Safe working loads, which shall be posted or marked on or adjacent to platforms and skids, shall have a minimum safety factor of five for any part, based upon maximum anticipated static loading conditions and the ultimate strength of the construction material.
- (d) The employer shall provide and maintain platform and skid attachments that will prevent accidental movement of the skid or platform.

**§1917.116 Elevators and escalators.**

- (a) **Elevator** means a permanent hoisting and lowering mechanism with a car or, platform moving vertically in guides and serving two or more floors of a structure. The term excludes such devices as conveyors, tiering or piling machines, material hoists, skip or furnace hoists, wharf ramps, lift bridges, car lifts and dumpers.

- (b) **Escalator** means a power-driven continuous moving stairway principally intended for the use of persons.
- (c) No elevator or escalator with a defect which affects safety shall be used.
- (d) Elevator safety devices shall not be overridden or made inoperable.
- (e) Elevators and escalators shall be thoroughly inspected at intervals not exceeding one year. Additional monthly inspections for satisfactory operation shall be conducted by designated persons. Records of the results of the latest annual elevator inspections shall be posted in elevators. Records of annual escalator inspections shall be posted in the vicinity of the escalator or be available at the terminal.
- (f) Elevator landing openings shall be provided with doors, gates or equivalent protection which shall be in place when the elevator is not at that landing, to prevent employees from falling into the shaft.
- (g) The elevator's or escalator's maximum load limits shall be posted and not exceeded. Elevator load limits shall be posted conspicuously both inside and outside of the car.
- (h) Elevators shall be operated only by designated persons except for automatic or door interlocking elevators which provide full shaft door closing and automatic car leveling.

**§1917.117 Manlifts.**

- (a) Inspection. Manlifts shall be inspected monthly by a designated person. Safety switches shall be checked weekly. Manlifts found to be unsafe shall not be operated until repaired. Inspections shall include at least the following:
  - (1) Step fastenings;
  - (2) Rails;
  - (3) Rail supports and fastenings;
  - (4) Roller and slides;
  - (5) Belt and belt tension;
  - (6) Handholds and fastenings;
  - (7) Floor landings;
  - (8) Guardrails;
  - (9) Lubrication;
  - (10) Safety switches;
  - (11) Warning signs and lights;
  - (12) Illumination;
  - (13) Drive pulley;
  - (14) Bottom (boot) pulley and clearance;
  - (15) Pulley supports;
  - (16) Motor;
  - (17) Drive mechanism;
  - (18) Brake;
  - (19) Electrical switches;
  - (20) Vibration and misalignment;
  - (21) Skip on up or down run when mounting the step (indicating worn gears); and
  - (22) Emergency exit ladders.
- (b) Inspection records. Inspection records shall be kept for at least one year. The record of the most recent inspection shall be posted in the vicinity of the manlift or in the terminal.
- (c) Emergency stop. An emergency stop device shall be available within easy reach from any position on the belt.
- (d) Instructions. Manlift use instructions shall be conspicuously posted.
- (e) Top floor warning sign and light. An illuminated sign and red light that are visible to the user shall be provided under the top floor opening of the manlift to warn the user to get off at that floor.
- (f) Bottom floor warning sign. A sign visible to descending passengers shall be provided to warn them to get off at the bottom floor.
- (g) Upper limit stop. An automatic stop device shall be provided to stop the manlift when a loaded step passes the top landing, except that manlifts installed after October 3, 1983 shall have two such devices.

- (h) Handholds and steps. Each step shall be provided with a corresponding handhold.
- (i) Emergency ladder. A fixed emergency ladder accessible from any position on the lift and in accordance with the requirements of §1917.118(d) shall be provided for the entire run of the manlift.
- (j) Landings.
  - (1) Clear and unobstructed landing spaces shall be provided at each level. Manlifts constructed after October 3, 1983 and that have a distance of 50 feet (15.24 m) or more between floor landings shall have an emergency landing every 25 feet (7.62 m) or less of manlift travel.
  - (2) Open sides of emergency landings shall be protected by guardrails.
  - (3) Floor landing entrances and exits shall be guarded by mazes, self-closing gates, or equivalent devices.
  - (4) Landings shall be of sufficient size and strength to support 250 pounds (1,112 N).
- (k) Floor opening guards. The ascending sides of manlift floor openings shall be provided with cones or bevel guards to direct the user through the openings.
- (l) Maintenance. Manlifts shall be equipped, maintained, and used in accordance with the manufacturer's specifications, which shall be available at the terminal.
- (m) Bottom pulley.
  - (1) Top clearance. A clearance of at least 11 feet (3.35 m) shall be provided between the top landing and the ceiling.
  - (2) Sides of the bottom pulley support shall be guarded to prevent contact with the pulley or the steps.
- (n) Top clearance. A clearance of at least 11 feet (3.3 m) shall be provided between the top landing and the ceiling.
- (o) Brakes. Manlifts shall be equipped with brakes that are:
  - (1) Self-engaging;
  - (2) Electrically released; and
  - (3) Capable of stopping and holding the manlift when the descending side is loaded with the maximum rated load.

#### §1917.118 Fixed ladders.

- (a) Scope and applicability. This section applies to all fixed ladders except:
  - (1) Ladders forming an integral part of railway cars, highway carriers, cargo containers or other transportation carrier equipment;
  - (2) Climbing devices such as step bolts or structural members of tanks and towers;
  - (3) Ladders built into or vertically attached to tubular scaffold framing; and
  - (4) Ladders used only for fire-fighting or emergency purposes.
- (b) Definitions.
  - (1) **Cage** (basket guard) means a barrier enclosing or nearly enclosing a ladder's climbing space and fastened to one or both of the ladder's side rails or to another structure.
  - (2) **Fixed ladder** means a ladder including individual rung ladders, permanently attached to a structure, building or piece of equipment.
  - (3) **Ladder safety device** means a support system limiting an employee's drop or fall from the ladder, and which may incorporate friction brakes, lifelines and lanyards, or sliding attachments.
  - (4) **Well** means a permanent complete enclosure around a fixed ladder, which is attached to the walls of the well.
- (c) Defects.
  - (1) Ladders with broken, split or missing rungs, steps or rails, broken welds or connections, corrosion or wastage or other defect which may affect safe use shall be removed from service.
  - (2) Ladder repairs shall provide strength at least equivalent to that of the original ladder.
- (d) Ladder specifications.

- (1) (i) Ladders installed before October 3, 1983, shall be capable of withstanding without damage a minimum concentrated load, applied uniformly over a 3 ½ inch (8.8 cm) width at the rung center, of 200 pounds (890 N).
- (ii) Ladders installed after October 3, 1983 shall be capable of withstanding 250 pounds (1,112 N) applied as described in paragraph (d)(1)(i) of this section. If used by more than one employee simultaneously, the ladder as a unit shall be capable of simultaneous additional loading in 250 pound (1,112 N) increments for each additional employee, applied to a corresponding number of rungs. The unit shall have a safety factor of four (4), based on ultimate strength, in the designed service.
- (2) (i) Ladders installed before October 3, 1983, shall have rungs evenly spaced from nine to 16 1/2 inches (22.9 to 41.9 cm) apart, center to center.
- (ii) Ladders installed after October 3, 1983 shall have rungs evenly spaced from 12±2 inches (30.5±5.08 cm) apart, center to center.
- (3) Ladders installed before October 3, 1983 shall have a width between side rails of at least 10 inches (25.4 cm).
- (i) Ladders installed after October 3, 1983 shall have a width between side rails of at least 12 inches (30.48 cm).
- (4) The minimum distance between the rung center line and the nearest permanent object behind the rung shall be 4 inches (10.16 cm), except that in ladders installed after October 3, 1983, the minimum distance shall be 7 inches (17.78 cm) unless physical limitations make a lesser distance, not less than 4½ inches (11.43 cm), necessary.
- (5) When a ladder passes through an opening or past overhead obstructions, a minimum 24 inch (.61 m) clearance shall exist between the climbing side and any obstruction. Where this distance is less than 30 inches (0.76 m), a deflection device shall be installed for guidance through the opening.
- (6) The side rails of ladders shall extend at least 36 inches (0.91 m) above the top landing surface, unless grab bars or equivalent holds are provided.
- (7) Ladders whose pitch exceeds 90 degrees to the horizontal (slanting backward on the climbing side) shall not be used.
- (e) Protection against falls.**
  - (1) Fixed ladders more than 20 feet (6.1 m) in height shall be provided with a cage, well, or ladder safety device.
  - (2) When a well or cage is used, ladders with length of climb exceeding 30 feet (9.14 m) shall comply with the following provisions:
    - (i) The ladder shall consist of multiple sections not exceeding 30 feet (9.14 m) each;
    - (ii) Each section shall be horizontally offset from adjacent sections, except as specified in paragraph (e)(2)(iv) of this section, and
    - (iii) A landing platform capable of supporting a load of 100 pounds per square foot (4.79 kPa) and fitted with guardrails complying with Sec. §1917.112(c) shall be provided at least every 30 feet (9.14 m), except as specified in paragraph (e)(2)(iv) of this section.
    - (iv) For ladders installed after October 3, 1983, offset sections and landing platforms are not required if hinged platforms capable of supporting 100 pounds per square foot (4.79 kPa), and which are kept closed except when opened for passage, are within the cage or well at intervals not exceeding 30 feet (9.14 m).
  - (3) Ladders equipped with ladder safety devices shall have rest platforms;
    - (i) Capable of supporting a load of 100 pounds per square foot (4.79 kPa);
    - (ii) Located at intervals of 150 feet (45.7 m) or less; and
    - (iii) Protected by guardrails complying with §1917.112(c) of three sides.
  - (4) Where used, ladder safety devices shall:
    - (i) Be installed and maintained in accordance with the manufacturer's instructions, which shall be available for inspection;
    - (ii) Be repaired only with replacement parts having performance capability at least equal to that of the original parts;

- (iii) Have a connection length between carrier centerlines and safety belts of 10 + or – 2 inches (25.4 + or - 5.08 cm); and
- (iv) Be installed in a manner that does not reduce the ladder's structural capability.
- (5) Ladder cages or wells shall:
  - (i) Be of rigid construction that allows unobstructed use but prevents an employee from falling through or dislodging the cage or well by falling against it;
  - (ii) Have smooth inner surfaces;
  - (iii) Extend at least 36 inches (0.91m) above landings; and
  - (iv) Extend to within 8 feet (2.44 m) above the ground or base, except that a maximum of 20 feet (6.1 m) is permitted where the cage or well would extend into traffic lanes.
- (6) Ladders installed after (effective date of standard) on radio, microwave communications, electrical power and similar towers, poles and structures, including stacks and chimneys, shall meet the requirements of this paragraph (e).
- (f) Individual rung ladders. Ladders consisting of individual rungs that are attached to walls, conical manhole sections or river cells shall:
  - (1) Be capable of supporting a load of 350 pounds (1557 N) without deformation;
  - (2) Form a continuous ladder, uniformly spaced vertically from 12 inches to 16 inches (30.5 to 40.6 cm) apart, with a minimum width of 10 inches (25.4 cm) and projecting at least 4½ inches (11.43 cm) from the wall;
  - (3) Be so constructed that an employee's foot cannot slide off the ends; and
  - (4) Be firmly attached and without sharp edges.

#### **§1917.119 Portable ladders.**

- (a) Scope and applicability. This section applies to all portable ladders, including job-made ladders for temporary use, unless otherwise specified.
- (b) Standards for existing manufactured portable ladders.
  - (1) Rungs of manufactured portable ladders obtained before October 3, 1983, shall be capable of supporting a 200-pound (890 N) load without deformation.
  - (2) Rungs shall be evenly spaced from 9 to 16 1/2 inches (22.9 to 41.9 cm), center to center.
  - (3) Rungs shall be continuous members between rails. Each rung of a double-rung ladder (two side rails and a center rail) shall extend the full width of the ladder.
  - (4) Width between side rails at the base of the ladder shall be at least 12 inches (30.48 cm) for ladders 10 feet (3.05 m) or less in overall length, and shall increase at least 1/4 inch (0.64 cm) for each additional 2 feet (0.61 m) of ladder length.
- (c) Standards for manufactured portable ladders. Portable manufactured ladders obtained after January 21, 1998 shall bear identification indicating that they meet the appropriate ladder construction requirements of the following standards:
  - ANSI A14.1-1990 Safety Requirements for Portable Wood Ladders
  - ANSI A14.2-1990 Safety Requirements for Portable Metal Ladders
  - ANSI A14.5-1992 Safety Requirements for Portable Reinforced Plastic Ladders
- (d) Standards for job-made portable ladders. Job-made ladders shall:
  - (1) Have a minimum and uniform distance between rungs of 12 inches (30.48 cm), center to center;
  - (2) Are capable of supporting a 250-pound (1,112 N) load without deformation; and
  - (3) Have a minimum width between side rails of 12 inches (30.48 cm) for ladders 10 feet (3.05 m) in height. Width between rails shall increase at least 1/4 inch (0.64 cm) for each additional 2 feet (0.61 m) of ladder length.
- (e) Maintenance and inspection.
  - (1) The employer shall maintain portable ladders in safe condition. Ladders with the following defects shall not be used and either shall be tagged as unusable if kept on the premises or shall be removed from the worksite:
    - (i) Broken, split or missing rungs, cleats or steps;
    - (ii) Broken or split side rails;
    - (iii) Missing or loose bolts, rivets or fastenings;

- (iv) Defective ropes; or
- (v) Any other structural defect.
- (2) Ladders shall be inspected for defects prior to each day's use, and after any occurrence, such as a fall, which could damage the ladder.
- (f) Ladder usage.
  - (1) Ladders made by fastening rungs or devices across a single rail are prohibited.
  - (2) Ladders shall not be used:
    - (i) As guys, braces or skids; or
    - (ii) As platforms, runways or scaffolds.
  - (3) Metal and wire-reinforced ladders with wooden side rails shall not be used when employees on the ladder might come into contact with energized electrical conductors.
  - (4) Individual sections from different multi-sectional ladders or two or more single straight ladders shall not be tied or fastened together to achieve additional length.
  - (5) Except for combination ladders, self-supporting ladders shall not be used as single straight ladders.
  - (6) Unless intended for cantilever operation, non-self-supporting ladders shall not be used to climb above the top support point.
  - (7) Ladders shall extend at least 36 inches (0.91 m) above the upper support level if employees are to leave or mount the ladder at that level, except that where such extension is impractical other equivalent means such as grab bars may be used to provide a hand grip.
  - (8) Ladders shall be securely positioned on a level and firm base.
  - (9) Ladders shall be fitted with slip-resistant bases and secured at top or bottom to prevent the ladder from slipping.
  - (10) The employer shall direct that ladders shall be placed so that employees climbing are not exposed to injury from projecting objects or doors that open toward the ladder.

**§1917.120 Fixed Stairways.**

- (a) Definition. **Fixed stairway** means interior and exterior stairs serving machinery, tanks and equipment, and stairs to or from floors, platforms or pits. The term does not apply to stairs intended only for fire exit purposes, to articulated stairs (the angle of which changes with the rise and fall of the base support) or to stairs forming an integral part of machinery.
- (b) New installations.
  - (1) Fixed stairs installed after October 3, 1983 shall be positioned within the range of 30 degrees to 50 degrees to the horizontal with uniform riser height and tread width throughout each run and be capable of a minimum loading of 100 pounds per square foot (445 N) and a minimum concentrated load of 300 pounds (1,334 N) at the center of any treadspan. Riser height shall be from 6 to 7.5 inches (15.24 to 19.05 cm), stair width a minimum of 22 inches (55.88 cm) and between vertical barriers, tread depth a minimum of 12±2 inches (30.48±5.08 cm), and tread nosing shall be straight leading edges.
  - (2) Stair landings shall be at least 20 inches (50.8 cm) in depth. Where doors or gates open on a stairway, a landing platform shall be provided. Door swing shall not reduce effective standing area on the landing to less than 18 inches (45.72 cm) in depth.
  - (3) Fixed stairs having four or more risers shall have stair railings or handrails complying with §1917.112(c)(1).
  - (4) Railing height from tread surface at the riser face shall be 33±3 inches (83.82 cm ±7.62 cm).
  - (5) Restricted areas. When physical features require stairs steeper than those provided for by paragraph (b)(1) of this section, stairs at angles of 50 degree to 75 degrees from the horizontal may be used if they:
    - (i) Are capable of a single concentrated load of 200 pounds (890 N) at the tread centers;
    - (ii) Have open treads at least 4 inches (10.16 cm) in depth and 18 inches (45.72 cm) in width with a uniformly spaced vertical rise between treads of 6 to 9.5 inches (15.24 to 24.13 cm); and

- (iii) Have handrails that meet the requirements of §1917.112(c)(1) on both sides and that are not less than 30 inches (76.2 cm) in height from the tread surface at the riser face.
- (6) Maintenance. Fixed stairways shall be maintained in safe condition and shall not be obstructed.

**§1917.121 Spiral stairways.**

- (a) Definition. **Spiral stairway** means one with closed circular form, uniform sector-shaped treads and a supporting column.
- (b) Requirements. Spiral stairways shall meet the following requirements:
  - (1) Stairways shall conform to the minimum dimensions of Figure F-1;

Spiral Stairway – Minimum Dimensions		
	A (half-tread width)	B
Normal use by employees	11 inches (27.94 cm)	6 inches (15.24 cm)
Limited access	9 inches (22.86 cm)	5 inches (12.7 cm)

- (2) Stairway risers shall be uniform and shall range from 6½ to 10½ inches (16.5 to 26.67 cm) in height;
- (3) Minimum loading capability shall be 100 pounds per square foot (4.79 kN), and minimum tread center concentrated loading shall be 300 pounds (1334 N);
- (4) Railings shall conform to the requirements of §1917.112(c)(1). If balusters are used, there shall be a minimum of one per tread. Handrails shall be a minimum of 1¼ inches (3.18 cm) in outside diameter; and
- (5) Vertical clearance shall be at least 6 feet, 6 inches (1.98 m) above the top step.
- (c) Maintenance. Spiral stairways shall be maintained in safe condition.

**§1917.122 Employee exits.**

- (a) Employee exits shall be clearly marked.
- (b) If an employee exit is not visible from employees work stations, directional signs indicating routes to the exit shall be posted.
- (c) Exits shall be readily accessible and sufficient in number to provide employees with a convenient means of escape in emergencies. A clear passage to the exit shall be maintained.
- (d) The minimum width of any employee exit shall be 28 inches (71.12 cm).

**§1917.123 Illumination.<sup>(9)</sup>**

- (a) Working and walking areas shall be illuminated. Unless conditions described in the regulations of the United States Coast Guard (33 CFR 126.15(1) and (n), and 33 CFR 154.570) exist in the case of specific operations, illumination in active work areas (for example, cargo transfer points) shall be of an average minimum light intensity of 5 foot-candles. The illumination in other work areas (for example, farm areas) shall be of an average minimum light intensity of 1 foot-candle except for security purposes when a minimum light intensity of 1/2 foot-candle shall be maintained. Where occasional work tasks require more light than that which is consistently and permanently provided, supplemental lighting shall be used.
- (b) The lighting intensity shall be measured at the task/working surface in the plane in which the task/working surface is present.
- (c) Lights shall, so far as possible, be placed so that they will not shine in the eyes of employees.

Footnote<sup>(9)</sup> The United State Coast Guard, at 33 CFR 126.15(1) and (n), and 33 CFR 154.570 sets out requirements for illumination at "designated waterfront facilities" and "large oil transfer facilities."

**§1917.124 Dockboards (car and bridge plates).**

- (a) General. The employer shall provide safe means of passage between different surface levels and across openings
- (b) [Reserved]
- (c) Dockboards (car and bridge plates).
  - (1) Dockboards shall be strong enough to support the loads imposed on them.
  - (2) Portable dockboards shall be anchored in position or be equipped with devices to prevent their movement.
  - (3) Hand holds or other effective means shall be provided on portable dockboards to permit safe handling.
  - (4) Positive means shall be used to prevent railcars or highway vehicles from being moved while dockboards or bridge plates are in position.
  - (5) Be designed, constructed, and maintained to prevent vehicles from running off the edge.<sup>(10)</sup>
  - (6) Dockboards shall be well maintained.
- (d) Ramps.
  - (1) Ramps shall be strong enough to support the loads imposed on them and be designed, constructed, and maintained to prevent vehicles from running off the edge.<sup>(11)</sup>
  - (2) Ramps shall be equipped with a guardrail meeting the requirement of §1917.112(c)(1) if the slope is more than 20 degrees to the horizontal or if employees could fall more than 4 feet (1.22 m).
  - (3) Ramps shall have slip-resistant surfaces.
  - (4) When necessary to prevent displacement by vehicle wheels, steel plates or similar devices used to temporarily bridge or cover uneven surfaces or tracks, shall be anchored.
  - (5) Ramps shall be well maintained.

Footnote<sup>(10)</sup> When the gap to be bridged is greater than 36 inches (.91m), an acceptable means of preventing vehicles from running off the edge is a minimum side board height of two and three-quarter inches.

Footnote<sup>(11)</sup> When the gap to be bridged is greater than 36 inches (.91m), an acceptable means of preventing vehicles from running off the edge is a minimum side board height of two and three-quarter inches.

**§1917.125 Guarding temporary hazards.**

Ditches, pits, excavations and surfaces in poor repair shall be guarded by readily visible barricades, rails or other equally effective means.

**§1917.126 River banks.**

- (a) This section applies to temporary installations or temporary operations near a river bank.
- (b) Where working surfaces at river banks slope so steeply that an employee could slip or fall into the water, the outer perimeter of the working surface shall be protected by posting or other portable protection such as roping off. In these situations, employees must wear a personal flotation device meeting the requirements of §1917.95(b).

**§1917.127 Sanitation.**

- (a) Washing and toilet facilities.
  - (1) The employer shall provide accessible washing and toilet facilities sufficient for the sanitary requirements of employees. The facilities shall have:
    - (i) Running water, including hot and cold or tepid water at a minimum of one accessible location (when cargo handling is conducted at locations without permanent facilities, potable water may be provided in lieu of running water);
    - (ii) Soap;

- (iii) Individual hand towels, clean individual sections of continuous toweling or warm air blowers; and
  - (iv) Fixed or portable toilets in separate compartments with latch-equipped doors. Separate toilet facilities shall be provided for male and female employees except when toilet rooms will be occupied by only one person at a time.
- (2) Washing and toilet facilities shall be regularly cleaned and maintained in good order.
- (b) Drinking water.**
- (1) Potable drinking water shall be accessible to employees at all times.
  - (2) Potable drinking water containers shall be clean, containing only water and ice, and shall be fitted with covers.
  - (3) Common drinking cups are prohibited.
- (c) Prohibited eating areas.** Consumption of food or beverages in areas where hazardous materials are being stored or handled shall be prohibited.
- (d) Garbage and overboard discharges.** Work shall not be conducted in the immediate vicinity of uncovered garbage or in the way of overboard discharges from the vessel's sanitary lines unless employees are protected from the garbage or discharge by a baffle or splash boards.

#### **§1917.128 Signs and marking.**

- (a) General.** Signs required by this part shall be clearly worded and legible, and shall contain a key word or legend indicating the reason for the sign.
- (1) Key words are such words as Danger, Warning, Caution.
  - (2) Legends are more specific explanations such as High Voltage, Close Clearance, Pedestrian Crossing.
- (b) Specific.** Every marine terminal shall have conspicuously posted signs as follows:
- (1) Locations of first aid facilities;
  - (2) Locations of telephones;
  - (3) Telephone numbers of the close ambulance service, hospital or other source of medical attention, police, fire department, and emergency squad (if any); and
  - (4) Locations of firefighting and emergency equipment and fire exits.

#### **§1917.151 Machine guarding.**

- (a) Definition.** **Guarded** means shielded, fenced, or enclosed by covers, casings, shields, troughs, spillways or railings, or guarded by position or location. Examples of guarding methods are guarding by location (positioning hazards so they are inaccessible to employees) and point of operation guarding (using barrier guards, two-handtripping devices, electronic safety devices, or other such devices).
- (b) General.**
- (1) Danger zones on machines and equipment used by employees shall be guarded.
  - (2) Where chips and dust produced by machine operation may result in a hazard to the operator, the machinery shall be equipped with an effective exhaust system at the point of origin, or other equally effective means shall be provided to protect the operator.
  - (3) Fixed machinery shall be secured to prevent shifting.
  - (4) A power cut-off device for machinery and equipment shall be provided at the operator's working position.
  - (5) Machines driven by belts and shafting shall be fitted with a beltlocking or equivalent protective device if the belt can be shifted.
  - (6) In operations where injury to the operator might result if motors were to restart after power failures, provisions shall be made to prevent machines from automatically restarting upon restoration of power.
  - (7) The power supply to machines shall be turned off, locked out, and tagged out during repair, adjustment, or servicing.
  - (8) Machines shall be maintained in a safe working condition.
  - (9) Only designated employees shall maintain or repair machinery and equipment.
  - (10) Machines with defects that affect the safety of operation shall not be used.

- (c)** Hand-fed circular ripsaws and hand-fed circular crosscut table saws. Unless fixed or manually adjustable enclosures or guarding provides equivalent protection, hand-fed circular ripsaws and hand-fed circular crosscut table saws shall be guarded as follows to keep employees clear of any danger zones:
- (1) They shall be equipped with hoods completely enclosing those portions of the saw above the table and the material being cut;
  - (2) They shall have spreaders to prevent material from squeezing the saw. Spreaders shall be in true alignment with the saw. Spreaders may be removed only during grooving, dadoing, or rabbeting operations, and shall be replaced at the completion of such operations; and
  - (3) They shall have non-kickback fingers or dogs to oppose the tendency of the saw to pick up material or throw material toward the operator.
- (d)** Swing cutoff saws.
- (1) Swing cut-off saws shall have hoods completely enclosing the upper half of the saw, the arbor end and the point of operation at all saw positions to protect the operator from material thrown up by the saw. The hood shall automatically cover the lower portion of the blade, so that when the saw returns to the back of the table the hood rises on top of the fence, and when the saw is moved forward the hood drops on top, remaining in contact with the table or the material.
  - (2) Swing cutoff saws shall have a device to return the saw automatically to the back of the table without rebound. The device shall not be dependent upon rope, cord or springs.
  - (3) Devices shall be provided to prevent saws from swinging beyond the front or back edges of the table.
  - (4) Inverted swing cutoff saws shall have hoods covering the part of the saw protruding above the table top or material being cut. Hoods shall automatically adjust to the thickness of, and remain in contact with, material being cut.
- (e)** Radial saws. Unless fixed or manually adjustable enclosures or guards provide equivalent protection, radial saws shall be guarded as follows:
- (1) The upper hood of radial saws shall enclose the upper portion of the blade up to and including the end of the saw arbor and shall protect the operator from being struck by debris. The sides of the lower exposed portion of the blade shall be guarded to the blade diameter by a device automatically adjusting to the thickness of the stock and remaining in contact with the stock. The lower guard may be removed only when the saw is used for bevel cuts;
  - (2) Radial saws used for ripping shall have non-kickback fingers or dogs on both sides to oppose the thrust or tendency of the saw to pick up material or throw material toward the operator;
  - (3) Adjustable stop shall be provided to prevent travel of radial saw blades beyond the table's edge;
  - (4) Radial saws shall be installed so that the cutting head returns to the starting position without rebound when released; and
  - (5) The employer shall direct that employees perform ripping and ploughing against the saw turning direction. Rotation direction and an indication of the end of the saw to be used shall be conspicuously marked on the hood.
- (f)** Band saws and band resaws.
- (1) Saw blades and band saw wheels shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table, to protect employees from point-of-operation hazards and flying debris.
  - (2) Band saws shall be equipped with brakes to stop the band saw wheel if the blade breaks.
  - (3) Band saws shall be equipped with a tension control device to keep the blade taut.
- (g)** Abrasive wheel and machinery.
- (1) Abrasive wheels shall be used only on machines having enclosure guards to restrain pieces of grinding wheels and to protect employees if the wheel breaks, except as provided in paragraphs (g)(2) and (g)(3) of this section. Where the operator must stand in front of the safety guard opening, the safety guard shall be adjustable or have an adjustable tongue or piece at the top of the opening. The safety guard or the tongue shall

- be adjusted so that they are always close to the periphery of the wheel. Guards shall be aligned with the wheel and the strength of fastenings shall be greater than the strength of the guard.
- (2) When the work provides equivalent protection, or when the machine is designed as a portable saw, guards may be constructed with the spindle end, nut and outer flange exposed. When the work entirely covers the side of the wheel, the side covers of the guard may be removed.
  - (3) Guarding is not required:
    - (i) For wheels used for internal work while the wheel is contained within the work being ground; or
    - (ii) For mounted wheels 2 inches (5 cm) and smaller in diameter used in portable operation.
  - (4) Work rests shall be used on fixed grinding machines. Work rests shall be rigidly constructed and adjustable for wheel wear. They shall be adjusted closely to the wheel with a maximum opening of  $\frac{1}{8}$ -inch (3.18 mm) and shall be securely clamped. Adjustment shall not be made while the wheel is in motion.
  - (5) Grinding wheels shall fit freely on the spindle. The spindle nut shall be tightened only enough to hold the wheel in place.
  - (6) Grinding machine wheels shall turn at a speed that is compatible with the rated speed of the wheel.
  - (7) Flanges and blotters shall be used only with wheels designed for their use. Flanges shall be of a type ensuring retention of pieces of the wheel in case of breakage.
  - (8) Abrasive wheels with operational defects shall not be used.
- (h) Rotating parts, drives and connections.
- (1) Rotating parts, such as gears and pulleys, that are located 7 feet (2.13 m) or less above working surfaces shall be guarded to prevent employee contact with moving parts.
  - (2) Belt, rope and chain drives shall be guarded to prevent employees from coming into contact with moving parts.
  - (3) Gears, sprockets and chains shall be guarded to prevent employees from coming into contact with moving parts. This requirement does not apply to manually operated sprockets.

**§1917.152 Welding, cutting and heating (hotwork) (See also §1917.2, definition of Hazardous cargo, materials, substance or atmosphere).**

- (a) Definition. **Hot work** means riveting, welding, flame cutting or other fire or spark-producing operation.
- (b) Hot work in confined spaces. Hot work shall not be performed in a confined space until a designated person has tested the atmosphere and determined that it is not hazardous.
- (c) Fire protection.
  - (1) To the extent possible, hot work shall be performed in designated locations that are free of hazards.
  - (2) When hot work must be performed in a location that is not free of hazards, all necessary precautions shall be taken to confine heat, sparks, and slag so that they cannot contact flammable or combustible material.
  - (3) Fire extinguishing equipment suitable for the location shall be immediately available and shall be maintained in readiness for use at all times.
  - (4) When the hot work operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire during hot work and for a sufficient time after completion of the work to ensure that no fire hazard remains. The employer shall instruct all employees involved in hot work operations as to potential fire hazards and the use of firefighting equipment.
  - (5) Drums and containers which contain or have contained flammable or combustible liquids shall be kept closed. Empty containers shall be removed from the hot work area.
  - (6) When openings or cracks in flooring cannot be closed, precautions shall be taken to ensure that no employees or flammable or combustible materials on the floor below are

exposed to sparks dropping through the floor. Similar precautions shall be taken regarding cracks or holes in walls, open doorways and open or broken windows.

- (7) Hot work shall not be performed:
- (i) In flammable or Potentially flammable atmospheres;
  - (ii) On or in equipment or tanks that have contained flammable gas or liquid or combustible liquid or dust-producing material, until a designated person has tested the atmosphere inside the equipment or tanks and determined that it is not hazardous; or
  - (iii) Near any area in which exposed readily ignitable materials such as bulk sulphur, baled paper or cotton stored. Bulk sulphur is excluded from this prohibition if suitable precautions are followed, the person in charge is knowledgeable and the person performing the work has been instructed in preventing and extinguishing sulphur fires.
- (8) (i) Drums, containers or hollow structures that have contained flammable or combustible substances shall either be filled with water or cleaned, and shall then be ventilated. A designated person shall test the atmosphere and determine that it is not hazardous before hot work is performed on or in such structures.
- (ii) Before heat is applied to a drum, container or hollow structure, an opening to release built-up pressure during heat application shall be provided.
- (d) Gas welding and cutting.**
- (1) Compressed gas cylinders:
- (i) Shall have valve protection caps in place except when in use, hooked up or secured for movement. Oil shall not be used to lubricate caps;
  - (ii) Shall be hoisted only while secured, as on a cradle or pallet, and shall not be hoisted by mallet, choker sling or cylinder caps;
  - (iii) Shall be moved only by tilting or rolling on their bottom edges;
  - (iv) Shall be secured when moved by vehicle;
  - (v) Shall be secured while in use;
  - (vi) Shall have valves closed when cylinders are empty, being moved or stored;
  - (vii) Shall be secured upright except when hoisted or carried;
  - (viii) Shall not be freed when frozen by prying the valves or caps with bars or by hitting the valve with a tool;
  - (ix) Shall not be thawed by boiling water;
  - (x) Shall not be exposed to spark, hot slag, or flame;
  - (xi) Shall not be permitted to become part of electrical circuits or have electrodes struck against them to strike arcs;
  - (xii) Shall not be used as rollers or supports;
  - (xiii) Shall not have contents used for purposes not authorized by the supplier;
  - (xiv) Shall not be used if damaged or defective;
  - (xv) Shall not have gases mixed within, except by gas suppliers;
  - (xvi) Shall be stored so that oxygen cylinders are separated from fuel gas cylinders and combustible materials by either a minimum distance of 20 feet (6.1 m) or a barrier having a fire-resistance rating of 30 minutes; and
  - (xvii) Shall not have objects that might either damage the safety device or obstruct the valve placed on top of the cylinder when in use.
- (2) Use of fuel gas. Fuel gas shall be used only as follows:
- (i) Before regulators are connected to cylinder valves, the valves shall be opened slightly (cracked) and closed immediately to clear away dust or dirt. Valves shall not be cracked if gas could reach possible sources of ignition;
  - (ii) Cylinder valves shall be opened slowly to prevent regulator damage and shall not be opened more than 1 1/2 turns. Any special wrench required for emergency closing shall be positioned on the valve stem during cylinder use. For manifolded or Coupled cylinders, at least one wrench shall be immediately available. Nothing shall be placed on top of a cylinder or associated parts when the cylinder is in use.

- (iii) Pressure-reducing regulators shall be attached to cylinder valves when cylinders are supplying torches or devices equipped with shut-off valves;
  - (iv) Cylinder valves shall be closed and gas released from the regulator or manifold before regulators are removed;
  - (v) Leaking fuel gas cylinder valves shall be closed and the gland nut tightened. If the leak continues, the cylinder shall be tagged, removed from service, and moved to a location where the leak will not be hazardous. If a regulator attached to a valve stops a leak, the cylinder need not be removed from the workplace but shall be tagged and may not be used again before it is repaired; and
  - (vi) If a plug or safety device leaks, the cylinder shall be tagged, removed from service, and moved to a location where the leak will not be hazardous.
- (3) Hose.
- (i) Fuel gas and oxygen hoses shall be easily distinguishable from each other by color or sense of touch. Oxygen and fuel hoses shall not be interchangeable. Hoses having more than one gas passage shall not be used.
  - (ii) When oxygen and fuel gas hoses are taped together, not more than four (4) of each 12 inches (10.16 cm of each 30.48 cm) shall be taped.
  - (iii) Hose shall be inspected before use. Hose subjected to flashback or showing evidence of severe wear or damage shall be tested to twice the normal working pressure but not less than 200 p.s.i. (1378.96 kPa) before reuse. Defective hose shall not be used.
  - (iv) Hose coupling shall not unlock or disconnect without rotary motion.
  - (v) Hose connections shall be clamped or securely fastened to withstand twice the normal working pressure but not less than 300 p.s.i. (2068.44 kPa) without leaking.
  - (vi) Gas hose storage boxes shall be ventilated.
- (4) Torches.
- (i) Torch tip openings shall only be cleaned with devices designed for that purpose.
  - (ii) Torches shall be inspected before each use for leaking shut-off valves, hose couplings and tip connections. Torches with such defects shall not be used.
  - (iii) Torches shall not be lighted from matches, cigarette lighters, other flames or hot work.
- (5) Pressure regulatory. Pressure regulators, including associated gauges, shall be maintained in safe working order.
- (6) Operational precaution. Gas welding equipment shall be maintained free of oil and grease.
- (e)** Arc welding and cutting.
- (1) Manual electrode holders.
- (i) The employer shall ensure that only manual electrode holders intended for arc welding and cutting and capable of handling the maximum current required for such welding or cutting shall be used.
  - (ii) Current-carrying parts passing through those portions of the holder gripped by the user and through the outer surfaces of the jaws of the holder shall be insulated against the maximum voltage to ground.
- (2) Welding cables and connectors.
- (i) Arc welding and cutting cables shall insulated, flexible and capable of handling the maximum current required by the operations, taking into account the duty cycles.
  - (ii) Only cable free from repair or splice for 10 feet (3 m) from the electrode holder shall be used unless insulated connectors or splices with insulating quality equal to that of the cable are provided.
  - (iii) When a cable other than the lead mentioned in paragraph (e)(2)(ii) of this section wears and exposes bare conductors, the portion exposed shall not be used until it is protected by insulation equivalent in performance capacity to the original.

- (iv) insulated connectors of equivalent capacity shall be used for connecting or splicing cable. Cable lugs, where used as connectors, shall provide electrical contact. Exposed metal parts shall be insulated.
- (3) Ground returns and machine grounding.
  - (i) Ground return cables shall have current-carrying capacity equal to or exceeding the total maximum output capacities of the welding or cutting units served.
  - (ii) Structures or pipelines, other than those containing gases or flammable liquids or conduits containing electrical circuits, may be used in the ground return circuit if their current-carrying capacity equals or exceeds the total maximum output capacities of the welding or cutting units served.
  - (iii) Structures or pipelines forming a temporary ground return circuit shall have electrical contact at all joints. Arcs, sparks or heat at any point in the circuit shall cause rejection as a ground circuit.
  - (iv) Structures or pipelines acting continuously as ground return circuits shall have joints bonded and maintained to ensure that no electrolysis or fire hazard exists.
  - (v) Arc welding and cutting machine frames shall be grounded, either through a third wire in the cable containing the circuit conductor or through a separate wire at the source of the current. Grounding circuits shall have resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
  - (vi) Ground connections shall be mechanically and electrically adequate to carry the current.
- (4) When electrode holders are left unattended, electrodes shall be removed and holders placed to prevent employee injury.
- (5) Hot electrode holders shall not be dipped in water.
- (6) The employer shall ensure that when arc welders or cutters leave or stop work or when machines are moved, the power supply switch shall be kept in the off position.
- (7) Arc welding or cutting equipment having a functional defect shall not be used.
- (8)
  - (i) Arc welding and cutting operations shall be separated from other operations by shields, screens, or curtains to protect employees in the vicinity from the direct rays and sparks of the arc.
  - (ii) Employees in areas not protected from the arc by screening shall be protected by appropriate filter lenses in accordance with paragraph (h) of this section. When welders are exposed to their own arc or to each other's arc, they shall wear filter lenses complying with the requirement of paragraph (h) of this section.
- (9) The control apparatus of arc welding machines shall be enclosed, except for operating wheels, levers, and handles.
- (10) Input power terminals, tap change devices and live metal parts connected to input circuits shall be enclosed and accessible only by means of insulated tools.
- (11) When arc welding is performed in wet or high-humidity conditions, employees shall use additional protection, such as rubber pads or boots, against electric shock.
- (f) Ventilation and employee protection in welding, cutting and heating.
  - (1) Mechanical ventilation requirements. The employer shall ensure that general mechanical ventilation or local exhaust systems shall meet the following requirements:
    - (i) General mechanical ventilation shall maintain vapors, fumes and smoke below a hazardous level.
    - (ii) Local exhaust ventilation shall consist of movable hoods positioned close to the work and shall be of such capacity and arrangement as to keep breathing zone concentrations below hazardous levels.
    - (iii) Exhausts from working spaces shall be discharged into the open air, clear of intake air sources;
    - (iv) placement air shall be clean and respirable; and
    - (v) Oxygen shall not be used for ventilation, cooling or cleaning clothing or work areas.

- (2) Hot work in confined spaces. Except as specified in paragraphs (f)(3)(ii) and (f)(3)(iii) of this section, when hot work is performed in a confined space the employer shall ensure that:
  - (i) General mechanical or local exhaust ventilations shall be provided; or
  - (ii) Employees in the space shall wear supplied air respirators in accordance with §1910.134 and a standby on the outside shall maintain communication with employees inside the space and shall be equipped and prepared to provide emergency aid.
- (3) Welding, cutting or heating of toxic metals.
  - (i) In confined or enclosed spaces, hot work involving the following metals shall only be performed with general mechanical or local exhaust ventilation that ensures that employees are not exposed to hazardous levels of fumes:
    - (A) Lead base metals;
    - (B) Cadmium-bearing filler materials; and
    - (C) Chromium-bearing metals or metals coated with Chromium-bearing materials.
  - (ii) In confined or enclosed spaces, hot work involving the following metals shall only be performed with local exhaust ventilation meeting the requirement of paragraph (f)(1) of this section or by employees wearing supplied air respirators in accordance with §1910.134;
    - (A) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials;
    - (B) Metals containing lead other than as an impurity, or coated with lead-bearing materials;
    - (C) Cadmium-bearing or cadmium-coated base metals; and
    - (D) Metals coated with mercury-bearing materials.
  - (iii) Employees performing hot work in confined or enclosed spaces involving beryllium-containing base or filler metals shall be protected by local exhaust ventilation and wear supplied air respirators or self-contained breathing apparatus, in accordance with the requirement of §1910.134.
  - (iv) The employer shall ensure that employees performing hot work in the open air that involves any of the metals listed in paragraphs (f)(3)(i) and (f)(3)(ii) of this section shall be protected by respirators in accordance with the requirement of §1910.134, and those working on beryllium-containing base or filler metals shall be protected by supplied air respirators, in accordance with the requirements of §1910.134.
  - (v) Any employee exposed to the same atmosphere as the welder or burner shall be protected by the same type of respiratory and other protective equipment as that worn by the welder or burner.
- (4) Inert-gas metal-arc welding. Employees shall not engage in and shall not be exposed to the inert-gas metal, welding process unless the following precautions are taken:
  - (i) Chlorinated solvents shall not be used within 200 feet (61 m) of the exposed arc. Surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is performed on them.
  - (ii) Employees in areas not protected from the arc by screening shall be protected by appropriate filter lenses in accordance with the requirement of paragraph (h) of this section. When welders are exposed to their own arc or to each other's arc, filter lenses complying with the requirements of paragraph (h) of this section shall be worn to protect against flashes and radiant energy.
  - (iii) Employees exposed to radiation shall have their skin covered completely to prevent ultraviolet burns and damage. Helmets and hand shields shall not have leaks, openings or highly reflective surfaces.
  - (iv) Inert-gas metal-arc welding on stainless steel shall not be performed unless exposed employees are protected either by local exhaust ventilation or by wearing supplied air respirators.
- (g) Welding, cutting and heating on preservative coatings.

- (1) Before hot work is commenced on surfaces covered by a preservative coating of unknown flammability, a test shall be made by a designated person to determine the coating's flammability. Preservative coatings shall be considered highly flammable when scrapings burn with extreme rapidity.
  - (2) Appropriate precaution shall be taken to prevent ignition of highly flammable hardened preservative coatings. Highly flammable coatings shall be stripped from the area to be heated. An uncoiled fire hose with fog nozzle, under pressure, shall be immediately available in the hot work area.
  - (3) Surfaces covered with preservative coatings shall be stripped for at least 4 inches (10.16 cm) from the area of heat application or employees shall be protected by supplied air respirators in accordance with the requirements of §1910.134 of this chapter.
- (h) Protection against radiant energy.**
- (1) Employees shall be protected from radiant energy eye hazards by spectacles, cup goggles, helmets, hand shields or face shields with filter lenses complying with the requirements of this paragraph.
  - (2) Filter lenses shall have an appropriate shade number, as indicated in Table G-1, for the work performed. Variations of one or two shade numbers are permissible to suit individual preferences.
  - (3) If filter lenses are used in goggles worn under the helmet, the shade numbers of both lenses equals the value shown in Table G-1 for the operation.

TABLE G-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 5/32 – inch electrodes.	10.
Inert-gas Metal-Arc Welding (Non-ferrous) 1/16 – to 5/32 – inch electrodes.	11.
Shielded Metal-Arc Welding: 3/16 to 1/4 - inch electrodes.....	12.
5/16 - and 3/8 – inch electrodes.....	14.

FOOTNOTE (12) The U.S. Coast Guard, at 33 CFR 126.15(c), requires prior permission of the Captain of the Port if welding or other hot work is to be carried out at a facility where dangerous cargoes as defined by 33 CFR 126.07 are located or being handled.

**§1917.153 Spray painting (See also §1917.2, definition of Hazardous cargo, materials, substance, or atmosphere).**

- (a) Scope.** This section covers painting operations connected with maintenance of structures, equipment and gear at the marine terminal and of transient equipment serviced at the terminal. It does not apply to overall painting of terminal structures under construction, major repair or

rebuilding of terminal structures, or portable spraying apparatus not used regularly in the same location.

**(b)** Definitions.

- (1) **Spraying area** means any area where flammable vapors, mists or combustible residues, dusts or deposits may be present due to paint spraying operations.
- (2) **Spray booth** means an enclosure containing a flammable or combustible spraying operation and confining and limiting the escape of paint, vapor and residue by means of a powered exhaust system.
- (3) **Approved** means, for the purpose of this section, that the equipment has been approved for the specified use by a nationally recognized testing laboratory.

**(c)** Spray painting requirements for door and outdoor spraying areas and booths.

- (1) Shut-off valves, containers or piping with attached hoses or flexible connections shall have shut-off valves closed at the connection when not in use.
- (2) Pumps used to transfer paint supplies shall have automatic pressure-relieving devices.
- (3) Hoses and couplings shall be inspected before use. Hoses showing deterioration, leakage or weakness in the carcass or at the couplings shall be removed from service.
- (4)
  - (i) No open flame or spark-producing equipment shall be within 20 feet (6.1 m) of a spraying area unless it is separated from the spraying area by a fire-retardant partition.
  - (ii) Hot surfaces shall not be located in spraying areas.
  - (iii) Whenever combustible residues may accumulate on electrical installations, wiring shall be in rigid conduit or in boxes containing no taps, splices or connections.
  - (iv) Portable electric lights shall not be used during spraying operations. Lights used during cleaning or repairing operations shall be approved for the location in which they are used.
- (5) When flammable or combustible liquids are being transferred between containers, both containers shall be bonded and grounded.
- (6)
  - (i) Spraying shall be performed only in designated spray booths or spraying areas.
  - (ii) Spraying areas shall be kept as free from combustible residue accumulation as practicable.
  - (iii) Residue scrapings, debris, rags, and waste shall be removed from the spraying area as they accumulate.
- (7) Spraying with organic peroxides and other dual-component coatings shall only be conducted in sprinkler-equipped spray booths.
- (8) Only the quantity of flammable or combustible liquids required for the operation shall be allowed in the spraying area, and in no case shall the amount exceed a one-day supply.
- (9) Smoking shall be prohibited and "No Smoking" signs shall be posted in spraying and paint storage areas.

**(d)** Additional requirements for spraying areas and spray booths.

- (1) Distribution or baffle plates shall be of noncombustible material and shall be removable or accessible for cleaning. They shall not be located in exhaust ducts.
- (2) Any discarded filter shall be removed from the work area or placed in water.
- (3) Filters shall not be used when the material being sprayed is highly susceptible to spontaneous heating and ignition.
- (4) Filters shall be noncombustible of an approved type. The same filter shall not be used when spraying with different coating materials if the combination of materials may spontaneously ignite.
- (5) Spraying areas shall be mechanically ventilated for removal of flammable and combustible vapor and mist.
- (6) Mechanical ventilation shall be in operation during spraying operations and long enough thereafter to exhaust hazardous vapor concentrations.
- (7) Rotating fan elements shall be nonsparking or the casing shall consist of or be lined with nonsparking material.
- (8) Piping systems conveying flammable or combustible liquids to the spraying booth or area shall be made of metal and be both bonded and grounded.

- (9) Air exhausted from spray operations shall not contaminate makeup air or other ventilation intakes. Exhausted air shall not be recirculated unless it is first cleaned of any hazardous contaminants.
  - (10) Original closed containers, approved portable tanks, approved safety cans or a piping system shall be used to bring flammable or combustible liquids into spraying areas.
  - (11) If flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, the pump discharge line shall have a relief valve discharging either to a pump section or detached location, or the line shall be equipped with a device to stop the prime mover when discharge pressure exceeds the system's safe operating pressure.
  - (12) Wiring, motors and equipment in a spray booth shall be of approved explosion-proof type for Class I, Group D locations and conform to subpart S of Part §1910 of this chapter for Class I, Division 1, Hazardous Locations. Wiring, motors and equipment within 20 feet (6.1m) of any interior spraying area and not separated by vapor-tight partitions shall not produce sparks during operation and shall conform to the requirements of subpart S of Part §1910 of this chapter for Class I, Division 2, Hazardous Locations.
  - (13) Outside electrical lights within 10 feet (3.05m) of spraying areas and not separated from the areas by partitions shall be enclosed and protected from damage.
- (e) Additional requirements for spray booths.**
- (1) Spray booths shall be substantially constructed of noncombustible material and have smooth interior surfaces. Spray booth floors shall be covered with noncombustible material. As an aid to cleaning, paper may be used to cover the floor during painting operations if it is removed after the painting is completed.
  - (2) Spray booths shall be separated from other operations by at least 3 feet (0.91m) or by fire-retardant partitions or walls.
  - (3) A space of at least 3 feet (0.91m) on all sides of the spray booth shall be maintained free of storage or combustible materials.
  - (4) Metal parts of spray booths, exhaust ducts, piping and airless high-pressure spray guns and conductive objects being sprayed shall be grounded.
  - (5) Electric motors driving exhaust fans shall not be located inside booths or ducts.
  - (6) Belts shall not enter ducts or booths unless the belts are completely enclosed.
  - (7) Exhaust ducts shall be made of steel, shall have sufficient access doors to permit cleaning, and shall have a minimum clearance of 18 inches (0.46m) from combustible materials. Any installed dampers shall be fully opened when the ventilating system is operating.
  - (8) Spray booths shall not be alternately used to spray different types of coating materials if the combination of the materials may spontaneously ignite unless deposits of the first material are removed from the booth and from exhaust ducts before spraying of the second material begins.

**§1917.154 Compressed air.**

Employees shall be protected by chip guarding and personal protective equipment complying with the provisions of Subpart E of this part during cleaning with compressed air. Compressed air used for cleaning shall not exceed a pressure of 30 psi. Compressed air shall not be used to clean employees.

**§1917.155 Air receivers.**

- (a) Application.** This section applies to compressed air receivers and equipment used for operations such as cleaning, drilling, hoisting and chipping. It does not apply to equipment used to convey materials or in such transportation applications as railways, vehicles or cranes.
- (b) Gauges and valves.**
  - (1) Air receivers shall be equipped with indicating pressure gauges and spring-loaded safety valves. Safety valves shall prevent receiver pressure from exceeding 110 percent of the maximum allowable working pressure.
  - (2) No other valves shall be placed between air receivers and their safety valves.

**§1917.156 Fuel handling and storage.**

- (a)** Liquid fuel.
- (1) Only designated persons shall conduct fueling operations.
  - (2) In case of spillage, filler caps shall be replaced and spillage disposed of before engines are started.
  - (3) Engines shall be stopped and operators shall not be on the equipment during refueling operations,
  - (4) Smoking and open flames shall be prohibited in areas used for fueling, fuel storage or enclosed storage of equipment containing fuel.
  - (5) Equipment shall be refueled only at designated locations.
  - (6) Liquid fuels not handled by pump shall be handled and transported only in portable containers or equivalent means designed for that purpose. Portable containers shall be metal, have tight closures with screw or spring covers and shall be equipped with spouts or other means to allow pouring without spilling. Leaking containers shall not be used.
  - (7) Flammable liquids may be dispensed in the open from a tank or from other vehicles equipped for delivering fuel to another vehicle only if:
    - (i) Dispensing hoses do not exceed 50 feet (15.24 m) in length; and
    - (ii) Any powered dispensing nozzles used are of the automatic-closing type.
  - (8) Liquid fuel dispensing devices shall be provided with an easily accessible and clearly identified shut-off device, such as a switch or circuit breaker, to shut off the power in an emergency.
  - (9) Liquid fuel dispensing devices, such as pumps, shall be mounted either on a concrete island or be otherwise protected against collision damage.
- (b)** Liquefied gas fuels -
- (1) Fueling locations.
    - (i) Liquefied gas powered equipment shall be fueled only at designated locations.
    - (ii) Equipment with permanently mounted fuel containers shall be charged outdoors.
    - (iii) Equipment shall not be fueled or stored near underground entrances, elevator shafts or other places where gas or fumes might accumulate.
  - (2) Fuel containers.
    - (i) When removable fuel containers are used, the escape of fuel when containers are exchanged shall be minimized by:
      - (A) Automatic quick-closing couplings (closing in both directions when uncoupled) in fuel lines; or
      - (B) Closing fuel container valves and allowing engines to run until residual fuel is exhausted.
    - (ii) Pressure-relief valve openings shall be in continuous contact with the vapor space (top) of the cylinder.
    - (iii) Fuel containers shall be secured to prevent their being jarred loose, slipping or rotating.
    - (iv) Containers shall be located to prevent damage to the container. If located within a compartment, that compartment shall be vented. Containers near the engine or exhaust system shall be shielded against direct heat radiation.
    - (v) Container installation shall provide the container with at least the vehicle's road clearance under maximum spring deflection, which shall be to the bottom of the container or to the lowest fitting on the container or housing, whichever is lower.
    - (vi) Valves and connections shall be protected from contact damage. Permanent protection shall be provided for fittings on removable containers.
    - (vii) Defective containers shall be removed from service.
  - (3) Fueling operations.
    - (i) To the extent applicable, fueling operations for liquefied gas fuels shall also comply with paragraph (a) of this section.
    - (ii) Using matches or flames to check for leaks is prohibited.
    - (iii) Containers shall be examined before recharging and again before reuse for the following:

- (A) Dents, scrapes and gouges of pressure vessels;
  - (B) Damage to valves and liquid level gauges;
  - (C) Debris in relief valves;
  - (D) Leakage at valves or connections; and
  - (E) Deterioration or loss of flexible seals in filling or servicing connections.
- (4) Fuel storage.
    - (i) Stored fuel containers shall be located to minimize exposure to excessive temperatures and physical damage.
    - (ii) Containers shall not be stored near exits, stairways or areas normally used or intended for egress.
    - (iii) Outlet valves of containers in storage or transport shall be closed. Relief valves shall connect with vapor spaces.
  - (5) Vehicle storage and servicing.
    - (i) Liquefied gas fueled vehicles may be stored or serviced inside garages or shops only if there are no fuel system leaks.
    - (ii) Liquefied gas fueled vehicles under repair shall have container shut-off valves closed unless engine operation is necessary for repairs.
    - (iii) Liquefied gas fueled vehicles shall not be parked near open flames, sources of ignition or unventilated open pits.

**§1917.157 Battery charging and changing.**

- (a) Only designated persons shall change or charge batteries.
- (b) Battery charging and changing shall be performed only in areas designated by the employer.
- (c) Smoking and other ignition sources are prohibited in charging areas.
- (d) Filler caps shall be in place when batteries are being moved.
- (e) Parking brakes shall be applied before batteries are charged or changed.
- (f) When a jumper battery is connected to a battery in a vehicle, the ground lead shall connect to ground away from the vehicle's battery. Ignition, lights and accessories on the vehicle shall be turned off before connections are made.
- (g) Batteries shall be free of corrosion buildup and cap vent holes shall be open.
- (h) Adequate ventilation shall be provided during charging.
- (i) Facilities for flushing the eyes, body and work area with water shall be provided wherever electrolyte is handled, except that this requirement does not apply when employees are only checking battery electrolyte levels or adding water.
- (j) Carboy tilters or siphons shall be used to handle electrolyte in large containers.
- (k) Battery handling equipment which could contact battery terminals or cell connectors shall be insulated or otherwise protected.
- (l) Metallic objects shall not be placed on uncovered batteries.
- (m) When batteries are being charged, the vent caps shall be in place.
- (n) Chargers shall be turned off when leads are being connected or disconnected.
- (o) Installed batteries shall be secured to avoid physical or electrical contact with compartment walls or components.

**§1917.158 Prohibited operations.**

- (a) Spray painting and abrasive blasting operations shall not be conducted in the vicinity of cargo handling operations.
- (b) Welding and burning operations shall not be conducted in the vicinity of cargo handling operations unless such hot work is part of the cargo operation.

**Appendix I to Part §1917-Special Cargo Gear and Container Spreader Test Requirements  
(Mandatory) (see §1917.5(c)(5))-§1917 APP I**

Type gear	Test requirement	Tested by	Proof test	
<b>A. ALL SPECIAL CARGO HANDLING GEAR PURCHASED OR MANUFACTURED ON OR AFTER JANUARY 21, 1998</b>				
1. Safe Working Load — greater than 5 short tons (10,000 lbs./4.5 metric tons).	Prior to initial use.	OSHA accredited agency only.	Up to 20 short tons.	125% SWL.
	Prior to reuse after structural damage repair.	OSHA accredited agency or designated person. (40)(1) 125% SWL.	From 20 to 50 short tons.	5 short tons in excess of SWL.
	Every four years after initial proof load test.		Over 50 short tons.	110% SWL.
2. Safe Working Load – 5 short tons or less.	Prior to initial use.	OSHA accredited agency or designated person.	125% SWL.	
	Prior to reuse after structural damage repair.			
3. Intermodal container spreaders not part of vessel's cargo handling gear.	Prior to initial use	OSHA accredited agency only.	125% SWL	
	Prior to reuse after structural damage repair.	OSHA accredited agency or designated person.		
	Every four years after initial proof load test.			
<b>B. ALL SPECIAL CARGO HANDLING GEAR IN USE PRIOR TO JANUARY 21, 1998.</b>				
1. Any Safe Working Load.	Every four years starting on January 21, 1998.	OSHA accredited agency or designated person.	Up to 20 short tons.	125% SWL.
	Prior to initial use or prior to reuse after structural damage repair.	OSHA accredited agency.	Over 50 short tons. From 20 to 50 short tons.	5 short tons in excess of SWL. 110% SWL.

<p>2. Intermodal container spreaders not part of ship's gear</p>	<p>Every four years starting on January 21, 1998.</p> <p>Prior to initial use or prior to reuse after structural damage repair.</p>	<p>OSHA accredited agency or designated person.</p> <p>OSHA accredited agency.</p>	<p>125% SWL.</p>
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