

Chapter 11

COMPLIANCE STANDARDS

11.1 PURPOSE

The requirements in this chapter are consistent with recognized safety standards. This chapter does not contain all safety standards, but covers those regulations applicable to Department work activities, operations, and facilities. For workplace safety issues or situations not addressed in this chapter, the specific regulation should be consulted.

11.2 LABELS, SIGNS, AND FACILITY MARKINGS

This section provides information on the labels, signs and markings required by various regulations and applicable to Department facilities or operations.

11.2.1 Classification of Signs and Color Specifications [29 CFR 1910.145]

- (A) **Danger signs.** The colors red, black, and white shall be those of opaque glossy samples as specified in Table 1 of *Fundamental Specification of Safety Colors for CIE Standard Source "C", American National Standard Z53.1-2006*, which is incorporated by reference as specified in **Sec. 1910.6**. All employees shall be instructed that danger signs indicate immediate danger and that special precautions are necessary.
- (A) **Caution signs.** Standard color of the background shall be yellow; and the panel, black with yellow letters. Any letters used against the yellow background shall be black. The colors shall be those of opaque glossy samples as specified in Table 1 of *American National Standard Z53.1-2006*. All employees shall be instructed that caution signs indicate a possible hazard against which proper precaution should be taken.
- (C) **Safety instruction signs.** Standard color of the background shall be white; and the panel, green with white letters. Any letters used against the white background shall be black. The colors shall be those of opaque glossy samples as specified in Table 1 of *American National Standard, Z53.1-2006*. Safety instruction signs shall be used where there is a need for general instructions and suggestions relative to safety measures.

11.2.2 Warehouse Signage

- (A) **Reels and cabinets.** Where reels or cabinets are provided to contain fire hose, the warehouse supervisor or designee shall assure that they are designed to facilitate prompt use of the hose valves, the hose, and other

equipment at the time of a fire or other emergency. The warehouse supervisor or designee shall assure that the reels and cabinets are conspicuously identified and used only for fire equipment. **[29 CFR 1910.158(c)(1)]**

- (B) Where gas or diesel operated equipment is used, a placard warning employees of carbon monoxide fumes must be placed on the facility wall where it can be plainly seen by employees. Concentration levels of carbon monoxide gas created by powered industrial truck operations shall not exceed the levels specified in **1910.1000. [29 CFR 1910.178(i)(1)]**
- (C) Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked. **[29 CFR 1910.176(a); 1910.22(b)]**

11.2.3 **Welding Signage and Markings**

- (A) **Warning sign.** After welding is completed, in a confined space the hot metal shall be marked or some type of warning must be provided to other workers. **[29 CFR 1910.252(b)(4)(vii)]**
- (B) Gauges on oxygen regulators shall be marked “**Use No Oil.**” **[1910.253(e)(6)(iii)]**
- (C) Compressed gas cylinders shall be legibly marked, for the purpose of identifying the gas content, with either the chemical or the trade name of the gas. Such marking shall be by means of stenciling, stamping, or labeling, and shall not be readily removable. Whenever practical, the marking shall be located on the shoulder of the cylinder. **[29 CFR 1910.253(b)(1)(ii)]**
- (D) Hydrogen gas cylinder storage shall be permanently marked, “**Hydrogen - Flammable Gas - No Smoking - No Open Flames.**” **[29 CFR 1910.103(b)(1)(v)]**
- (E) All filler metals and fusible granular materials shall carry the following notice, as a minimum, on tags, boxes, or other containers:

CAUTION

Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. See **ANSI Z49.1-2006 Safety in Welding and Cutting** published by the American Welding Society. **[29 CFR 1910.252(c)(1)(vi)(A)]**

Brazing (welding) filler metals containing cadmium in significant amounts shall carry the following notice on tags, boxes, or other containers:

WARNING CONTAINS CADMIUM–POISONOUS FUMES MAY BE FORMED ON HEATING

Do not breathe fumes. Use only with adequate ventilation such as fume collectors, exhaust ventilators, or air-supplied respirators. See **ANSI Z49.1-2006**. If chest pain, cough, or fever develops after use, call physician immediately. **[29 CFR 1910.252(c)(1)(vi)(B)]**

Brazing and gas welding fluxes containing fluorine compounds shall have cautionary wording to indicate that they contain fluorine compounds. Cautionary wording by the American Welding Society for brazing and gas welding fluxes reads as follows:

CAUTION CONTAINS FLUORIDES

This flux when heated gives off fumes that may irritate eyes, nose, and throat.

1. Avoid fumes - use only in well-ventilated spaces.
2. Avoid contact of flux with eyes or skin.
3. Do not take internally. **[29 CFR 1910.252(c)(1)(iv)(A)-1910.252(c)(1)(iv)(C)]**

11.2.4 Signage for Spray Booth/Spray Finishing Operations

"No Smoking" signs. "No smoking" signs in large letters on contrasting color background shall be conspicuously posted at all spraying areas and paint storage rooms. **[29 CFR 1910.107(g)(7)]**

11.2.5 Maintenance Shop Signage

- (A) Flammable and combustible liquid storage cabinets shall be labeled in conspicuous lettering, **"Flammable - Keep Fire Away."** **[29 CFR 1910.106(d)(3)(ii)]**
- (B) Safety cans or other portable containers of flammable liquids that have a flash point at or below 80 degrees (F) shall be painted red with either a yellow band around the can or the name of the contents stenciled on the can. Safety cans or other portable containers of flammable liquids having a flash point at or below 80° F, table containers of flammable liquids (open cup tester), excluding shipping containers, shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow. **[29 CFR 1910.144(a)(1)(ii)]**

- (C) Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: **Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.** [29 CFR 1910.147(c)(5)(iii)]

11.2.6 Loading Dock

- (A) **Clearance limits.** Clearance signs to warn of clearance limits shall be provided. [29 CFR 1910.176(e)]
- (B) A **Carbon Monoxide** wall placard shall be provided where fumes are likely from forklifts, tow motors, and vehicles idling at loading docks. [29 CFR 1910.1200]
- (C) Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways, and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked. [29 CFR 1910.22(B)]

11.2.7 Chemical Storage

- (A) Flammable and combustible liquid storage cabinets shall be labeled in conspicuous lettering, "**Flammable - Keep Fire Away.**" [29 CFR 1910.106(d)(3)(ii)]
- (B) All containers must be labeled with the type of contents and an appropriate hazard warning [29 CFR 1910.1200(f)(1)(i)]
- (C) Empty chemical containers must be properly discarded in trash. Empty chemical containers cannot be reused for storing any other chemicals, fuels, water, or pesticides.
- (D) All facilities that contain hazardous material must be properly placarded on the exterior in accordance with **National Fire Protection Association 704.**

11.2.8 Vehicle Maintenance Area

- (A) Safety cans or other portable containers of flammable liquids having a flash point at or below 80° F, table containers of flammable liquids (open cup tester), excluding shipping containers, shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow. [29 CFR 1910.144(a)(1)(ii)]

- (B) Caution signs shall be posted to indicate potential hazards (e.g., those requiring eye, ear protection). **[29 CFR 1910.145]**
- (C) Permanent aisles and passageways shall be appropriately marked. **[29 CFR 1910.22(b)(2)]**
- (D) Compressed gas cylinders shall be legibly marked, for the purpose of identifying the gas content, with either the chemical or the trade name of the gas. Such marking shall be by means of stenciling, stamping, or labeling, and shall not be readily removable. Whenever practical, the marking shall be located on the shoulder of the cylinder. **[29 CFR 1910.253(b)(1)(ii)]**

11.2.9 Exit Markings

- (A) All exits must be clearly visible and marked by a sign reading "EXIT". **[29 CFR 1910.37 (b)(2)]**
- (B) Each exit route must be adequately lighted so that an employee with normal vision can see along the exit route. **[29 CFR 1910.37(b) (I)]**
- (C) Any door, passage, or stairway that is neither an exit nor a way of exit access and likely to be mistaken for an exit, must be marked with a sign reading "Not an Exit." **[29 CFR 1910.37 (b)(5)]**
- (D) If the direction of travel to the exit or exit discharge is not immediately apparent, signs must be posted along the exit access indicating the direction of travel to the nearest exit and exit discharge. Additionally, the line-of-sight to an exit sign must clearly always be visible. **[29 CFR 1910.37(b)(4)]**
- (E) Each exit route door must be free of decorations or signs that obscure the visibility of the exit route door. **[29 CFR 1910.37(b)(3)]**
- (F) Each exit sign must be illuminated to a surface value of at least five foot-candles (54 lux) by a reliable light source and be distinctive in color. Self-luminous or electroluminescent signs that have a minimum luminance surface value of at least .06-foot lamberts (0.21 cd/m²) are permitted. **[29 CFR 1910.37(b)(6)]**

11.2.10 Construction Site

- (A) In areas where 911 is not available, the telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted. **[29 CFR 1926.50(f)]**

- (B) First aid supplies shall be easily accessible when required. **[29 CFR 1926.50(d)(1)]**
- (C) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. **[29 CFR 1926.51(a)(3)]**
- 11.2.11 Dip Tanks Containing Flammable or Combustible Liquids. "No Smoking"** signs shall be posted in the immediate area. [NFPA 34-1995]
- 11.2.12 Crawler, Locomotive, and Truck Cranes**

"Load rating chart." A substantial and durable rating chart with clearly legible letters and figures shall be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his control station. **[29 CFR 1910.180(c)(2)]**
- 11.2.13 Radial Saws**

Ripping and ploughing shall be against the direction in which the saw turns. The direction of the saw rotation shall be conspicuously marked on the hood. In addition, a permanent label not less than 1 1/2 inches by 3/4 inch shall be affixed to the rear of the guard at approximately the level of the arbor, reading as follows: **"Danger: Do Not Rip or Plough From This End"**. **[29 CFR 1910.213(h)(5)]**
- 11.2.14 Jacks**

The rated load shall be legibly and permanently marked on jacks and other vehicle lifts by casting, stamping, or other suitable means. **[29 CFR 1910.244(a)(1)(ii)]**
- 11.2.15 Wiring Components**

Pull and junction boxes for systems over 600 volts, nominal: Boxes shall provide a complete enclosure for the contained conductors or cables. Boxes shall be closed by suitable covers securely fastened in place. Covers for boxes shall be permanently marked "HIGH VOLTAGE." The marking shall be on the outside of the box cover and shall be readily visible and legible. **[29 CFR 1910.305(b)(3)-1910.305(b)(3)(iii)]**
- 11.2.16 Aerial Platforms**

A legible sign shall be affixed to the bucket requiring operators to wear a body harness and attach a lanyard, or other approved fall protection device. **[29 CFR 1910.145]** A body belt shall be worn and a lanyard

attached to the boom or basket when working from an aerial lift.
[29 CFR 1910.67(c)(2)(v)]

11.2.17 **Tire Servicing**

Current charts and procedures containing instructions, safety precautions, and other information applicable to the types of multi-piece rim wheels being serviced and maintained shall be available in the service area. **[29 CFR 1910.177(d)(5)]**

11.2.18 **Eye and Face Protection**

Areas designated for wearing eye and/or face protection shall be clearly labeled.

11.2.19 **Agricultural Tractors**

Each rollover protective structure (ROPS) shall have a label permanently affixed to the structure. This label shall include:

- (A) Manufacturer or fabricator name and address;
- (B) ROPS model number, if any;
- (C) Tractor make, model, or serial number that the structure is designed to fit; and
- (D) A statement that the ROPS was tested in accordance with the requirements of the standard. **[29 CFR 1928.51(c)]**

11.2.20 **Confined Space**

- (A) Use lock out/tag out to control hazardous energy. **[29 CFR 1910.147]**
- (B) **Caution signs** indicating a confined space when workers are present must be posted (**yellow background with black letters**). **[29 CFR 1910.145]**
- (C) If the workplace contains permit required confined spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces. **[29 CFR 1910.1469(c)(2)]**

NOTE: A sign reading **DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER** or using other similar language would satisfy the requirement for a sign.

11.2.21 Load Rating for Storage

In every building or other structure, or part thereof, used for storage purposes, the loads approved by the building official shall be marked on plates of approved design which shall be supplied and securely affixed by the owner of the building, or his duly authorized agent, in a conspicuous place in each space to which they relate. Such plates shall not be removed or defaced but, if lost, removed, or defaced, shall be replaced by the owner or his agent. **[29 CFR 1910.22(d)(1)]**

11.2.22 Refrigerant Recycling Area

All used refrigerant must be stored and labeled in accordance with **40 CFR Part 82**.

11.3 COMPETENT PERSONS

This section provides information on certain operations or equipment where a competent person is required either to erect, install, or inspect the equipment or operation, or to train employees in performing such operations or use of equipment. A competent person is one who can identify existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who are authorized to take prompt corrective measures to eliminate them. The competent person shall be selected or designated by the Unit Manager/Office Head. **[29 CFR 1926.32(f)]**

11.3.1 Unit Managers/Cost Center Managers or designees shall ensure that a competent person is available whenever the following operations or activities are being conducted and that such operations comply with the following standards:

- (A)** Scaffolding operations to include erecting, dismantling, and moving. **[29 CFR 1926. 451 (f) (7)] [29 CFR-1910.28 (h) (10)]**
- (B)** Powered platforms installations. **[29 CFR 1910.66]**
- (C)** Abrasive blasting operations. **[29 CFR 1910.94]**
- (D)** Training and instruction on respirator use. **[29 CFR 1910.134 (C (3))]**
- (E)** Conducting inspection of slings and all fastenings. **[29 CFR 1910.184(d)]**
- (F)** Welding operations. **[29 CFR 1910.253; 1910.155]**
- (G)** Telecommunications repair/installation. **[29 CFR 1910.2128]**

- (G) Use of radioactive materials or x-rays. **[29 CFR 1910.53(b)]**
- (H) Identifying hazards and selection of control measures in asbestos operations. **[29 CFR 1910.1101]**
- (I) Exposure monitoring for cadmium. **[29 CFR 1910.1027(d)]**
- (J) Fitting of ear protective devices. **[29 CFR 1910.101(b)]**
- (K) Welding or cutting a preservative coating whose flammability is unknown. **[29 CFR 1926.354(a)]**
- (L) Safety monitoring system for fall hazards. **[29 CFR 1926.500; 1926.502]**
- (M) Crane operations. **[29 CFR 1910.-180] [1926 Subpart CC]**
- (N) Operation of personnel hoists. **[29 CFR 1926.552]**
- (O) Excavating and trenching. **[29 CFR 1926.650 - 652]**
- (P) Lifting slab operations. **[29 CFR 1926.705]**

11.4 OPERATIONAL REQUIREMENTS

11.4.1 Tools, Machines, and Equipment

11.4.1.1 General Requirements [29 CFR 1926.300]

- (A) All tools shall be maintained in a safe condition.
- (B) When power operated tools are designed to accommodate guards, they must be equipped with such guards when in use.
- (C) Tools with exposed drives, pulleys, and belts will be guarded to prevent accidental contact with moving parts.
- (D) All personnel shall be trained to safely use all tools and equipment that they are required to use in the performance of their regular duties.
- (E) Employees using hand and power tools and exposed to the hazards of falling, flying, abrasive, and/or splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall be provided the appropriate personal protective equipment necessary to protect them from the hazard.
- (F) Hand held power tools such as circular saws and chain saws shall be equipped with a switch that will shut off the power when hand pressure is released.

- (G) The supervisor shall not issue or permit the use of unsafe hand tools, such as wrenches with defective jaws, chisels with mushroom heads, and wooden handled tools with splintered handles or loose heads.

11.4.1.2 Electric Powered Tools [29 CFR 1926.302(a)]

- (A) Electric power-operated tools shall either be double insulated or grounded (three conductor wires and three-prong plug) and in good repair.
- (B) All double insulated tools shall be marked or labeled.
- (C) Electric cords shall not be used to hoist or lower tools.

11.4.1.3 Pneumatic Power Tools [29 CFR 1926.302(b)]

- (A) Pneumatic power tools must be secured to the hose by a positive means (factory fitting), to prevent the tool from becoming accidentally disconnected.
- (B) Safety clips or retainers are required on percussion pneumatic impact tools to prevent attachments from accidentally being expelled.
- (C) A safety device is required on automatic-feed pneumatically driven nailers, staplers, etc., which operate at more than 100 pounds per square inch (psi) pressure to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.
- (D) Compressed air used for cleaning purposes shall not exceed 30psi and shall be used with effective chip guarding and personal protective equipment. This 30psi requirement does not apply to concrete form, mill scale, and similar cleaning operations.
- (E) Hoses and other accessories shall not be operated at pressures above the manufacturer's recommended safe operating pressures.
- (F) Air hoses shall not be used for hoisting and lowering tools.
- (G) Air hoses more than 1/2 inch inside diameter must have a safety device to reduce pressure at the source of supply in case of hose failure.
- (H) Airless spray guns that atomize paints and fluids at 1,000 or more pounds per square inch must be equipped with safety devices to prevent accidental pulling of the trigger.

11.4.1.4 Fuel Powered Tools [29 CFR 1926.302(c)]

All fuel-powered tools must be stopped and cooled before being refueled, serviced, or maintained.

11.4.1.5 Explosive Actuated Fastening Tools [29 CFR 1926.241]

The use of explosive actuated tools is restricted only to qualified personnel approved by the engineer or project manager. Testing of explosive actuated tools is required each day prior to loading. These tools must be used only with the correct guard, shield, or attachment in place.

11.4.2 Industrial Shop Machines

11.4.2.1 Machine Guarding [29 CFR 1926.300(b)]

- (A) All machines must have effective and properly working guards that are always in place when they are operating.
- (B) Guards will not be removed or made inoperative except for authorized maintenance.
- (C) When guards are removed during machine repair, power control switches will be locked in the "off" position and properly tagged. The machine will remain locked until guards are replaced.

11.4.2.2 Abrasive Wheels [29 CFR 1910.215]

- (A) All employees using abrasive wheels shall be protected by eye protection equipment.
- (B) All abrasive wheel bench and stand grinders shall be provided with safety guards which cover the spindle ends, nuts, and flange, and which are strong enough to withstand the effects of a bursting wheel.
- (C) An adjustable work rest of rigid construction shall be used on floor and bench mounted grinders. Such work rest shall be kept at a distance not to exceed 1/8 inch from the surface of the wheel.
- (D) An adjustable tongue guard shall be attached to the peripheral band at the top of the opening and the distance from the wheel will not exceed 1/4 inch.
- (E) All abrasive wheels shall be closely inspected prior to use and tested to ensure they are free of cracks or defects.
- (F) Soft metal such as aluminum will not be ground on an abrasive wheel unless the wheel is designed for that purpose.

- (G) All contact surface of the wheel shall be flat and free of foreign matter, e.g., non-ferrous metals such as copper and brass.
- (H) When using the wire wheel, a leather apron, gloves, and full-face shield shall be used.

11.4.2.3 Drill Presses

- (A) Only drills that are properly sharpened shall be used.
- (B) Drills shall be visually checked to make sure that the drill is running true before using.
- (C) Drills shall be run at the proper speed for the drill size and the stock being drilled.
- (D) Small drills shall be operated at high speeds, large drills at low speeds.
- (E) Chucks shall be removed before starting the drill press.
- (F) Never attempt to hold work under the drill by hand. Clamp the work securely to the table before starting the machine. If the work should slip from the clamp, never attempt to stop it with the hands.
- (G) File or scrape all burrs from drilled holes.
- (H) Do not reach around or in back of a revolving drill.
- (I) Eye protection shall be worn at all times while operating drill presses.
- (J) All gear covers must be in place while operating.
- (K) All drill presses shall be properly grounded.

11.4.2.4 Metal Saws

- (A) The operator shall stand to one side of the saw frame when turning on the power and then adjust the speed to suit the work.
- (B) Do not bend over the saw during operation.
- (C) Mount or tighten the work only when the saw is stopped.
- (D) Material that is to be cut off shall be supported so that the protruding end of long work will not fall and possibly cause injury.
- (E) Protect the protruding end so that others cannot run into it.

- (F) Ensure that the blades for both circular and band saws are in good condition.
- (G) To prevent hand injuries, use a supporting block when cutting short pieces.
- (H) Wear eye protection at all times while operating metal saws.
- (I) All grounds and gear covers must be in place while operating.

11.4.2.5 Lathes

- (A) Before turning the power on, check to see that tailstock, tool holder, and job are properly clamped. If a magnetic chuck is used, be sure the current is on before starting the machine.
- (B) When putting on or removing the chuck or face plate, use hand power only. Do not use the power that operates the lathe.
- (C) Do not leave the chuck wrench or other tools in the chuck.
- (D) Do not use a wrench on revolving work or parts.
- (E) Never try to measure the work, feel the edge, or adjust a cutting tool when the lathe is running.
- (F) When filing, ensure that a sturdy wooden handle in good condition protects the tang of the file and stand to one side so that the file is forced upward and away from the body rather than toward it.

11.4.2.6 Woodworking Machines

- (A) Fixed power-driven tools shall be provided with a disconnect switch that can be locked or tagged in the off position.
- (B) The operating speed shall be etched or otherwise permanently marked, on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute.
- (C) Automatic feed devices shall be installed wherever the work will permit.
- (D) All moving parts shall be covered or guarded to protect the operator from the hazard point.
- (E) Portable power driven circular saws shall be equipped with guards above and below the base plate or shoe. When the tool is withdrawn from the

work, the lower guard shall automatically and instantly return to the covering position.

- (F) Circular table saws used for ripping shall be equipped with anti-kickback fingers or dogs.

11.4.3 Abrasive Blasting [29 CFR 1910.94]

11.4.3.1 Only respiratory protection equipment that has been approved by the Mine Safety and Health Administration and the National Institute of Occupational Safety and Health against dusts produced during abrasive blasting operations shall be used. An Abrasive blasting respirator is constructed so that it covers the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive. **[29 CFR 1926.57(f)(1)(ii)]**

11.4.3.2 Abrasive blasting respirators shall be worn when:

- (A) Working inside blast cleaning rooms,
- (B) Using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operation in an exhaust ventilated enclosure,
- (C) The concentrations of toxic dust exceed acceptable limits.

11.4.3.3 Dust filter respirators shall only be worn in outside abrasion blasting operations when non-silica abrasive or low toxic materials are used.

11.4.3.4 Dust filter respirators shall not be worn when silica sand is used or toxic materials are being blasted.

11.4.3.5 Operators shall be equipped with heavy canvas or leather gloves and aprons.

11.4.3.6 Safety shoes shall be worn when heavy pieces of work are handled.

11.4.3.7 Equipment for protection of the eyes and face shall be supplied to the operator when the respirator design does not provide the same protection.

11.4.3.8 The air for abrasive blasting respirators shall be free from harmful dusts, mists, or noxious gases.

11.4.3.9 If the air is supplied from a regular compressed air line:

- (A) The trap and carbon filter shall be provided and regularly maintained to remove oil, water, scale, and odor.

- (B) A pressure-reducing diaphragm or valve shall be installed.
 - (C) An automatic control shall be provided to either sound an alarm or shut down the compressor in case of overheating.
- 11.4.3.10** Dust shall not be permitted to accumulate on the floor or ledges outside of an abrasive blasting enclosure.
- 11.4.3.11** The blast-cleaning nozzle must be equipped with an operating valve that can be held open manually. A support shall be provided to hold the nozzle when it is not being used.
- 11.4.4 Spray Booth/Spray Finishing Operations**
- 11.4.4.1 General Requirements**
- (A) Spray booths shall be designed to sweep air currents toward the exhaust outlet.
 - (B) Interiors shall be smooth without edges to prevent pocketing of residue.
 - (C) Floor covering shall be non-combustible.
 - (D) Spray booths shall be designed so the air velocity over the open face of the booth shall not be less than 100 linear feet per minute. A visible gauge or audible alarm or pressure-activated device shall be installed to ensure this requirement is maintained.
 - (E) All discarded filter packs shall be disposed of in accordance with local codes.
 - (F) Spray booths shall be protected with an automatic sprinkler system.
 - (G) Filters shall be non-combustible.
 - (H) Spray booths shall be separated from other operations by not less than three (3) feet.
 - (I) Spray booths shall be constructed so that all portions are accessible for cleaning. A clear space of not less than 3 feet on all sides shall be maintained free from storage or combustible construction.
 - (J) Wiring conformance. Electrical wiring and equipment shall conform to the provisions of **29 CFR 1910.107(c)(4)** and shall otherwise be in accordance with subpart S of this part. **[29 CFR 1910.107(c)(4)]**

- (K) No open flame or other sources of ignition shall be within 20 feet of any spraying area unless separated by a partition.
- (L) Portable electric lamps shall not be used in any spraying area during spraying operations.
- (M) Mechanical ventilation shall be kept in operation at all times while spraying and for a sufficient time thereafter to allow vapors and residue to be exhausted.
- (N) Add: Individuals not involved in spray finishing operations must not be allowed within 20 feet of the spraying and overspray area.
- (O) Those employees that are spray finishing must be provided with and wear appropriate respiratory protection (as determined by air monitoring results) any material in the finish or its solvent to below the limits established for air contaminants.
- (P) When spray painting is conducted out-of-doors. OSHA states that spray painting out-of-doors always means an area away from the main building and completely open on at least two sides.

11.4.4.2 Flammable/Combustible Liquids

- (A) Storage of flammable and combustible liquids shall conform to the requirements of **29 CFR 1910.106**.
- (B) Flammable/combustibles kept in spraying operations should not exceed one day or one shift use. Open or glass containers shall not be used.
- (C) Shut-off valves shall be provided where a hose is attached to piping or containers.
- (D) All pressure hoses and coverings shall be inspected daily.

11.4.4.3 Maintenance

- (A) Spraying operations shall not be conducted outside the predetermined spraying areas.
- (B) Spray finishing employees' clothes shall not be left on the premises overnight unless stored in metal lockers.
- (C) **“NO SMOKING”** signs shall be posted at all spraying areas and paint storage rooms.

11.4.5 Dip Tanks [29 CFR 1910.23 and 1910.124]

11.4.5.1 General Requirements

- (A) Portable containers used for fitting or refilling dip tanks shall be positively grounded and electrically bonded.
- (B) No open flames spark producing devices, or heated surfaces having a temperature sufficient to ignite the vapors shall be within 20 feet of a dip tank.
- (C) Waste cans shall be provided for rags and other impregnated materials. The cans shall be metal and specifically approved for this type of disposal.
- (D) If fire protection is not provided per 29 CFR 1910.125(f) covers on dip tanks shall be arranged to close automatically in the event of a fire.
- (E) Periodic inspections of dip tank facilities shall be conducted.
- (F) “**NO SMOKING**” signs shall be posted in the vicinity of dip tanks.
- (G) Areas in the vicinity of dip tanks shall be provided with extinguishers suitable for flammable and combustible liquid fires.

11.4.6 Welding and Cutting [29 CFR 1910.252]

11.4.6.1 General Requirements

- (A) When combustibles cannot be moved from the welding/cutting area, the requirements of **NFPA 51B** shall be followed. No cutting and welding operation will be permitted without authorization from the Unit Manager/Office Head.
- (B) Suitable fire extinguishers shall be available.
- (C) Fire watches are required if welding or sparks could easily ignite cutting and combustibles in the area. This could be greater than or less than 35 feet from point of operation.
- (D) Cutting or welding shall not be conducted in areas not specifically authorized by the Unit Manager/Office Head, in the presence of explosive atmospheres which exist or may develop, and where quantities of combustibles are stored.
- (E) Supervisors are responsible for the safe handling and use of the cutting and welding equipment.

- (F) Areas shall be made fire safe before cutting or welding is conducted.
- (G) No welding or cutting shall be done on used drums, barrels, tanks, or containers until they have been cleaned thoroughly.
- (H) All welding cables shall be placed so they are clear of passageways, ladders, and stairways.
- (I) Ventilation requirements as directed by **[29 CFR 1926.353]** when conducting Construction activities.

11.4.6.2 Oxygen, Fuel, Gas Welding, and Cutting [29 CFR 1910.253]

(A) Transporting, Moving, and Storing Compressed Gas Cylinders

- (1) Valve protection caps shall be in place.
- (2) Cylinders shall not be intentionally dropped, stricken, or permitted to strike each other violently.
- (3) Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved.
- (4) When transporting cylinders by cranes or derricks, a cradle, boat, or suitable platform shall be used.
- (5) Valve protection caps shall not be used for lifting.
- (6) Cylinders shall not be moved unless the regulators are removed, and valve protection caps are in place. Cylinders are not moved up or down stairwells
- (7) Cylinders shall not be placed so close to work that sparks, hot slag, or flame will reach them.
- (8) Cylinders shall be located away from electrical conduit or electrical generating equipment to avoid becoming part of an electrical circuit.
- (9) Cylinders shall be placed in an upright position, and chained or otherwise restrained to prevent falling. Inside of buildings, cylinders shall be stored in a well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials such as oil or excelsior. Cylinders should be stored in assigned places away from elevators, stairs, or gangways. Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized

persons. Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards.

11.4.6.3 Use of Fuel Gases [29 CFR 1926.350(d)]

- (A) Only properly instructed and qualified employees will operate equipment using fuel gases.
- (B) Fuel gas shall not be taken into confined spaces.
- (C) Fuel gas and oxygen manifolds must be clearly identified and placed in well-ventilated area. The manifold hose connections must be such that the hose cannot be interchanged between fuel gas and oxygen manifolds. Header connections will be supplied.
- (D) Oxygen and fuel gas hoses must be easily distinguished from each other by color or surface characteristics. Torches must be inspected at the beginning of each shift for leaking valves, couplings, and connections. Pressure regulators must be in proper working order while in use.
- (E) Cylinders not having fixed hand wheels shall have keys, handles, or non-adjustable wrenches on valves stems while in service.
- (F) Valves shall be closed before moving cylinders.
- (G) Valves shall be closed when work is finished.
- (H) Empty cylinder valves shall be closed.
- (I) Acetylene cylinder valves shall be opened as little as one-half turn of the spindle - preferably no more than three-fourths of a turn.
- (J) When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use.
- (K) Acetylene shall never be utilized at a pressure in excess of 15 pounds per square inch (psi) gage.

11.4.6.4 Arc Welding and Cutting [29 CFR 1910.254]

- (A) Oxygen cylinders and fitting shall be kept away from combustible material, especially oil and grease, as oxygen is not compatible with these products.
- (B) Only the correct manual electrode holders shall be used. If the portion gripped by the hand contains current, it must be fully insulated against the maximum voltage encountered to ground.

- (C) Proper welding cables and connectors must be used and must be completely insulated. Splicing, if used, shall be equal to the insulating quality of the cable and shall not be located within 10 feet of the electrode holder.
- (D) Ground return cables must have a safe current-carrying capacity equal to or greater than the specified maximum output capacity of the units serviced. When a structure or pipeline is employed as a ground circuit, a determination must be made that the required electric contact exists at all joints.
- (E) The frames of all arc welding and cutting machines shall be grounded with a third wire or a separate wire, which is grounded at the source of the current.
- (F) Arc welding or cutting operations shall be shielded by noncombustible or flameproof screens to protect employees and other persons in the vicinity from the direct rays of the arc.
- (G) Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protection equipment.

11.4.6.5 Resistance Welding [29 CFR 1910.255]

- (A) All equipment shall be installed by a qualified electrician.
- (B) A safety type disconnecting switch, circuit breaker, or circuit interrupter shall be provided near the machine.
- (C) Operators shall be properly trained and determined competent to operate the equipment before being designated to do so.
- (D) Controls of all automatic air and hydraulic chargers shall be guarded against accidental activation.
- (E) All doors and panels shall be kept blocked on the resistance welding machines.
- (F) Appropriate shields shall be provided to protect workers and passing employees from the sparks.
- (G) Fire curtains shall be provided.
- (H) For spot and seam welding, voltage shall not exceed 120 volts during operation.

11.4.6.6 Welding, Cutting, and Heating Relative to Preservation Coatings [29 CFR 1926.354]

- (A) The flammability of protective coatings must be determined before welding, cutting, or heating is commenced.
- (B) When coatings are highly flammable, they shall be stripped from the area to prevent ignition. Protective measures must be taken when the preservative coating is toxic.

11.4.7 Battery Rooms and Battery Charging [29 CFR 1926.441]

11.4.7.1 General Requirements

- (A) Batteries of the unsealed type shall be located in the enclosures with outside vents and arranged so as to prevent escape of fumes, gases, or electrolyte spray into other areas.
- (B) The room/area housing batteries will be well ventilated to prevent accumulation of explosive gases or toxic vapors.
- (C) Face protection that provides side as well as frontal protection shall be provided and worn.
- (D) Rubber aprons and gloves shall be provided and worn.
- (E) Facilities for quick flushing of eyes will be provided within 25 feet of the battery handling area.
- (F) “**NO SMOKING**” signs will be posted in the area.
- (G) Fire extinguishers shall be provided, as required by the State Fire Marshal.
- (H) Racks and trays must be electrolyte resistant. The racks shall be located in an area of minimal personnel and vehicle traffic; separate rooms are desirable.
- (I) Procedures for electrolyte disposal shall be in accordance with environmental regulations.

11.4.7.2 Battery Charging

- (A) Battery charging must be performed in areas designated for that purpose.
- (B) When batteries are being charged, the vent caps shall be kept in place to avoid electrolyte spray.

11.4.8 Refrigerant Recycling

11.4.8.1 Records must be maintained at all facilities that service motor vehicle air conditioners.

11.4.8.2 All used refrigerant must be kept in gray containers with a yellow cover, with a label reading "**Dirty Refrigerant, Do Not Use Without Recycling**".

11.4.8.3 Refrigerant recycling and recovery equipment manufactured on or after November 15, 1993, shall meet EPA requirements.

11.4.9 Automotive Service Stations

11.4.9.1 Fueling facilities, both attended and unattended, will comply with the requirements of **National Fire Code 30A** and the rules of the State Fire Marshal.

(A) A tested automatic closing type hose nozzle shall be provided on island type dispensers used for Class I liquids.

(B) A hose nozzle used for dispensing Class I liquids into a portable container shall be manually held open during dispensing.

11.4.9.2 Portable Containers

(A) Dispensing of Class I and Class II fuels in portable containers is prohibited unless the container is metal and is an approved container.

(B) Safety can is an approved closed container, of not more than 5 gallons capacity, having a flash-arresting screen, spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure. **[29 CFR 1926.155(I)]**

11.4.9.3 Unattended Self-Service Stations

(A) Emergency controls (clearly identified) shall be installed at a location acceptable to the State Fire Marshal at a minimum of 20 feet from the dispenser, but not more than 100 feet from the dispenser to shut off power to all dispensing devices in an emergency. Additional controls shall be installed on each group of dispensers or the outdoor equipment used to control the dispensers.

(B) An approved, tested automatic closing type hose nozzle valve with latch hold-open device shall be provided on fuel hoses used for Class I liquids.

- (C) A telephone or other approved clearly identifiable means of notifying the fire department shall be provided on site.
- (D) Additional fire protection shall be provided when required by the State Fire Marshal.

11.4.9.4 **Drainage and Waste Disposal**

Crankcase draining and liquids shall not be dumped into sewers, streams, or upon the ground as required by National Pollutant Discharge Elimination System (NPDES) permit issued.

11.4.9.5 **Sources of Ignition**

Smoking and the use of matches and lighters shall not be permitted within 50 feet of areas used for fueling.

11.4.9.6 **Fire Control**

At least one or more Class 4 B: C fire extinguishers shall be located within 100 feet of each pump dispenser.

11.4.9.7 **Signs**

- (A) The following signs shall be posted in the dispensing area:
 - (1) **"WARNING - It is unlawful and dangerous to dispense gasoline into unapproved containers. No Smoking - Stop Motor."**
 - (2) **IN CASE OF FIRE OR SPILL:**
 - (a) Use emergency stop button.
 - (b) Report accident by calling [include local fire department number and phone location]
- (B) Operating instructions shall also be conspicuously posted in the dispensing area. These instructions shall include:
 - (1) Location of emergency controls.
 - (2) Requirement for user to stay outside of vehicle during dispensing.

11.4.10 **Servicing of Single and Multi-Piece Rim Wheels [29 CFR 1910.177]**

11.4.10.1 **Training and Instruction**

- (A) No employee shall service a multi-piece rim wheel unless the employee has been trained. Training at a minimum shall include the instruction applicable data contained in the charts or rim manuals.
- (B) Each employee shall be able to demonstrate his/her ability to service multi-piece rim wheels safely, including performance of the following tasks:
 - (1) Demounting of tires (including deflation)
 - (2) Inspection of wheel components
 - (3) Mounting of tires (including inflation within a restraining device)
 - (4) Handling of wheels
 - (5) Inflation of tires when wheels are mounted on a vehicle
 - (6) Installation and removal of wheels

11.4.10.2 Tire Servicing Equipment

- (A) A restraining device shall be available. The supervisor will ensure that employees use the restraining device while servicing multi-piece rim wheels. Restraining device is an apparatus such as a cage, rack assemblage of bars and other components that will constrain all rim components during an explosive separation of a multi-piece rim wheel, or during the sudden release of contained air of a single rim wheel. **[29 CFR 1910.177(b)]**
- (B) The restraining device shall have the capacity to withstand the maximum force that would be transferred to it during an explosive wheel separation occurring at 150 percent of maximum tire specification pressure for the wheels being serviced.
- (C) Restraining devices shall be capable of preventing rim components from being thrown outside or beyond the frame of the device for any wheel position within the device.
- (D) Restraining devices shall be inspected prior to each day's use. Any restraining device or barrier exhibiting damage such as cracks at welds, cracked or broken components, bent or sprung components, pitting or structural damage shall be removed from service immediately. The supervisor shall furnish and assure that an airline assembly consisting of the following components be used for inflating tires: A clip-on chuck; An in-line valve with a pressure gauge or a preset regulator; and a sufficient length

of hose between the clip-on chuck and the in-line valve (if one is used) to allow the employee to stand outside the trajectory. **[29 CFR 1910.177(d)(4)]**

- (E) When inflating tires, use a clip-on chuck and an in-line valve with a gauge or pressure regulator.
- (F) Current charts and procedures containing instructions, safety precautions, and other information applicable to the types of multi-piece rim wheels being serviced shall be maintained and available in the service area.
- (G) A current rim manual containing instructions for the type rims being serviced shall be available in the service area.
- (H) Only those tools recommended in the rim manual for the type of wheel being serviced may be used to service multi-piece rim wheels.

11.4.10.3 Wheel Component Acceptability

- (A) Wheel components shall not be interchanged except as provided in the charts or in the applicable rim manual.
- (B) Wheel components shall be inspected prior to assembly. Rim bases, side rings, or lock rings which are bent out of shape, pitted from corrosion, broken, or cracked shall not be used and shall be rendered unusable and discarded.
- (C) Mating surfaces of the rim gutter, rings, and tire shall be free of dirt, surface rust, scale, or rubber buildup prior to mounting and inflation.

11.4.10.4 Operating Instructions for Servicing Multi-Piece Rim Wheels

- (A) Tires shall be completely deflated by removing the valve core.
- (B) Tires shall be completely deflated by removing the valve core, before a wheel is removed from the axle in either of the following situations:
 - (1) When the tire has been under-inflated at 80 percent or less of its recommended pressure.
 - (2) When there is obvious or suspected damage to the tire or wheel components.
- (C) Rubber lubricants shall be applied to bead and rim mating surfaces during assembly of the wheel and inflation of the tire.

- (D) Tires shall be inflated only when contained by a restraining device except when the wheel assembly is on the vehicle. Tires that are under-inflated but have more than 80 percent of the recommended pressure may be inflated while the wheel is on the vehicle if remote control inflation equipment is used and no employees are in the path of the trajectory. An exception to this requirement is contained in the following paragraph.
- (E) When multi-piece rim wheels are being handled, employees shall stay out of the trajectory unless it can be demonstrated that performance of the servicing makes the employee's presence in the path of trajectory necessary.
- (F) When a tire is being partially inflated without a restraining device for the purpose of seating the lock ring or to round out the tube, such inflation shall not exceed 3 (psi).
- (G) When a tire is in a restraining device, the employee shall not rest or lean any part of his body or any equipment on or against the restraining device.
- (H) After inflating the tire, the rim, tire, and rings shall be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment to the tire, rim, or rings is necessary, the tire shall be deflated by removal of the valve core before the adjustment is made.
- (I) No attempt shall be made to correct the seating of side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.
- (J) Cracked, broken, bent, or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated.
- (K) Extension handles (cheaters) will not be used on wrenches for the purpose of removing nuts.
- (L) Mechanical equipment or other assistance will be provided when it is necessary for the tire shop employee(s) to handle heavy or extremely bulky tires and wheels.

11.4.10.5 Operating Instructions for Single Piece Rim Wheels

- (A) Tires shall be completely deflated by removal of the valve core before dismounting.
- (B) Mounting and demounting of the tire shall be done only from the narrow ledge of the wheel. Care shall be taken to avoid damaging the tire beads while mounting tires on wheels.

Tires shall be mounted only on compatible wheels of matching bead diameter and width.

- (C) Nonflammable rubber lubricant shall be applied to bead and wheel mating surfaces before assembly of the rim wheel unless the tire or wheel manufacturer recommends against the use of any rubber lubricant.
- (D) If a tire-changing machine is used, the tire shall be inflated only to the minimum pressure to force the tire bead onto the rim ledge while on the tire changing machine.
- (E) If a bead expander is used, it shall be removed before the valve core is installed and as soon as the rim wheel becomes airtight (the tire bead drops onto the bead seat).
- (F) Tires may be inflated only when contained within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.
- (G) Tires shall not be inflated when any flat, solid surface is in the trajectory and within one foot of the sidewalk.
- (H) Employee shall stay out of the trajectory when inflating a tire. [**29 CFR 1910.177 Appendix A Trajectory**]
- (I) Tires shall not be inflated to more than the inflation pressure stamped in the sidewall unless the manufacturer recommends a higher pressure.
- (J) Tires shall not be inflated above the maximum pressure recommended by the manufacturer to seat the tire bead firmly against the rim flange.
- (K) No heat shall be applied to a single piece wheel.
- (L) Cracked, broken, bent, or otherwise damaged wheels shall not be reworked, welded, brazed, or otherwise heated.

11.4.11 Vehicle Rollover Protection and Warning Devices [29 CFR 1926.1001 and 1002]

11.4.11.1 The following vehicles will be provided with rollover protection, seat belts, and service braking system capable of stopping or holding the equipment fully loaded: fenders or mud flaps shall be required if the vehicle is capable of exceeding speeds of 15 miles per hour.

- (A) Scrapers

- (B) Loaders
- (C) Crawler or wheel tractors
- (D) Bulldozers
- (E) Off-highway trucks
- (F) Graders
- (G) Agricultural or industrial tractors

11.4.11.2 All two-directional equipment such as rollers, compactors, bulldozers, etc., must be equipped with an audible reverse signal or alarm.

11.4.12 Hazardous Waste Disposal

11.4.12.1 The Unit Manager shall ensure that:

- (A) Hazardous waste is properly stored, handled, and disposed of;
- (B) Approved storage facilities are made available for hazardous waste;
- (C) Storage facilities are properly placarded in accordance with **NFPA 704 (National Fire Protection Association)**;
- (D) Appropriate fire suppression equipment is made available;
- (E) Hazardous waste is not stored within 50 feet of the facility property line;
- (F) All containers of hazardous waste are marked "**Hazardous Waste**" and the date the waste started accumulating must be included.

11.4.12.2 Hazardous Waste Generators

- (A) All Department facilities where hazardous wastes are generated must have an assigned U.S. Environmental Protection Agency (USEPA) identification number.
- (B) Storage of hazardous wastes must not exceed the storage requirements outlined in **40 CFR Part 264**.
- (C) The Unit Manager shall ensure that all shipments of hazardous wastes are properly manifested and a log maintained reflecting the manifest number, name of transporter, amount of waste shipped, and the date the original manifest was returned.

- (D) All hazardous waste must be packaged, labeled, marked, and placed in accordance with **49 CFR Parts 100-185**.
- (E) The generator of the documentation must maintain records of all its hazardous waste operations. A copy of each manifest with the handwritten signature of the transporter and the signature and date of acceptance by the designated disposal facility must be maintained for three (3) years and then sent to the Department of State to be transferred to electronic format (**Retention Schedule No. G-11** and **Records Management, Procedure No. 050-020-025**).
- (F) The generator must keep a copy of each **Annual Report** and **Exception Report** for at least three (3) years from the due date of the report (March 1), and then send it to the Department of State to be transferred to electronic format.
- (G) The generator must keep records of any test results, waste analysis, or other determinations made for at least three (3) years from the date that the waste was last sent to an on-site or off-site treatment, storage, or disposal facility, and then sent to the Department of State to be transferred to electronic format.
- (H) The generator who ships hazardous waste off-site must submit an **Annual Report**. Once the generator has received a USEPA identification number, the FDEP (Florida Department of Environmental Protection) will send an **Annual Report** form to be submitted.
- (I) The generator who does not receive a copy of the manifest with the handwritten signature of the owner or operator of the designated treatment, storage, or disposal facility within thirty-five (35) days of the date the waste was accepted by the initial transporter must contact the transporter and/or owner or operator of the designated facility to determine the status of the hazardous waste.
- (J) The generator must submit an **Exception Report** to the Secretary of the FDEP if he/she has not received a copy of the manifest with the handwritten signature of the owner or operator of the designated treatment or the initial transporter accepted disposal facility within forty-five (45) days of the date the waste.

11.4.12.3 Hazardous Waste Spills

First responders who are responsible for only notifying proper authorities are required to be trained at the awareness level to understand what

hazardous substances are, the risks involved, and what action to take in notifying the proper authorities for cleanup.

11.4.13 Boating Operations

Technically, a boat is classified as a vessel, but for the Department's purposes they will also be classified as vehicles.

- (A) Smoking in boats is prohibited.
- (B) Employees shall not be authorized to use a boat (with the exception of johnboats and utility boats used in culverts or streams) unless they have successfully completed an approved safety course meeting the requirements of the U.S. Coast Guard and all other applicable State and Federal regulations.
- (C) Boats shall be equipped with appropriate U.S. Coast Guard approved personal flotation devices (PFD) for each person aboard.
- (D) All boats shall be required to carry visual distress signals for use during daylight and nighttime operations.
- (E) Because certain navigational rules require sound signals, a whistle, horn, or bell shall be carried on board all boats.
- (F) All boats shall use navigational lights between sunset and sunrise.
- (G) Anchor lights shall be used on all boats at anchor unless the boat is less than 23 feet in length or the boat is anchored in or near a narrow channel, fairway, or anchorage or where other vessels normally navigate.
- (H) For diving operations, the red and white diver's flag shall be displayed or the nationally recognized Alpha diver's flag. (Refer to the **Bridge Underwater Operations, Procedure No. 850-010-011**).
- (I) A first aid kit shall be carried in the boat.
- (J) A float plan should be completed and filed with the supervisor before leaving the facility.
- (K) Standing in small utility boats while in the water should be avoided.
- (L) Employees shall not sit on the gunnels, seat backs, or raised pedestal seats while underway.

- (M) Unless anchoring both fore and aft, boats shall not be anchored by the stern.
- (N) All equipment in the boat shall be secured before getting underway.
- (O) Fill all portable fuel tanks on the dock. Wipe off all spilled fuel immediately.
- (P) After fueling, open all hatches and windows and let the boat air out; run the blower (if equipped) before starting the engine.
- (Q) All gas powered or diesel-powered boats shall have at a minimum one type B-1 hand portable fire extinguisher.
- (R) All employees in boats shall wear a U.S. Coast Guard approved PFD. The only exception is divers during diving operations. (Refer to the **Bridge Underwater Operations, Procedure No. 850-010-11**).
- (S) Cutting or welding work in a gas-powered boat is prohibited.

11.4.14 **Diving Operations [29 CFR 1910.401 and 1926.1071]**

Working in an underwater environment is inherently hazardous in that it continually subjects divers to life-threatening safety and health hazards which include high pressure, temperature extremes, unpredictable sea states, toxic substances, abnormal stresses, physical hazards (such as falling), loose or sharp underwater objects, hazardous sea creatures/plant life, and hazards involved while using underwater tools and equipment. For procedures and requirements for diving operations, refer to **Bridge Underwater Operations, Procedure No. 850-010-011**.

11.4.15 **Storage Facilities and Storage Areas**

The Department uses both inside and outside storage facilities. Warehouses, storage yards, and supply dumps are all part of storage operation. Employees working in any type of storage facility to prevent hazards caused by the methods of storage and to protect the materials being stored must observe safe work practices.

11.4.15.1 **Warehouse - Inside Storage**

- (A) **Hazardous Substances** - Dangerous materials, such as flammable liquids, corrosives, toxic substances, and hazardous materials will be stored only in accordance with the requirements of the State Fire Marshal and other appropriate state (FDEP) and local standards. Hazardous substances shall be stored in special containers in well-ventilated, fire-resistant areas. All sources of ignition including smoking shall be prohibited in these storage

areas. Certain other commodities such as oils and grease, which are subject to spontaneous combustion, will be stored where they present no hazards to employees or property.

- (B) **Floors** - Floors in warehouses will not be overloaded at any time. For upper storage areas, safe load capacities will be established and posted in plain view of all employees.
- (C) **Stacked Material** - Materials will be piled in neat stacks, stabilized by dunnage, if necessary. Leaning or unbalanced stacks will be re-piled immediately to prevent their falling.
- (D) **Electric Light Fixture Clearance** - Stacked materials will be kept at least 18 inches away from electric light fixtures. Guards shall be installed over hanging light fixtures to prevent accidental breakage of the bulb and injury to employees.
- (E) **Ignition Hazard** - Smoking will not be permitted in any storage area.
- (F) **Fire Equipment** - Stored materials will be kept at least 18 inches from automatic sprinkler valves, fire hoses, extinguishers, sprinkler heads, exits, and fire doors; for non-sprinkler areas, there must be 24 inches of clearance that spans across the ceiling in an invisible plane beneath the ceiling.
 - (1) Stacked materials, bins, and shelves will be arranged to permit immediate access to all storage areas during a fire.
 - (2) Fire exits shall be marked and easily accessible.
- (G) **Second Deck Storage Bins** - Hand rails and ladders (portable or fixed) shall be provided for safe access to second deck storage bins. Materials that require frequent handling should not be stored in second deck storage bins.
- (H) No one will stand on boxes, chairs, tables, desks, or any other makeshift stand to reach supplies or stock stored on shelves. Always use a safe stepladder.
- (I) **Housekeeping** - Floors shall be kept clean and free of tripping hazards. Aisles and stairways shall be kept free of obstructions that interfere with operations.
- (J) **Aisles** - Proper aisles should be maintained for the safe storage/removal of materials. This allows for enough room to carry or transport supplies and equipment by hand or with powered equipment.

- (1) Aisle spaces should be kept to a minimum as it limits storage space, but aisles shall be adequate for handling the type of materials to be stored.
 - (2) Aisles should be straight and lead directly to exits.
 - (3) Intersections of aisles should be located where there is maximum illumination and visibility.
- (K) **Mechanical Materials Handling Equipment** - Mechanical devices will be used when loads are too heavy or bulky to be lifted or carried efficiently or safely by hand. Fork lifts, conveyors, hand trucks, chutes, rollers, and hoists, when properly used, simplify materials handling and greatly reduce accident, injury, and damage potential.

11.4.15.2 **Stored Materials - Outdoors**

- (A) Both temporary and permanent storage shall be neat and orderly. Materials piled haphazardly or strewn about increase the possibility of incidents and injuries to employees and damage to materials. These areas should also be free of grass and weeds.
- (B) Drums or containers for dispensing flammable or other liquids shall be stored on racks in outside areas. Drip pans shall be provided to catch spills. Flammable liquid drums shall have a means for grounding against static electricity.
- (C) **Lumber Storage**
- (1) Lumber shall be sorted by size and length and stored in separate piles.
 - (2) Firm ground shall be selected for outdoor lumber piling or stacking.
 - (3) During un-stacking, the pile must never be undermined by removal of boards from the lower rows first. Boards must be removed from top rows first.
 - (4) A periodic check should be made to determine if there is shifting of stacked or piled material.
 - (5) Used lumber will have all nails removed before it is stacked for storage.
- (D) **Bagged Materials Storage**

- (1) Bagged materials shall not be stacked more than 10 bags high without setbacks, except when restrained by supports of appropriate strength.
 - (2) Bags shall be cross-tied with the mouths of the bags toward the inside of the pile.
 - (3) During unstacking, the pile must never be undermined by the removal of bags from the lower rows. Bags must be removed from the top rows.
 - (4) The entire top of the stack shall be kept nearly level and the necessary setback maintained.
- (E) Concrete Blocks, and Hay or Straw Bales**
- (1) These materials shall be stacked in tiers on solid, level surfaces.
 - (2) The stacks shall be set back and secured to prevent toppling.
 - (3) Hay or straw bales are a fire hazard and shall be kept dry.
 - (4) Hay or straw bale storage areas shall be properly posted with "**NO SMOKING**" and "**NO SOURCES OF IGNITION**" signs within 50 feet.
- (F) Steel and Aluminum** - Reinforcing sheet, structural aluminum, and steel shall be stored in orderly piles away from walkways and roadways. These items shall be securely piled to prevent items from sliding off or the pile toppling over.
- (G) Pipe** - Pipes shall be stacked and blocked so as to prevent spreading or rolling. Separate stacks shall be made for each size, and should not be more than 5 feet high. Before removing pipe, the inside should be checked for any wasp/hornet nests and/or reptiles/animals.
- (H) Round Piling or Poles**
- (1) Round piling or poles shall be stored in an orderly manner on a solid, level surface.
 - (2) Either a pyramid stack or battened stack shall be used.
 - (3) The lower tier of stacks shall have all piles or poles securely chocked to prevent lateral spread.

- (4) Unloading of round pilings, poles, or pipe shall be done so that no person is required to be on the unloading side of the carrier after the tie wires have been cut or during the unloading of stakes.

(I) Sand, Gravel, Dirt, Crushed Stone, and Asphalt Mix

- (1) When operators remove any of these materials from stockpiles, either manually or by mechanical means, they shall ensure that no overhang or vertical face exists.
- (2) Materials stored or stacked against walls or partitions shall not be at a height that will endanger the stability or exceed the strength of walls or partitions.

- (J) Drums** - Drums should be stored on racks designed so that the drum is kept horizontal or on pallets to keep the drum off the ground to prevent moisture from rusting through the bottom. This storing practice should be used regardless of whether the drums are stored indoors or outdoors. Outdoors, if the drums are stored vertically, a tarp or some type of protection must be used to cover the tops to keep out any water, (which also causes corrosion on the top.)

11.4.16 Working Surfaces, Floor Openings, and Stairways

(A) Walking-Working Surfaces

- (1) All shop areas, utility rooms, halls, and storerooms shall be kept clean and orderly.
- (2) All floors shall be kept clean and as dry as possible.
- (3) Aisles used by material handling equipment shall be appropriately marked on the floor.
- (4) Aisles, passageways, and floors shall be kept free of any obstructions such as protruding rails, splinters, holes, or loose boards.
- (5) Covers or guardrails shall be provided to protect employees from open holes, ditches, etc.

(B) Guarding Floor Openings, Wall Openings, and Holes

- (1) A floor opening is any opening measuring at least 12 inches or more in any floor, roof, or platform through which a person may fall.

- (2) Every stairway floor opening shall be guarded by a standard railing. All exposed sides (except entrance) shall be guarded.
 - (3) All ladder-way floor openings shall be guarded by a railing with toe boards and a swinging gate.
 - (4) Every hatchway and chute floor opening shall be guarded by either a hinged floor opening with standard railing or a removable railing with toe board on two sides and fixed railings with toe boards on all other exposed sides.
 - (5) When covers are not in place, all pit and trap door openings that are used infrequently shall either be constantly attended by an employee or protected on all exposed sides by removable railings.
 - (6) An employee shall constantly attend every temporary floor opening, including manholes, when the cover is not in place until the work requiring the opening has ended. If the posting of an employee is ineffective or not feasible, removable railings should protect the opening.
 - (7) **Wall Openings**
 - (a) All wall openings where there is a drop of more than 4 feet shall be protected by a rail, roller, picket fence, half door or equivalent barrier.
 - (b) Every temporary wall opening shall have adequate guards.
 - (8) **Open sided Floors, Platforms, and Runways**
 - (a) Every open sided floor or platform 4 feet or more above the adjacent floor or ground level shall be guarded by standard railings.
 - (b) Toe boards shall be provided when employees can pass beneath the open sides or falling materials could cause a hazard.
- (C) **Stairway Railings and Guards**
- Every flight of stairs having four or more risers shall be equipped with applicable standard handrails.
- (D) **Stair Treads**

All treads shall be reasonably slip-resistant and nosing's shall be of non-slip finish.

(E) Fixed Industrial Stairs

This requirement includes interior and exterior stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits.

- (1) Stairs shall be made to carry a load of five times the normal line load anticipated.
- (2) The width of the stairs shall be a minimum width of 22 inches.
- (3) Stairways shall be designed and installed at horizontal angles between 30 and 50 degrees.
- (4) All treads shall be slip resistant.
- (5) Stairways platforms shall be no less than the width of the stairway and a minimum of 30 inches in length measured in the direction of travel.
- (6) Railings and handrails shall be provided on the open sides of all exposed stairways and stair platforms.
- (7) A vertical clearance above any stair tread shall be at least 7 feet.

11.4.17 Cranes

(A) Crawler, Locomotive, and Truck Cranes

- (1) Only trained and designated employees shall be permitted to operate a crane.
- (2) Rated load capacities, recommended operating speeds, and special hazard warnings shall be conspicuously posted on all equipment within view of the operator.
- (3) The operator shall be prohibited from dragging loads sideways with the crane.
- (4) The operator shall be prohibited from leaving his/her position at the controls while the load is suspended.

- (5) Employees shall be prohibited from standing or passing under a load on a hook.
- (6) No tools, equipment, oilcans, waste, etc., shall be left lying loose in or about the cab.
- (7) The minimum clearance between electrical lines and the crane shall be 10 feet from lines rated 50 kilovolts or below; greater clearances are needed from higher voltage lines.
- (8) The accessible area within the swing radius of the rear of the superstructure of the crane shall be barricaded in such a manner to prevent an employee or equipment from being struck.
- (9) All hauling vehicles whose payload is loaded by means of cranes, power shovels, etc. shall have a cab shield or canopy.
- (10) Operators of cranes, hoists, or similar lifting equipment shall take signals from only one person who is knowledgeable of the standard hand signals. Illustrations of standard hand signals shall be posted at conspicuous training locations.

(B) Inspections

- (1) **Daily** - to be conducted by a designated competent person on all control mechanisms, all safety devices, hydraulic systems, hooks, ropes, and electrical systems.
- (2) **Monthly** - for brakes, crane hooks, and ropes.
- (3) **Annually** - a complete inspection conducted by a competent person or government/private agency, including certification, record of when, who inspected, results, and what was inspected.

(C) Vehicle-Mounted Elevating and Rotating Work Platforms

- (1) Lift controls shall be tested each day prior to using equipment.
- (2) Only trained employees shall be authorized to operate this equipment.
- (3) Employees shall be prohibited from sitting or climbing on the edge of the basket and from using planks, ladders, or other devices for a work position.

- (4) A full body harness with lanyard or other approved fall protection devices shall be required to be worn and attached to the boom or basket.
- (5) Brakes shall be set, and outriggers, when used, positioned on a solid surface.
- (6) Load limits shall be used when the vehicle is on an incline.
- (7) Wheel chocks shall be used when the vehicle is on an incline.
- (8) Aerial trucks shall be prohibited from being moved when the boom is elevated in a working position and employees are in the basket.
- (9) Employees are prohibited from belting off to an adjacent pole, structures or piece of equipment while working from an aerial lift.
- (10) Articulating boom and extended boom platforms designed as personnel carriers shall have both platforms and lower controls. The controls shall be plainly marked.

(D) Overhead and Gantry Cranes

- (1) The load rating shall be clearly marked on each side of the crane.
- (2) Only trained, designated employees shall be allowed to operate the crane.
- (3) All exposed moving parts shall be guarded.
- (4) Electrical equipment shall be protected from dirt, grime, and moisture.
- (5) All live electrical parts shall be covered.
- (6) Modifications to the cranes shall be prohibited unless authorized and approved in writing by the manufacturer.
- (7) Operators shall be prohibited from moving loads over the heads of employees, leaving lifting devices unattended with a load suspended, or allowing employees to stand under a suspended load.
- (8) **Inspections shall be conducted:**
 - (a) **Daily** - on all functional operational mechanisms, hydraulic systems, tanks, pumps, hooks, hoist chains, and connections.

- (b) **Monthly** - on all hooks, hoist chains, and ropes (cables). Requires a certification record including date of inspection, signature of inspector, and what was inspected.
 - (c) **Periodic** - at least annually, on all of the above including bolts, units, brakes, gears, electrical, drive gears, sheaves, wire ropes, and other components by a competent person, or a governmental/private agency which shall provide a certified record of occurrence, inspector, and results.
- (9) Hooks with more than 15 percent in excess of normal throat opening or more than 10-degree twist from the plane of the unbent hook shall be discarded.