

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1910 and 1917

[Docket No. S-501]

Marine Terminals

AGENCY: Occupational Safety and Health Administration, Labor.

ACTION: Final rule.

SUMMARY: The Occupational Safety and Health Administration (OSHA) presents, through this notice, its final rule for marine terminals. The provisions contained in this rule apply to the shoreside aspects of marine cargo handling. Shipside activities will continue to be addressed in 29 CFR Part 1918. Although throughout the rulemaking process, OSHA identified the proposed rule for marine terminals as 29 CFR Part 1918a, the recent consolidation of its shipyards standards makes it possible to codify the rule for marine terminals as 29 CFR Part 1917.

This final rule is a vertical standard, i.e., one that applies to this industry exclusively and is designed specifically to address the hazards associated with marine cargo handling ashore. However, certain sections and subparts of Part 1910, the General Industry Standards, will continue to apply to marine terminals and have been referenced in this vertical standard.

DATES: This final rule is effective October 3, 1983, except §§ 1917.23, 1917.24, 1917.25, 1917.50, and 1917.116 which contain information collection requirements which are under review at OMB. Any petitions for administrative consideration of these standards or for an administrative stay pending judicial review must be filed with the Assistant Secretary for Occupational Safety and Health by August 19, 1983.

Any petitions filed after this date will be considered untimely. This requirement is considered essential to permit the Agency to give full consideration to each petition and to respond in advance of the effective date of the standard.

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SUPPLEMENTARY INFORMATION:

Approval by OMB is pending on matters concerning the Paperwork Reduction Act.

I. History.

Due to the alarming number and serious nature of the accidents and injuries in the marine cargo-handling industry, Congress amended the Longshoremen's and Harbor Workers' Compensation Act (LHWCA) (44 Stat. 1424; 33 U.S.C. 901 et seq.) in 1958 to provide maritime employees with a safe work environment. The amendments (Pub. L. 85-742, 72 Stat. 835) significantly strengthened Section 41 of the LHWCA (44 Stat. 1444; 33 U.S.C. 941) by requiring employers covered by the Act to "furnish, maintain and use" equipment and to establish safe working conditions in accordance with regulations promulgated by the Secretary of Labor. Two years later, the Labor Standards Bureau (LSB) of the Department of Labor (DOL) issued the first set of safety and health regulations for longshoring activities as 29 CFR Part 9 (25 FR 1565). These standards were amended on several occasions between 1960 and 1971. Since 1971, there have been no substantive changes in these provisions. However, these regulations only covered longshoring activities taking place aboard vessels.

Passage of the Occupational Safety and Health Act (the Act) (84 Stat. 1590; 29 U.S.C. 650 et seq.) by Congress in 1970 enabled the Federal government to become directly involved with commercial shoreside cargo-handling operations in marine terminals. Section 6(a) of the Act (84 Stat. 1593; 29 U.S.C. 655) authorized the Secretary of Labor to adopt established Federal standards issued under other statutes, including LHWCA, as occupational safety and health standards under the Act. Accordingly, the Secretary adopted the existing longshoring regulations and recodified these rules as 29 CFR Part 1918 (39 FR 22074, June 19, 1974). Since the Act comprehensively covered all private employments, the longshoring standards also applied to shoreside cargo-handling operations (see 29 CFR 1910.16).

In addition, in accordance with established policy codified at 29 CFR 1910.5(c)(2), OSHA has applied its general industry regulations to shoreside activities not covered by its older longshoring rules. Citations have also been frequently issued under Section 5(a)(1) (the General Duty Clause) of the Act (84 Stat. 1593; 29 U.S.C. 654)(Ex.22), since some serious hazards are not addressed by requirements in Part 1910 or Part 1918.

The attempt to apply and to enforce provisions from different standards to shoreside activities has encouraged a fragmentary approach to compliance activity, has produced much misunderstanding and dissension, and has not provided adequate employee protection. As a result, several groups have requested that OSHA "make the industry whole" by consolidating all the regulations applicable to the marine terminal portion of the cargo-handling industry into a comprehensive set of regulations parallel to those for the shipboard portion of the operation. OSHA believes that a marine terminal standard tailored specifically to the hazards and circumstances of this industry, written in simplified and more understandable language, is clearly needed.

II. Background of the Standard.

In the early 1960's, OSHA's predecessor agency, the Bureau of Labor Standards, played an important role in developing an American National Standards Institute (ANSI) marine terminal standard (ANSI MH9) to assist the industry in its voluntary efforts at accident prevention. When completed, however, this consensus standard left many gaps in safety coverage, and it was somewhat out of date by 1971. A new ANSI MH9 committee was established after the advent of OSHA, and in 1972, this group developed a revised ANSI marine terminal standard, Safety Requirements for Marine Terminal Operations, ANSI MH9.1. OSHA had intended to adopt this new ANSI revision under Section 6(a) of the Act; however, the Agency did not do so because the standard was considered incomplete and because the legal authority to adopt such national consensus standards expired in April 1973. OSHA then began to develop its own marine terminal standard, using ANSI MH9.1, State standards, other available data, and staff experience and research as starting points.

Subsequently, the Assistant Secretary of Labor for OSHA appointed an ad hoc Standards Advisory Committee (SAC) to review the Agency's draft marine terminal document and to make appropriate recommendations. (A list of committee members and their affiliations appears in the front of the volume of committee recommendations, which has been entered in the record (Ex.2)). The first meetings of the SAC took place in June 1974, and its period of service terminated in March 1975. Staff work then resumed, with review and consideration of the transcripts of committee meetings and

recommendations, and further revision in response to the committee's comments.

On January 16, 1981, OSHA published its proposed rule for marine terminals (46 FR 4182). Simultaneously, OSHA scheduled an informal public meeting for April 28, 1981, at which time interested parties were given the opportunity to present their concerns orally and to seek clarification of the proposal from OSHA representatives. A transcript of that meeting has been entered into the official record (Ex. 96). The Notice of Proposed Rulemaking also informed the public of the opportunity to request an informal public rulemaking hearing on the substance of the proposal. Requests for public hearings were received from the International Longshoremen's Association (Ex. 93-47), the American Association of Port Authorities (Ex. 93-91), the West Gulf Maritime Association (Ex. 93-48) and other interested parties.

In a notice dated April 6, 1982 (47 FR 14716), OSHA announced a three week schedule for an informal public hearing, and also solicited comment on a limited number of alternative provisions to certain rules of the proposal. These alternatives were taken from comments submitted by labor unions, stevedoring companies, port authorities and trade associations, among others, and were suggested to remedy perceived deficiencies in the proposal's provisions and to provide more flexibility in meeting the goals of the proposal. In addition, the Agency asked for further information on the proposal's economic impact, especially concerning its impact on small businesses.

The hearing was convened in Washington, D.C., for three days beginning May 25, 1982, reconvened in San Francisco for another three days beginning June 8, 1982, and concluded in Houston, Texas on June 23, 1982. Numerous interested parties submitted comments and presented testimony at the hearing (Ex. 300x-400x), and these comments greatly assisted the Agency in its promulgation of the final rule. The record was left open until August 1, 1982, for the submission of post-hearing comments. Finally, by his order of September 21, 1982, Administrative Law Judge Henry B. Lasky closed the record of the proceeding.

In developing the final rule, OSHA gave careful review and consideration to all available material and data found in the record in an effort to meet the goals of the Act and to satisfy the legitimate concerns of the interested parties who have participated in this rulemaking. In so doing, the Agency wrote the marine terminal standard to

enhance the safety of dockworkers, to address the specific hazards associated with the marine terminal industry, and to encourage voluntary compliance by employers and employees. To achieve these goals, the rule has been written in straightforward, performance-based language, which has allowed OSHA to reduce the volume of the rule to 1/3 that of the existing rules that currently apply to marine terminals. In addition, in an effort to keep the employer's compliance costs to the lowest level consonant with employee safety, the standard makes extensive use of the "grandfather clause" or phase-in concept. This practice will reduce to a minimum the amount of equipment that must either be replaced or retrofitted to comply with the standard's provisions. Another method of reducing costs and avoiding regulatory rigidity is the standard's use of a range rather than a specific figure for design or construction specifications. For example, rather than specifying that guardrails must be 36 inches high, the standard permits railing height to fall within a range which experience and ergonomic research have determined to be appropriate and safe.

Finally, OSHA has worked closely with the U.S. Coast Guard throughout the development of this standard, to ensure that the final rule's requirements complement and do not conflict with that agency's regulatory efforts in the marine terminal environment. Section 4(b)(1) of the Act (84 Stat. 1592, 29 U.S.C. 653) preempts OSHA jurisdiction as to the working conditions of employees "with respect to which other Federal agencies . . . exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health." Thus, in marine terminals, OSHA's jurisdiction does not apply to those working conditions to which the Coast Guard has exercised its statutory authority, pursuant to the Port and Waterways Safety Act (92 Stat. 1271, 33 U.S.C. 1221 *et seq.*), to promulgate standards affecting occupational safety and health.

III. Marine Terminal Hazards.

The work environment at a marine terminal exposes maritime employees to a greater risk of injury than is true for workers in most other industries. In terms of number of injuries per worker and of lost workdays per worker, cargo-handling operations in American ports represent some of the most dangerous activities in American industry. A simple comparison of injury incidence and accident severity rate between the marine terminal industry and the industrial average for the private sector will illustrate the hazardous nature of

the work performed along the waterways of this country.

Examination of accident data compiled by the U.S. Bureau of Labor Statistics (BLS) up to 1978 (Ex. 18, 46 FR 4183) and from 1978 to 1981 reveals that the injury/illness incidence continues to be more than twice that of the national average for total private sector employment. The following BLS table covering the period 1978-1981 is useful for comparison:

INJURY/ILLNESS INCIDENCE RATES PER 100 FULL-TIME WORKERS

	Total cases	Lost work-day cases	Non-fatal cases with-out lost work-days	Lost work-days
1978:				
Private Sector	9.4	4.1	5.3	63.5
SIC 446*	21.9	12.2	9.6	459.5
1979:				
Private Sector	9.5	4.3	5.2	67.7
SIC 446*	21.1	11.8	9.2	467.0
1980:				
Private Sector	8.5	3.9	4.6	63.7
SIC 446*	21.1	12.7	8.4	507.0
1981:				
Private Sector	8.1	3.7	4.4	60.6
SIC 446*	20.0	11.7	8.3	497.2

*Standard Industrial Classification 446 is made up, in most part, of employments engaged in marine cargo-handling.

In addition, the BLS table and previously submitted data demonstrate that the accident severity rate, computed on the basis of lost workdays per worker, continues to be at least seven times greater than the national average (46 FR 4183, Ex. 18). For example, in 1981, though on the average only 60.6 workdays were lost to injury per 100 full-time workers, the marine cargo-handling industry lost over 497 workdays per 100 workers. Thus, this industry continues to remain one of high risk and of alarming accident severity.

The available data on accidents and injuries in marine terminals indicate that terminal employees are exposed to a significant risk of injury in the workplace. Since this standard is directed at the significant risk which exists in the marine terminal environment, OSHA therefore finds that this marine terminal standard is reasonably necessary for the protection of these employees from a wide range of workplace hazards.

IV. General Characteristics of the Standard.

(A) Vertical vs. Horizontal Standards

The marine terminal standard is in a format that will allow it to stand by itself, i.e., to be a vertical standard (one that applies to this industry exclusively and in lieu of any other OSHA

standard); in a few areas of coverage specified in the rule's scope section, some of OSHA's general industry standards are incorporated by reference. In general, vertical standards encourage compliance because they are directed to the particular problems of the industry, and because they only contain provisions that are appropriate to the industry in question. On the other hand, since many industries covered by OSHA do in fact use the same or similar equipment and processes, and therefore have employees who are exposed to the same hazards, it is usually a more efficient use of the Agency's resources to develop "horizontal" standards (those applying to more than one industry). However, both the Standards Advisory Committee and a number of interested parties (Ex. 2 at ia, 58) urged OSHA to adopt a vertical standard for this industry. After careful consideration of the advantages and disadvantages of vertical and horizontal standards, OSHA has decided to adopt a vertical standard for this high-hazard and large workforce industry. The Agency believes that only this type of regulation will eliminate redundant and conflicting coverage, reduce the confusion caused by the existing dual coverage, be tailored specifically to the unique problems of marine terminals, and address adequately the hazards peculiar to this industry.

(B) Performance vs. Specification

The format and substance of this standard reflect OSHA's effort to eliminate needless regulations and to simplify and update others. To achieve these goals, the Agency has adopted a performance approach to writing new rules and revising existing ones. A performance-based standard identifies a hazard and the level of control required to protect against the hazard, without specifying the precise means of achieving such control, while a specification standard stipulates design and construction criteria to be met to achieve a particular safety objective. The lack of flexibility in many specification standards fails to take into account the adequacy of many existing facilities and discourages design and use innovations. Staff review of Part 1910 convinced the Agency that many general industry provisions could be left out of the marine terminal standard without reducing the level of protection now provided to marine terminal employees and also that performance language could be substituted for other existing provisions. Accordingly, by not including some Part 1910 provisions and by modifying others, the Agency has sought both to streamline and

strengthen the safety requirements of this standard. Where provisions from the general industry standards have been judged appropriate and applicable to the marine terminal environment, they have been adopted to meet this industry's specific safety and health requirements.

V. Summary and Explanation of the Standard.

The marine terminal standard was originally proposed as a new Part 1918a (46 FR 4182) of 29 CFR. However, because of the consolidation of Parts 1915, 1916 and 1917 into a single Part 1915 (Maritime Consolidation, 47 FR 16986, April 20, 1982), Part 1917 has become available for the final rule. Section numbers in this new Part 1917 will be same as those proposed for 1918a (e.g., proposed § 1918a.43 becomes final § 1917.43), and the Part designations are used interchangeably in this preamble.

(A) Generic Changes

Many provisions that were published in OSHA's original proposal for marine terminals have been revised in some respect. However, most changes merely involved alteration or deletion of a single word or phrase appearing many times throughout this standard. When these types of changes have been made, this summary will not discuss each individual provision. Rather, it will identify those general phrases as originally proposed, explain in succinct fashion why those phrases have been deleted or or altered in the final rule, and provide examples of how those affected provisions will appear after such a change.

Some parts of the original proposal were identified as being duplicative, unnecessary or unattainable, or were covered by regulations of other Federal agencies. Such provisions were deleted. Accordingly, the Agency will list those provisions with OSHA's rationale for their deletion.

Many provisions put forward in the proposal have counterparts in OSHA's regulations for longshoring (29 CFR Part 1918) and general industry (29 CFR Part 1910), and in certain instances interested parties have expressed a preference for the older regulatory language over that of the proposal. Since the industry has become familiar with that language over the years and since the selected older rules provide protection equal to those OSHA proposed in this rulemaking, the Agency has decided to carry forward the language from the existing general industry or longshoring rules instead of that of the proposal. OSHA will list those provisions, as proposed, along

with the language to be carried forward from the existing standards.

1. "The employer shall ensure * * *

OSHA recognizes that the Act is explicit in placing the responsibility for compliance with OSHA regulations on the employer (see Section 5(a), 29 U.S.C. 654(a)). As such the phrase as proposed is unnecessary and is withdrawn. An example of this change is as follows:

Proposal:

Section 1918a.19 Movement of barges and railcars.

The employer shall ensure that barges and railcars are not moved by cargo runners (running rigging) from vessel cargo booms, cranes or other equipment not suitable for the purpose.

Final Rule:

Section 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.

The following proposed provisions have been altered in the above manner:

- § 1918a.11(a)—Housekeeping.
- § 1918a.13(a)—Slinging.
- § 1918a.14—Stacking of cargo and pallets.
- § 1918a.15—Coopering.
- § 1918a.16—Line handling.
- § 1918a.17 (a), (e), (j), (k)—Railroad facilities.
- § 1918a.19—Movement of barges and railcars.
- § 1918a.20—Interference with communications.
- § 1918a.23 (b), (d), (e)—Hazardous atmospheres and substances.
- § 1918a.24(a)—Carbon monoxide.
- § 1918a.26—Fumigants, pesticides, insecticides and hazardous preservatives.
- § 1918a.27(a)—Personnel.
- § 1918a.41(a)—House falls.
- § 1918a.42(a)—Miscellaneous auxiliary gear.
- § 1918a.43 (b)(1), (c)(1), (e)(1), (e)(6)(ii)(D), (e)(6)(ii)(G)—Powered industrial trucks.
- § 1918a.44 (b), (j), (k), (l)(1), (p)(3)(ii), (p)(4)—General rules applicable to vehicles.
- § 1918a.45 (a)(1), (d)(1), (g)(2), (j)(1), (6), (7), (k)(1)—Cranes and derricks.
- § 1918a.47(a)(1)—Winches.
- § 1918a.48 (a), (g), (j)(2)—Conveyors.
- § 1918a.49 (a), (b), (i), (l)(1)—Spouts chutes, hoppers, bins.
- § 1918a.50(b)—Certification of marine terminal handling devices.
- § 1918a.51(a)—Hand tools.

- § 1918a.71(b)—Terminals handling intermodal containers or roll-on, roll-off operations.
- § 1918a.73(b)(1)—Terminal facilities handling menhaden and similar species of fish.
- § 1918a.111(a)—Maintenance and load limits.
- § 1918a.112(a)(1)—Guarding of edges.
- § 1918a.113—Clearance of heights.
- § 1918a.114 (a)(1), (c)(2)—Cargo doors.
- § 1918a.116 (a), (b) (c)—Platforms and skids.
- § 1918a.117 (c), (e)—Elevators and escalators.
- § 1918a.119 (c)(1), (7)—Fixed ladders.
- § 1918a.120 (b)(1), (c), (d), (e)(1), (f)(8)—Portable ladders.
- § 1918a.121(d)—Fixed stairways.
- § 1918a.122(b)—Spiral stairways.
- § 1918a.123(a)—Employee exits.
- § 1918a.126—Guarding temporary hazards.
- § 1918a.151 (b)(1), (7), (9), (c), (d)(1), (e)(5), (g)(1), (6), (h)—Machine guarding.
- § 1918a.152 (b)(1), (c)(1), (2), (d)(1), (e)(1)(i), (6), (f)(1), (2), (f)(3)(iii), (iv), (v), (f)(4), (g), (h)—Welding, cutting and heating.
- § 1918a.153 (c)(1), (8), (d)(1), (e)(1)—Spray painting.
- § 1918a.154—Compressed air.
- § 1918a.155(b)(1)—Air receivers.
- § 1918a.156 (b)(1), (c)(1)—Fuel handling and storage.
- § 1918a.157(a)—Battery charging and changing.
- § 1918a.158(a)—Prohibited operations.

2. "The employer shall direct."

In a limited number of provisions of the final rule related to work practices, OSHA has substituted the words "instruct" or "direct" in place of the proposal's use of the term "ensure." This section was taken in response to the concern raised by numerous parties that the Agency appeared to be requiring that employers be ensurers of the conduct of their employee (e.g., Exs. 93-51, 93-78, 93-83, and 93-85). Though OSHA did not intend in the proposal that the term "ensure" connote strict liability, the term has been removed to alleviate any doubt in the minds of interested parties. OSHA has long recognized that an employer is not a guarantor of employee conduct, and therefore the Agency cannot mandate that the employer be the "ensurer" of that conduct. However, employers do have an obligation both to educate their workers in these practices through an ongoing safety program and to insist that the employees continue to perform their work in a manner consistent with that program. An example of this type of change is as follows:

Proposal:

Section 1918a.43(b)(7) Powered industrial trucks.

The employer shall ensure that drivers ascend and descend grades slowly.

Final Rule:

Section 1917.43(b)(7) Powered industrial trucks.

The employer shall direct drivers to ascend and descend grades slowly.

The following proposed provisions have been altered in the above manner:

§ 1918a.41(c)—House falls.

§ 1918a.43(b) (7), (8), (9)—Powered industrial trucks.

§ 1918a.44 (d), (g)—General rules applicable to vehicles.

§ 1918a.45 (e)(1), (g)(3)—Cranes and derricks.

§ 1918a.71(g)(2)—Terminals handling intermodal containers or roll-on roll-off operations.

§ 1918a.128(c)—Sanitation.

3. [Records] "which shall be available at the terminal."

Many parties contended that records concerning strength ratings for loose gear and other material handling devices do not have to be kept at the terminal in order to be "available", but need only be placed in a central location where they can be retrieved if so requested (e.g., Exs. 93-10, 93-54, 93-61, and 83-64). OSHA recognizes that due to the transient nature of employment in the marine terminal industry, it is extremely difficult for stevedoring companies to keep such records at the terminal where they may be working on any particular day. In place of the phrase "at the terminal," OSHA has substituted the phrase "available for inspection." This substitution affords the employer some latitude in enabling him to maintain all his records at a central location, while at the same time meeting the need for access to necessary information. An example of this change is as follows:

Proposal:

Section 1918a.42(g)(4) Miscellaneous auxiliary gear.

Synthetic web slings shall be used in accordance with the manufacturer's use recommendations, which shall be available at the terminal.

Final Rule:

Section 1917.42(g)(4) Miscellaneous auxiliary gear.

Synthetic web slings shall be used in accordance with the manufacturer's use recommendations, which shall be available for inspection.

The following proposed provisions have been altered in the above manner:

§ 1918a.42 (g)(4), (h)—Miscellaneous auxiliary gear.

§ 1918a.45 (f)(7)—Cranes and derricks.

§ 1918a.50 (c)(1), (2), (e), (h)—Certification of marine terminal material handling devices.

4. Deletions.

OSHA has deleted some of the proposed provisions from its final rule for marine terminals. Those deletions appear below with a brief rationale supporting the Agency's action.

Section 1918a.13(c)

Section 1918a.13(c) proposed that when bundles of cargo are lifted by bands, strapping or ties, those means of containment shall be strong enough to support the load (46 FR 4228).

One commenter (Ex. 93-53) pointed out that this provision was already well covered by the requirements of paragraph .13(d). Upon reexamination, OSHA concurs, for § 1918a.13(c) is merely a specialized subset of § 1918a.13(d), thereby making deletion of § 1918a.13(c) appropriate.

Section 1918a.13(e)

Section 1918a.13(e) proposed that the method of hoisting unitized loads by banding or strapping be approved and tested in accordance with 29 CFR Part 1919 (46 FR 4228). Based on the rulemaking record (Exs. 93-7, 93-10, 93-58, 93-48, 93-85, 93-91, 93-102, and 93-84), OSHA has determined that although the expected result of this provision is desirable, it is not necessary for employee safety, for the remainder of § 1917.13 will provide adequate protection. Proposed paragraph (e) would have necessitated testing and certifying of every unit of cargo-handling gear and equipment—a practice which would be prohibitively expensive. Moreover, Part 1919 contains no guidelines for testing banding or strapping. As a consequence, § 1918a.13(e) has been deleted.

Section 1918a.27(a)(2)

Section 1918a.27(a)(2) proposed that every machine operator must be instructed in established operating practices and must pass a practical operating examination (46 FR 4230). However, the modifications made in the final rule of the preceding subparagraph (§ 1918a.27(a)(1)), which will require the employer to select qualified machine operators, adequately covers the concerns addressed in the proposal's § 1918a.27(a)(2). Section 1918a.27(a)(2) is therefore deleted.

Section 1918a.43(c)(6)

Section 1918a.43(c)(6) proposed that records of daily inspections of powered industrial trucks be maintained at the marine terminal for at least 30 days (46 FR 4233). The Agency, after reviewing the rulemaking record (Exs. 93-9, 93-22, and 93-74), has determined that a recordkeeping requirement in this paragraph would be unnecessary as an additional check in light of the extensive maintenance requirements of other subparagraphs ((c), (d), and (e)) within this section.

Section 1918a.43(e)(3)(ii)

Section 1918a.43(e)(3)(ii) proposed that the employer would ensure that no employee would ride on lift truck forks (46 FR 4233). The Agency has determined that paragraph (b)(2) of this section, requiring safe places to ride on the trucks for authorized personnel and barring unauthorized personnel to ride on the trucks, more than adequately addresses the concerns relative to safe riding practices. The Agency recognizes that riding on the forks of a lift truck is extremely dangerous and feels that paragraph (b)(2) can be effectively utilized in enforcement activities.

Section 1918a.43(e)(6)(i)

Section 1918a.43(e)(6)(i) proposed that the employer ensure that employees not stand on the forks of a lift truck or on a pallet or load while being lifted (46 FR 4233). However, paragraph (e)(6)(ii) states, in clear terms, when an employee may be elevated by a lift truck, and there is therefore no need to enumerate situations when employees may not be lifted.

Section 1918a.43(e)(6)(ii)(E)

Section 1918a.43(e)(6)(ii)(E) proposed that overhead protection would be provided, as necessary, to employees on platforms elevated by lift trucks (46 FR 4233). Review of the rulemaking record (Exs. 93-74, 93-84, 93-85, 93-91, and 93-102) convinced OSHA that space limitations involved in this type of overhead work prevents employers from installing overhead guarding. Moreover, in most cases, elevated employees will be working in places where there is no activity above them. In light of these facts, the Agency has deleted the provision.

Section 1918a.44(h)

Section 1918a.44(h) proposed that signs be posted to warn vehicle drivers at marine terminals of cross traffic lanes used or crossed by pedestrians (46 FR 4234). Commenters argued that the provision's wording could be construed to require indiscriminate posting of signs

and was also impractical (Exs. 93-23 and 93-58). Others claimed that it was redundant, in that § 1918a.44(i) covered the same matter in a clearer fashion (Ex. 93-74). After reviewing these comments and the proposal, OSHA has concluded that §§ 1918a.44 (e), (f), (g) and (i) adequately provide for the safety of pedestrian workers. Accordingly, this paragraph is deleted.

Section 1918a.44(1)(2)

Section 1918a.44(1)(2) proposed that ramps used to gain access to vehicles have a safety factor of four (4) for the load being carried (46 FR 4234). Commenters demonstrated that this requirement was both excessive and impossible to comply with (Exs. 93-58 and 93-93). In light of this information, OSHA has deleted this provision.

Section 1918a.45(f)(2)(ii)

Section 1918a.45(f)(2)(ii) proposed that the main purchase block of cranes with extendable booms be secured when a whip line is in use (46 FR 4235). However, review of the record (Exs. 93-31, 93-36, and 93-58) has disclosed that securing the main purchase block while using the whip line could cause severe difficulties if the operator failed to release the block before extending the boom. Damage to the crane structure as well as operating personnel would likely occur. Accordingly, OSHA has deleted this provision.

Section 1918a.45(g)(3)(iii)

Section 1918a.45(g)(3)(iii) proposed that wind speed information read out directly in the crane operator's cab (46 FR 4236). Several commenters argued that the devices transmitting such readout information have proven unreliable, in that the low voltage signals that run through flexible cable systems to moving trolley cabs are not strong enough to consistently deliver this type of information (Exs. 93-3 and 93-74). Moreover, others stated that such direct readout information is unnecessary for safety purposes, as long as the crane wind-indicating devices provide visible or audible alerts to the crane operators, and that this system has been used successfully on the Pacific Coast for many years (Ex. 93-85). In consideration of this information, OSHA has deleted the direct readout provision, but will require in paragraph (g)(3)(ii) that wind-indicating devices give visible or audible alerts to crane operators.

Section 1918a.45(j)(4)

Section 1918a.45(j)(4) proposed that unless crane platforms used to hoist employees were surrounded by a net five feet in height, each employee on the

platform would have to be secured by a safety belt, harness and lifeline or equivalent device (46 FR 4237). Commenters pointed out this requirement appeared unnecessary in light of the stringent platform guarding and strength requirements of paragraph (j)(1) (Ex. 93-74, 100-3, and 100-37). The Agency agrees and has deleted the provision.

Section 1918a.95(b)

Section 1918a.95(b) proposed that employees use protective creams or ointments when skin exposure to a particular substance required their use (46 FR 4241). Interested parties opposed this provision on grounds that some employees have experienced allergic reactions to some protective ointments, so that requiring their use could be detrimental (Exs. 93-10 and 93-74). In light of these reactions, the provision is deleted.

Section 1918a.115

Section 1918a.115 proposed that apron working areas be of sufficient dimensions to allow for unobstructed cargo handling (46 FR 4242). However, the language was criticized as vague; more importantly, it was pointed out that the problems addressed by this rule were addressed more specifically and completely in other parts of the proposal (Exs. 93-74 and 93-85) such as those concerned with slippery conditions (§ 1917.12), slinging (§ 1917.13), stacking (§ 1917.14) and line handling (§ 1917.16). Accordingly, the Agency decided to drop the provision.

5. Retention of Existing Language in 29 CFR Part 1910 and Part 1918.

Throughout the rulemaking record, there appear many requests to substitute parallel regulations in Parts 1910 and 1918 in place of certain provisions of the proposal (see e.g., Exs. 93-35, 93-48, 93-54, 93-74, 93-85, 93-93, and 98-4). These parties found the language of the current rules to be more understandable, more practical and less restrictive than that of the proposal. OSHA has reviewed these provisions and has determined that many of the existing provisions in Parts 1910 and 1918 will provide protection equivalent to their counterparts in the proposal. Accordingly, the following rules of the proposal have been replaced by language from the current regulations listed below:

Proposed Rule	Current Rule
§ 1918a.11(b)—Housekeeping.	§ 1918.43(c).
§ 1918a.13(a)—Slinging.	§ 1918.81(a).
§ 1918a.13(b)—Slinging.	§ 1918.81(e).

Proposed Rule	Current Rule
§ 1918a.27(a)(1)—Personnel.	§ 1918.97(a).
§ 1918a.27(a)(3)—Personnel.	§ 1918.97(b).
§ 1918a.42(a)(2)—Miscellaneous auxiliary gear.	§ 1918.61(a).
§ 1918a.43(c)(7)—Powered industrial trucks.	§ 1910.178(a)(3).
§ 1918a.45(f)(9)—Cranes.	§ 1910.179(g)(2)(i).
§ 1918a.46—Crane load/limit devices.	§ 1918.74.
§ 1918a.48(f)—Conveyors.	§ 1918.69(a).

(B) Section by Section Analysis

This section presents a detailed discussion of the remainder of those provisions of the final rule which were changed from the proposed rule. Those provisions which were not changed from the proposal are not discussed here because no significant, substantive criticism of these provisions were received during the course of the rulemaking.

Section 1917.1 Scope and applicability.

Section 1917.1 outlines the scope and applicability of the marine terminals standard, Part 1917. The standard applies to container, general cargo, roll-on roll-off, passenger, lash, menhaden, dry bulk and bulk liquid (excluding flammable and combustible liquid) terminals. Coverage extends to facilities on ocean coasts, the Gulf Coast, the Great Lakes and inland waterways. The standard contains no additional provisions directed solely at operations in grain elevator terminals, although such terminals are covered by applicable provisions, such as those for electrical equipment and powered industrial trucks. Applicable provisions of the general industry grain elevator standard are expected to be proposed for inclusion in these marine terminals regulations in the future.

The coverage of Part 1917 includes all shoreside activities within a marine terminal—except those which are specifically exempted in the standard, as outlined in greater detail below. In clarifying the boundary between Part 1917 and Part 1918, OSHA's shipboard longshore regulations, the Agency has set the foot of the gangway to mark the limit to which Part 1918 may be applied landward. Similarly, Part 1917's jurisdiction extends out to the ship no further than this point of the gangway.

This regulation does not apply to construction activities at marine terminals, which are regulated under the Agency's Construction Safety and Health Regulations (29 CFR Part 1926).

In addition, pursuant to § 4(b)(1) of the Act (84 Stat. 1952, 29 U.S.C. 653), the standard does not apply to working

conditions of employees in marine terminals with respect to which the United States Coast Guard or the Office of Pipeline Safety Regulation of the Materials Transportation Bureau, Department of Transportation exercises statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health. The Office of Pipeline Safety has responsibility for regulating safety and health matters relating to interstate pipelines, under the Natural Gas Pipeline Safety Act, 49 U.S.C. 1671 *et seq.* Pursuant to the Ports and Waterways Safety Act, (33 U.S.C. 1221 *et seq.*) the Coast Guard has exercised its regulatory authority over: (1) Maintenance of port security (including fire protection and safe procedures for welding and hot work) under 33 CFR Part 126; (2) the handling and storage of hazardous materials as defined in 49 CFR Part 172; and (3) the handling of explosives and dangerous commodities, under 46 CFR Part 146.

Bulk liquid terminals specializing in the handling of flammable and combustible liquids are exempt from the coverage of this standard. These facilities are already regulated by the Coast Guard under 33 CFR Part 126, which specifically addresses liquid petroleum gas and liquid natural gas terminals.

Also excluded from coverage of this Part are fully automated bulk coal handling facilities that are contiguous to electrical power generating plants. OSHA received extensive oral and documentary evidence from both industry and labor concerning the proposed coverage of these facilities by the standard (see *e.g.*, Exs. 93-94, 93-97, 100-54, 101-7, 101B-12, 101C-4, 138). Representatives of the Edison Electric Institute (EEI) testified that "virtually all electric utility coal handling facilities are fully automated" (Ex. 101-7:3), that these automated systems are each operated by a single employee sitting in a control booth overlooking the operation, and that such automated facilities did "not expose employees to the hazards of cargo-handling." The International Brotherhood of Electrical Workers (IBEW) disputed EEI's claim that virtually all bulk coal-handling facilities were fully automated. It argued instead that a review of certain job descriptions of workers at these facilities illustrated that these facilities were not fully automated, and that the jobs subjected these workers to the types of operational exposures which the marine terminal standard was designed to cover (Ex. 100-54:2-3). However, further information provided

by EEI revealed that the job descriptions provided by the IBEW either concerned tasks not related to coal handling or dealt with single operators working in a protected control cab (Ex. 140:3-6). Accordingly, after a review of all relevant evidence, OSHA has granted this limited exemption to the electrical utility industry for its "fully automated" facilities.

Certain subparts and provisions of OSHA's general industry standards (29 CFR Part 1910) have been retained in the marine terminals standard. OSHA's electrical regulations for general industry (Subpart S) continue in effect, as does the Agency's noise standard (§ 1910.95). Where referenced in the marine terminals standard, the toxic and hazardous substances rules for general industry (Subpart Z) also apply. Similarly, any commercial divers performing underwater inspection, salvage, or repair tasks at a marine terminal, such as voyage repairs or piling inspection, continue to be covered under OSHA's safety and health regulations for commercial diving operations (Subpart T).

In addition, as paragraph (a)(2)(v) states, the scaffold section of the general industry standards (§ 1910.28) continues to apply in marine terminals. At present, OSHA is developing revisions of its construction and general industry rules for scaffolds, in connection with the Agency's planned overall revision of the walking-working surface standards in Subpart D of Part 1910 and Subparts L and M of Part 1926. The Agency intends to evaluate data and comments on scaffolds received in the course of that rulemaking, and information obtained in response to this rulemaking, to determine appropriate requirements for scaffolds used in marine terminals. Provisions determined to be suitable to protect employees working on scaffolds in marine terminals would then be proposed for inclusion in the marine terminal standard.

Paragraph (a)(2)(vi) provides that § 1910.94(a), the general industry standard for abrasive blasting, is incorporated into the marine terminals standard. OSHA is presently revising the general industry abrasive blasting standards, and comment received in the course of that rulemaking will be evaluated for suitability of application to marine terminals. Provisions determined to be appropriate to abrasive blasting operations in the marine terminal setting would then be proposed for inclusion in this standard.

Paragraph (a)(2)(vii) provides that § 1910.20, the general industry standard for access to employee exposure and

medical records, is incorporated into the marine terminals standard.

Paragraph (a)(2)(viii) provides that § 1910.134, the general industry standard for respiratory protection, is incorporated into the marine terminals standard. The International Longshoremen's and Warehousemen's Union (ILWU) argued vigorously that the proposal's section concerning respiratory protection, § 1918a.92, was "deficient in many ways," in that the standard did not provide for any form of fit testing, and appeared to allow use of dusk masks whose protection factors were inadequate (Ex. 98-4). The union recommended that OSHA adopt the general industry standard, § 1910.134, *ibid.* In its written testimony submitted for the rulemaking hearing, the ILWU again heavily emphasized the need for OSHA to adopt § 1910.134 in place of § 1918a.92 (Ex. 118), and pointed to such additional deficiencies in § 1918a.92 as the absence of standards concerning storage, cleaning and air quality for respirators as reasons for replacing the provision. *Id.* at 8-9. Finally, the union identified further weaknesses of § 1918a.92 in its post-hearing submission (Ex. 136 at 4-5). In examining the two provisions, OSHA has determined that the criticisms of § 1918a.92 by ILWU are warranted, and has accordingly substituted § 1910.134 in its place.

Section 1917.2 Definitions.

Section 1917.2 includes definitions of terms used in more than one section of the standard; terms used only once are defined where they appear in the text.

Marine terminals. Several changes were made in the proposal's definition of the term "marine terminals" in response to written comments. Commenters asked that the definitions specifically reference passenger terminals if these terminals were to be included in the definition (Exs. 93-53 and 98-5), which OSHA has done in the final rule. In addition, several interested parties suggested that the Agency clarify whether the storage areas associated with production or manufacturing facilities are exempt from the definition of "marine terminal" (Exs. 93-49, 93-53 and 93-87). The Agency has added a clause to the definition which exempts these storage areas from coverage. As defined, the term "marine terminals" would not include manufacturing and production operations which have their own docking facilities and are located within the marine terminal area. Examples of such operations are sugar refining plants, cement plants, electrical power transmission facilities and smelters. These facilities are principally concerned with manufacturing rather

than cargo handling, and would therefore continue to be regulated under the general industry standards rather than the marine terminal standards.

It is important to note, however, that although facilities are excluded from coverage from Part 1917 (Marine Terminals), the longshoring operations conducted at these facilities remain subject to the provisions of 29 CFR Part 1918 (Safety and Health Regulations for Longshoring). A longshoring operation is the loading, unloading, moving, or handling of cargo, ship's stores, gear, etc., into, in, on, or out of any vessel.

Subpart B—Marine Terminal Operations

Section 1917.11 Housekeeping.

Paragraph (a) provides that in areas where work is being conducted, those active areas shall be kept free of equipment and materials not in use and clear of projecting nails, strapping and other sharp objects not necessary for the work in progress.

The addition of the term "active" to the proposal's term "work areas" (46 FR 4228) was made in response to comments which feared that the standard could be applied to situations where the possibility of employee exposure was remote (Ex. 93-48, 93-74, and 93-85). This change was first suggested as an alternative provision (47 FR 14720), which was subsequently supported by numerous parties (*e.g.*, Exs. 100-3, 100-10, 100-31, and 100-43).

Paragraph (b) provides safeguards that make it unlikely for hatch beams, covers or pontoons stowed ashore at a marine terminal to become unstable and possibly fall and strike employees. This paragraph provides that when beams and pontoons are stowed in tiers more than one high, dunnage or other suitable material shall be used under and between tiers. This requirement parallels that which appears at 29 CFR 1918.43(c), and was suggested by one commenter to the proposal (Ex. 98-4). This provision was also set out as an alternative provision (47 FR 14720), and was also later supported by interested parties (Exs. 100-31 and 100-43). It should be noted that OSHA does not intend to require employers to place dunnage or other material under and between the large hatch covers that are currently being used by cellular container vessels. These covers shall, however, be stowed in a stable manner.

Paragraph (c) requires that cargo and materials shall not obstruct access to vessels, cranes or buildings, and that means of access within buildings shall be similarly unobstructed. This latter requirement was added to the proposal (46 FR 4228) at the behest of one

commenter (Ex. 98-4), who noted that the proposal did not require that passageways, aisles and stairs within buildings be kept clear. The Agency set this additional requirement out as an alternative provision (47 FR 14720), which drew considerable support from those who submitted comments (Exs. 100-21, 100-31, 100-32, 100-43, and 100-48).

Section 1917.12 Slippery conditions.

Section 1917.12 directs employers to eliminate slippery conditions, to the extent possible, in immediate work areas. The addition of the term "immediate" to the proposal (46 FR 4228) was in response to comments which stated that the need for narrowing this provision was due to the fact that changing weather conditions could render the entire extensive outside work area of the terminal facility slippery, but that only a part of the work area would be utilized by employees engaged in cargo-handling at any one time (Exs. 93-10, 93-17, and 93-74). This change was suggested as an alternative provision (47 FR 14720), which was later supported by several commenters (Exs. 100-9, 100-21, 100-37, and 100-43).

Section 1917.13 Slings.

Paragraph (c) provides that unitized loads bound by bands or straps may be hoisted only if the bands or straps are both suitable for hoisting and strong enough to support the weight of the load. Originally proposed as § 1918a.13(d) (46 FR 4228), this provision allowed hoisting only if the bands or straps were specifically designed for that purpose. However, commenters pointed out that there are many cargo operations in which unitized loads are hoisted by bands not expressly designed for hoisting, and that these bands have proved suitable (Exs. 93-48 and 93-75). Typically, the shipper, as opposed to the stevedore, establishes through testing or design that these bands are suitable for hoisting. *Ibid.* This paragraph was listed as an alternative provision (47 FR 14720), and was supported by many parties for inclusion in the final rule (Exs. 100-9, 100-21, 100-31, 100-43, and 100-48).

Paragraph (d) provides that additional means of hoisting be provided that will ensure safe lifting when loads being lifted have damaged bands or straps. OSHA's proposal, § 1918a.13(f) (46 FR 4228), requires similar protection, but several commenters requested alternative language for the sake of clarity (Exs. 93-54 and 93-85). Set out as an alternative provision (47 FR 14720),

this standard also garnered wide support from participants in the rulemaking (Exs. 100-9, 100-21, 100-31, 100-43, and 100-48).

Section 1917.14 Stacking of cargo and pallets.

Section 1917.14 has been expanded to include not only secure stacking of cargo and pallets stored in tiers, as OSHA originally proposed (46 FR 4228), but other materials (such as loose gear, supplies, etc.) as well. This revision was undertaken in response to a comment which noted that the Pacific Coast Maritime Safety Code, ANSI MH9.1 and the Washington State Administrative Code all required that materials, in addition to cargo and pallets, be safely stacked (Ex. 98-4). When published as an alternative provision (47 FR 14720), this rule was accorded wide acceptance (Exs. 100-3, 100-10, 100-21, 100-37, 100-43, and 100-48).

Section 1917.15 Coopering.

Section 1917.15 has been modified to allow some flexibility in the repair of damaged cargo packaging. OSHA has proposed that this operation be so located and performed as not to endanger employees (46 FR 4228). The rulemaking record contains information from a commenter (Ex. 93-74), which notes that to minimize damage or loss of cargo, repackaging is performed generally at the location where the damage is first observed. This practice consequently allows little leeway in locating the repair. As a result, OSHA has deleted the location requirement. However, the Agency does require this operation to be performed in a manner that does not endanger employees, and though the employer may not always be able to change the locale of repair, he can control the activities that surround the operation.

Section 1917.16 Line handling.

Paragraph (a) provides that cargo, material or vehicles shall not be located to obstruct the working surface used to handle mooring lines. OSHA had proposed that these areas be "free of obstructions" (46 FR 4228). Written comments, though, pointed out that these areas could not be "freed" of obstructions, since such essential objects for attaching lines such as bollards and cleats could not be eliminated from docking facilities (Exs. 93-17, 93-24, 93-35, 93-74, 93-85, and 93-98). An alternative provision, directed at the removal of cargo, materials and vehicles from mooring line handling areas, was suggested (47 FR 14721), and was met with wide support (Exs. 100-3, 100-9, 100-10, 100-21, 100-31, 100-32,

100-43, and 100-48). Accordingly, this provision was incorporated into the final rule.

Section 1917.17 Railroad facilities.

Paragraph (a) provides that work be conducted in railcars only if the floors of those railcars are visibly safe to support the work activity and equipment used within them. As proposed (46 FR 4228), this provision did not contain the qualifying term "visibly." One commenter objected, stating that the proposal would make the employer responsible for hidden defects in railcar floors, over which the employer had no knowledge or control (Ex. 93-74). An alternative rule was suggested, which added the term "visibly" (47 FR 14721), and which received approval from interested parties (Exs. 100-3, 100-9, 100-10, 100-21, 100-31, 100-37, and 100-43). The alternative has therefore been placed in the final rule.

Paragraph (e) provides that positive means shall be taken to protect employees working in, on or under a railcar from impact by other rolling stock. OSHA's proposal (46 FR 4228) required the placement of flags or warning signs 50 feet from the railcar to guard against this hazard. However, the rulemaking record contains information (Exs. 93-23, 93-58, and 93-74) which indicates that not every marine terminal could comply with that proposed requirement. When railcars are located on a spur track, 50 feet may not be available, making compliance with the proposal impossible (Exs. 93-23, 93-58, 93-84, and 93-91). Another commenter noted that the proposal did not provide adequate protection for employees working in or near railcars, and advocated that "positive means" such as derails—as required by California and Washington—be used to prevent railcars from striking workers (Ex. 98-4). An alternative provision, calling for positive means to be taken to protect employees from moving railcars (47 FR 14721), met with substantial approval by interested parties (Exs. 100-3, 100-9, 100-10, 100-21, 100-37, and 100-43). Positive means can include restrictions on rolling stock movement imposed administratively or physically. The Agency has accordingly adopted this language to accord protection to employees, while providing performance language for flexibility of compliance.

Paragraph (g) provides that the employer shall institute all necessary controls during railcar movement to safeguard personnel. Additionally, it requires that employees be located clear of the hauling rope and not between the rope and the cars, should winches or capstans be employed for car

movement. OSHA had proposed that railcars could only be moved if connected to an engine or other powered vehicle, prohibiting free rolling movement (46 FR 4228). The rulemaking record (Exs. 93-9, 93-23, 93-24, 93-74, and 133) supports the fact that cars have been moved safely without engines or powered vehicles for some time and further, that free rolling movement at some railroad terminals (humping) is conducted with strict controls and without adverse impact to employee safety. The Agency's modifications are based on this information.

Paragraph (h) requires that railcar doors be opened slightly before being opened fully, an exercise that would alert workers to shifted loads. Additionally, this paragraph provides that special precautions, such as stationing workers at a distance, or additional securing of the doors, be taken when doors being opened are visibly damaged. OSHA had proposed that only freight car doors in safe condition be opened (46 FR 4228). However, commenters pointed out that the proposal's absolute prohibition against opening doors in poor condition was unrealistic, in that the cargo in that railcar has to be discharged at some point (Exs. 93-64, 93-74, and 93-97). This modification of the proposal provides for the safe opening of damaged doors.

Paragraph (i) provides that if powered industrial trucks are used to open freight car doors, either the trucks or the doors will be fitted with door opening attachments. OSHA had proposed that the truck be equipped with the door opening attachment (46 FR 4228). Commenters, though, observed that in certain instances railcar doors were equipped with opening attachments for forklift trucks, and that the standard should be changed to allow for the use of such safety devices (Exs. 93-74 and 93-85). Set out as an alternative provision (47 FR 14721), this suggestion received a large amount of public support (Exs. 100-3, 100-8, 100-9, 100-10, 100-21, 100-31, 100-37, and 100-43), thereby convincing OSHA to adopt the alternative as a final rule.

Paragraph (k) as proposed required that employees not be positioned in gondolas or flat cars when drafts of cargo were being landed in the car or hoisted over the car. It also required that end gates in a raised position, be secured (46 FR 4229). Interested parties informed the Agency that the major cause of injuries in flat car or gondola operations was slipping or tripping while getting out of the railcar, and that these operations can be conducted safely with men in the car, provided that

the men can stand clear when the cargo is being lowered or hoisted (Exs. 93-48, 93-74, 93-78, and 93-85). They suggested changing the provision to more performance oriented language, which would call for the removal of flat car workers from the railcar in hoisting operations unless there was a safe place to stand. *Ibid.* The Agency set this language out as an alternative provision (47 FR 14721), which drew a favorable response (Exs. 100-3, 100-9, 100-10, 100-11, 100-21, 100-31, 100-43), which accordingly persuaded OSHA to accept the alternative. Consequently, employees shall be positioned away from the cars whenever drafts that create overhead, caught in or between or struck by hazards are handled, unless there is a safe place in the car to stand.

Paragraph (o) provides that warning signs be posted if insufficient clearance for personnel exists between railcars and structures. As proposed, this provision specified that warning signs be posted if a clearance of less than 24 inches existed between railcars and structures, cargo or edges (46 FR 4229). Some commenters criticized this proposed regulation as unnecessary, stating it merely informed personnel of the obvious (Ex. 93-58), while others called for an even more stringent rule (Ex. 98-4), and still others argued that the rule's concept was acceptable, but did not need to be applied to such obvious hazards as waterside edges, or have to specify a dimension (Ex. 93-74). This last performance oriented suggestion was set out as an alternative provision (47 FR 14721), which, after engendering sufficient support (Exs. 100-8, 100-9, 100-11, 100-21, 100-37, and 100-43) was accepted by the Agency as a final rule. Accordingly, warning signs shall be posted if insufficient clearance for personnel exists between railcars and structures.

Section 1917.18 Log handling.

Paragraph (d) requires that logs placed adjacent to vehicle curbs on the dock be no more than one tier high unless placed in bunks or stacked in a manner that prevents rolling. OSHA's proposed rule provided for the same protection (46 FR 4229), but, according to commenters (Exs. 93-74 and 93-85), was not as clear as it should be. Accordingly, the Agency changed the language to parallel the relevant provision of the Washington State Industrial Code, WAC-296-56-520.

Section 1917.20 Interference with communications.

Section 1917.20, as originally proposed, required that noise shall not interfere with the communication of

warnings or instructions during cargo-handling operations (46 FR 4229). Several parties argued that this provision should be limited to only those noise-producing factors at the workplace which are under the employer's control, for noise from such things as aircraft overflights and ship whistles could not be controlled by the employer (Exs. 93-48 and 93-74). However, noise which interferes with the communication of warnings or instructions during cargo-handling is a distinct hazard, whether the employer's activities generate that noise or not. Noise from aircraft overflights and ship whistles is of short duration, and so is more of an annoyance than an interference with necessary communications, but noise from maintenance, construction and repair work can be for periods of longer duration, and can, on occasion, significantly interfere with work communications. Consequently, the Agency's final rule prohibits cargo-handling when noise producing maintenance, construction or repair work interferes with the communication of warnings or instructions.

Section 1917.22 Hazardous cargo.

As proposed, paragraph (b) required that hazardous cargo be handled by netting or restraining ropes to prevent damage to the cargo packaging during handling (46 FR 4229). Interested parties asserted that this provision would, in effect, require the use of netting or restraining ropes in every instance in which hazardous cargo was handled, and such protection is unnecessary when hoisting stable loads (Exs. 93-74 and 93-85). These parties asked that OSHA develop performance language to replace the proposed provision. *Ibid.* As a result of these suggestions, the Agency drafted a new paragraph for the final rule, which requires that hazardous cargo be slung and secured so that neither the draft nor individual packages could fall as a result of tipping the draft or slacking of the supporting gear.

Section 1917.23 Hazardous atmospheres and substances.

Paragraph (a) describes the purpose and scope. The proposal noted that this section covered areas where a hazardous atmosphere or substance may exist (46 FR 4229). Many industry commenters objected to the proposal, arguing that the proposal could be interpreted to hold employers responsible for the previous contents of railcars and containers in situations where the employer had no access to information concerning those contents (Exs. 93-74, 93-78, and 93-85). They

suggested an alternative provision (47 FR 14721) limiting this section to areas in which the employer is aware that a hazardous atmosphere or substance may exist (Exs. 93-74 and 93-85). However, labor representatives objected to the language of the alternative provision, arguing that the alternative was unnecessary, since the Act requires that the Secretary must show actual or constructive knowledge on the part of the employer when citing an employer for a violation of the Act (Ex. 118). During the course of the hearing, however, all parties agreed that their respective interpretation of the term "aware" meant actual or constructive knowledge on the part of the employer (Ex. 332x at 276-277, 330-331). Accordingly, with that mutual understanding in mind, OSHA has adopted the alternative provision for paragraph (a) in the final rule.

Paragraph (b)(1) has been modified in the same manner as paragraph (a). To make a determination of the existence of a hazardous atmosphere, it provides that a designated and appropriately equipped person test the atmosphere before employee entry to determine whether and what type of hazardous atmosphere exists. As in paragraph (a), constructive or actual knowledge is the criterion for establishing awareness as to whether or not a work space contains or has contained a hazardous atmosphere. Originally set out as an alternative provision (47 FR 14721), this paragraph was well supported by interested parties (Exs. 100-3, 100-9, 100-10, 100-21, 100-31, 100-37, and 100-43).

Paragraph (d)(3) has been modified to combine proposed paragraphs (d)(3) and (d)(4). Accordingly, except for emergency or rescue operations, employees shall not enter into any atmosphere identified to be flammable or oxygen deficient. In those cases where entry is necessary, proper instruction shall be afforded to employees about all dangers inherent to those atmospheres and about the proper use of self-contained breathing apparatus, the use of which is mandatory. Several parties thought that the wording of paragraph (d)(4), as proposed, was too vague, and could be interpreted to appear to permit employees to enter flammable or oxygen deficient atmospheres (Exs. 93-40, 93-64, and 98-4). In addition, another party objected to the use of supplied air respirators in these atmospheres, pointing out that their use was not recommended by safety equipment manufacturers and would "surely result in future fatalities" (Ex. 93-1). First

presented as an alternative provision (47 FR 14721-14722), this rule gained wide acceptance by the major interested parties who submitted written comments (Exs. 100-3, 100-9, 100-10, 100-31, and 100-43). One commenter, however, asked that the word "oxygen" be deleted from the phrase "self-contained oxygen breathing apparatus," because, with the exception of re-breathing equipment, air, not oxygen is used in self-contained breathing apparatus (Ex. 100-21). This suggestion has also been incorporated in the final rule.

Paragraph (d)(4) is a new addition that was suggested by some participants during the rulemaking and supported in written comments by many others (Exs. 98-4, 100-3, 100-9, 100-10, 100-21, and 100-37). It provides that warning signs or equivalent means (guards, locks, etc.) be supplied at all access points or spaces that have been identified as being hazardous.

Section 1917.24 Carbon monoxide.

Paragraph (a) has been modified to establish a ceiling of 100 parts per million (PPM) (0.01%). OSHA has proposed a 75 PPM ceiling. However, the rulemaking record reflects no substantial support for that figure. Numerous commenters argued against the proposal, stating that its adoption would promote regulatory confusion, since OSHA's shipboard longshoring requirements (Part 1918) set a ceiling of 100, as opposed to 75 (Exs. 93-23, 93-51, 93-74, 93-84, 93-85, and 93-91). All of these commenters noted that OSHA had provided no scientific evidence of any form as a reason for going to the lower ceiling level. *Ibid.* After closely examining these comments, OSHA has decided to adopt a 100 PPM ceiling in place of the proposal's 75 PPM ceiling.

Paragraph (c) has been expanded to allow employers to test for CO concentrations with instruments other than gas detector tubes certified by NIOSH. A commenter alerted the Agency to the fact that there are many excellent direct reading carbon monoxide detection instruments on the market that are far more accurate than detector tubes (Ex. 93-78). Accordingly, OSHA changed the provision to permit the use of NIOSH-certified detector tubes and other measuring instruments whose accuracy is as great or greater than the detector tubes.

Section 1917.25 Fumigants, pesticides, insecticides and hazardous preservatives.

Paragraph (a) has been modified in the same manner as §§ 1917.23(a) and (b)(1). If the employer is aware through

either constructive or actual knowledge that cargo in a space has been stowed, handled, or treated with a fumigant, pesticide, insecticide or hazardous preservative, he must make a determination as to whether a hazardous atmosphere exists.

Section 1917.26 First aid and lifesaving facilities.

Paragraph (d) has been modified so as to allow for blankets and other suitable coverings to be used in the aid of injured employees. Interested parties objected to the proposal's requirement of a blanket (46 FR 4230), stating that blankets were highly susceptible to pilferage at marine terminals (Exs. 93-48, 93-74, and 93-85). Set out as an alternative provision (47 FR 14722), this rule was greeted with extensive support by those submitting written comments (Ex. 100-9, 100-21, 100-31, 100-37, 100-43, and 100-48), and consequently is adopted by the Agency.

Paragraph (f) provides that a 30-inch U.S. Coast Guard approved life ring, with at least 90 feet of line, be available at readily accessible points at waterside work areas where employees are exposed to the hazard of drowning. As originally proposed, paragraph (f) required these rings within 200 feet of each waterside work area without distinction of hazards (46 FR 4230). Commenters argued that the proposal would require use of life rings whether or not there is any exposure to the hazard of drowning (Exs. 93-74, 93-78, and 93-85). These commenters recommended alternative language, which would provide for life rings where the hazard exists. *Ibid.* Upon review, OSHA found this reasoning to be persuasive and incorporated these suggestions into the final rule.

Section 1917.27 Personnel.

Paragraph (b)(1), as proposed (46 FR 4230), required that within two years of promulgation of this rule, supervisors of more than five persons shall possess documentary evidence of satisfactory completion of a course in accident prevention. Commenters observed that the proposal was vaguely worded, in that, as written, it could require accident prevention and training for office managers and other persons not involved with cargo-handling (Exs. 93-74 and 93-85). Others argued that documentary evidence of such training was not necessary to achieve good safety performance because employers can establish this fact through use of other means (Ex. 93-27, 93-85, and 98-1). Those submitting comments also emphasized that safety courses for supervisors involved in cargo-handling

operations is already provided by many employers (Ex. 93-85). In light of these comments, OSHA has altered the provision to require that after two years from promulgation of the final rule, immediate supervisors of cargo-handling operations involving more than five persons shall satisfactorily complete a course in accident prevention.

Paragraph (b)(2) as proposed outlined course components concerning safety that are considered rudimentary in scope in their application to the majority of this Nation's ports. In its proposal, OSHA required these components to be mandatory. The rulemaking record (Exs. 93-85 and 93-97) reflects information that has led the Agency to conclude that the advisory nature of this provision will enhance safety by allowing employers to create programs best suited to the individual characteristics of their particular operations.

Subpart C—Cargo Handling Gear and Equipment

Section 1917.42 Miscellaneous auxiliary gear.

When originally proposed, paragraph (a)(2) required loose stevedoring gear to be inspected during use (46 FR 4230). However, some commenters argued that this practice would be extremely expensive and time consuming (Exs. 93-58, 93-84, 93-91, and 98-6). They stated that loose gear is routinely inspected before use. *Ibid.* Moreover, another party pointed out that both ANSI MH9 and § 1918.61(a) provide that inspection of loose gear during use shall be conducted "when necessary" (Ex. 93-74). This party remarked that the degree of inspection for loose gear varies, in that some loose gear such as wire rope slings should be inspected frequently during use, whereas hooks and shackles generally need only be inspected prior to each day's use. *Ibid.* Upon reviewing these comments, OSHA amended this paragraph to require inspection of loose gear before each use, and when necessary, at intervals during its use.

Paragraph (b)(1), as proposed (46 FR 4230-31) required an employer to ascertain and adhere to the manufacturer's use ratings for wire rope and wire rope slings used for hoisting. Commenters pointed out that since some manufacturers were out of business, no ratings would be available (Exs. 93-54, 93-58, 93-84, 93-91, and 100-49). In response to this matter, OSHA has changed the final rule so that when the manufacturer is unable to supply such ratings, the employer shall use the tables for wire rope and wire rope slings found in ANSI B30.9-1971. The Agency

does stress that this alternative is acceptable "when the manufacturer is unable to supply such ratings" and would point out that effort must be made to secure those ratings before this alternative is employed.

Paragraph (f) proposed that properly fitting thimbles be used where any rope is secured permanently to a ring, shackle or attachment. However, commenters alerted the Agency to the fact that there are situations where, due to the size of the rope and the physical limitations of using the rope, thimbles are not always practicable (Ex. 93-96). For example, it is a common practice to use ropes for barge rigging, which utilize woven-in eyes for looping over large attachments—but a thimble large enough to fit over a large attachment would make the eye too heavy to use for rigging purposes. *Ibid.* Consequently, paragraph (f) of the final rule calls for use of thimbles "where practicable."

Paragraph (g)(3), as proposed, prohibited the repair and re-entering into service of damaged synthetic web slings (46 FR 4231). However, several commenters argued that these slings have been successfully repaired and reused and that it was unreasonable to preclude these actions (Ex. 93-7, 93-23, and 93-51). Accordingly, the Agency will allow repair and reuse of synthetic web slings, but only under certain, restricted conditions. The repairs may be undertaken by reputable sling manufacturers or other similar establishments, such as reliable cordage suppliers. Each repaired sling must be proof tested by the repairer to twice the rated capacity of the sling prior to reservice. The employer shall retain a certificate of the proof test and have it available for examination upon request. These conditions were first set out in the form of an alternative provision (47 FR 14723), which gained substantial support from interested parties (Exs. 100-3, 100-9, 100-10, 100-21, 100-37, 100-43, and 100-48).

Paragraph (g)(4), as proposed, stated that all synthetic web slings be used with the manufacturer's use recommendations, which were to be available (46 FR 4231). OSHA was informed, though, that it is sometimes impossible to gain control of all slings' use recommendations, particularly in the case of pre-slung inbound cargoes (Ex. 93-74). The Agency has, as a consequence, modified this provision to state that synthetic web slings *provided by the employer* be used in accordance with manufacturer's use recommendations.

Paragraph (i), as proposed, called for the employer to adhere to the manufacturer's recommended ratings for

safe working loads for the sizes of wrought iron and steel alloy chains and chain slings used (46 FR 4231). It has been modified in a manner similar to paragraph (b)(1) and for the same reason. The revised wording allows for the use of chains and chain slings without manufacturer's ratings, if the employer uses the chains in accordance with the rating table for chains and chain slings that appear in ANSI B30.9-1071. It must be emphasized that this alternative can be utilized only after it has been ascertained that "the manufacturer is unable to provide such ratings."

Paragraph (k) has been modified to require that reusable pallets "used for hoisting" have fastenings of bolts and nuts, drive screws, etc., whereas the proposal (46 FR 4232) did not contain this qualifying phrase. Testimony (Ex. 301x at 46-47) included in the public record indicates that pallets used in transit shed or consolidation station operations are moved almost exclusively by forklift trucks, and as such do not require the type of construction necessary for pallets that are hoisted by other forms such as bar bridles and wire rope slings of lifting gear. This provision now recognizes and allows for those situations.

As proposed, paragraph (k)(2) provided that damaged pallets be removed from the work area, be identified as damaged and stored away from the work area (46 FR 4232). Some commenters contended that the proposal was confusing with regard to the removal of pallets from the "work area," since the "work area" of a marine terminal could be seen to encompass most, if not all, of the entire terminal (Exs. 93-10 and 93-74). These commenters suggested an alternative provision, which called for storing damaged pallets in designated areas, and identified as damaged. *Ibid.* OSHA has adopted this suggestion in its final rule.

Section 1917.43 Powered industrial trucks.

Paragraph (b)(1), as proposed (46 FR 4232), required that no modifications affecting capacity or safety be undertaken on powered industrial trucks, unless prior approval had been obtained from the manufacturer or from a professional engineer experienced with the particular equipment, who has consulted with the manufacturer. Based on written comments submitted to the record (Exs. 93-48, 93-58, and 93-74), OSHA has modified this provision to take into account those situations in which the manufacturer is no longer in business. It must be understood that if

the manufacturer is available, every effort must be made to secure its input.

Paragraph (b)(10), as proposed, stipulated that steering knobs were prohibited from usage (46 FR 4233). However, commenters informed OSHA that these knobs *formerly* presented a hazard on small industrial trucks due to wheel spin and poor steering control, but power steering had eliminated these hazards (Exs. 93-26, 93-74, and 93-85). Accordingly, OSHA has altered this provision to allow the use of steering knobs on trucks with power steering.

Paragraph (b)(11), as proposed, provided that the operator of a powered industrial truck actually "see" that cargo was positively engaged, if the means of engagement was "ordinarily hidden" from the operator's station (46 FR 4233). Typically, this sighting is achieved by mirrors. Commenters remarked that a ground spotter or equipment panel lights on the operator's console may safely allow the operator to "determine" that the cargo has been engaged without actually seeing the engagement for himself (Exs. 93-74 and 93-85). This concept was set out as an alternative provision (47 FR 14723-14724) and was strongly supported by interested parties (Exs. 100-3, 100-9, 100-10, 100-21, 100-31, 100-37, and 100-43).

The final rule has been changed to reflect this information, and so holds that when lifting devices on powered industrial trucks 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.

Paragraph (b)(12) was not proposed by OSHA but was suggested as an alternative provision by the International Longshoremen's and Warehousemen's Union (Ex. 98-4). The union urged the Agency to adopt a provision which protects vehicle operators from sliding loads, noting that Rule 1220 of the Pacific Coast Maritime Safety Code (Ex. 20) requires "when towing cargo on pipe trucks or similar equipment, a safe means shall be taken to protect the driver from sliding loads." Put forward as an alternative provision (47 FR 14724), this rule was well-supported by parties submitting written comments (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-30, 100-37, and 100-43). Accordingly, OSHA has included this additional provision in the final rule.

Paragraph (c)(2), as proposed (46 FR 4233), required that batteries on trucks be disconnected from the primary electrical system during repairs, unless power is necessary for testing and repair. One commenter alerted the

Agency to the additional need to discharge capacitors on certain types of electric trucks before performing maintenance, so as to prevent shock injuries (Ex. 93-26). Therefore, the Agency has added a requirement that provides for the safe discharge of residual energy on trucks having electrical systems capable of storing energy.

Paragraph (c)(5) had provided that trucks be both maintained in safe working order and inspected by an authorized person on each day of use (46 FR 4233). However, several commenters argued that including both the maintenance and inspection requirements was unnecessary, in that a requirement to maintain trucks in safe working order implied that some type of preventive maintenance program would already have to be in effect (Exs. 93-48, 93-74, and 93-85). This recommendation was presented as an alternative provision (47 FR 14724), and was greeted with extensive approval (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-31, and 100-43). Upon review, OSHA agrees with the written commenters concerning the regulatory overlap of this regulation, and has incorporated the alternative provision into the final rule. However, it must be understood that the determination that the truck is in safe working order involves some form of inspection. Whether that inspection is made part of a maintenance program or other equally effective programmed check is left to the discretion of the employer.

Paragraph (d)(2), as proposed, required all approved trucks to bear a label or other identification indicating testing laboratory approval (46 FR 4233). Certain industry parties contended that this labelling requirement should pertain only to those trucks acquired after the effective date of this standard, arguing that some older trucks would have difficulty complying with this provision (Exs. 93-48 and 93-74). However, this labelling requirement, present in OSHA's General Industry standards, has been in effect since February 15, 1972, for all trucks acquired as of or after that date. See 29 CFR 1910.178(a)(2), (3); 29 CFR 1910.182(b). As these standards have been applicable to marine terminals since their 1972 promulgation there should be no significant problem with complying with an altered paragraph (d)(2), whose labeling requirement is the same as that of the General Industry rule.

Paragraph (e)(4), as proposed, required that truck counterweights be affixed so that they could not be dislodged (46 FR 4233). It has been

modified to reflect that there are indeed times when counterweights can be taken off and on (Exs. 93-74 and 93-85). The intent of this provision is, of course, to prevent accidental, unplanned dislodgement.

Paragraph (f)(2) has been revised from the proposal (46 FR 4233) to correct a technical misstatement in the language of the proposal, which was brought to the Agency's attention by commenters (Exs. 93-74 and 93-85). The strength requirement concerning truck guards is now correctly stated as "a load applied horizontally at the operator's shoulder level equal to the drawbar pull of the machine."

Paragraph (g)(3) as proposed (46 FR 4234) stated that truck operator visibility shall be provided in all directions by mirrors or equivalent means. Several commenters criticized this proposal as vague and impossible to comply with (Exs. 93-74 and 93-85). During the public hearing, industry spokesmen were asked if OSHA changed the language of this rule to "Operator visibility shall be provided in all directions of movement," whether the amended rule would be considered cured of its deficiency (Ex. 332x at 291-292). This suggestion was greeted affirmatively, and has consequently led the Agency to alter this provision in the manner presented at the hearing.

Section 1917.44 General rules applicable to vehicles.

Paragraph (b) as proposed prohibited parking areas for private vehicles from being concurrently used for cargo or other storage (46 FR 4234). Commenters informed OSHA that there has been no substantial, expressed adverse experience in allowing concurrent usage and that current U.S. Coast Guard regulations (33 CFR 126.15(d)(5)) in fact allow this practice (Exs. 93-45, 93-74, and 93-85). OSHA has determined that as long as vehicles are parked in specified parking areas, the presence of cargo should not present any significant hazard. Therefore, as modified, paragraph (b) provides that private vehicles may park only in designated areas. This modification was suggested first by interested parties (Exs. 93-74 and 93-85), and later set out as an alternative provision (47 FR 14724).

Paragraph (j), as proposed, required that a 20 foot space be provided between any two vehicles in any truck line (46 FR 4234). Numerous commenters objected to this provision, all of them arguing that the only times such a distance between trucks is needed are when trucks are being inspected or checked right at the terminal gate or under the crane loading "hook" (Exs. 93-

7, 93-10, 93-23, 93-30, 93-45, 93-48, 93-53, 93-54, 93-60, 93-74, and 93-85). Many of these parties argued that this spacing requirement should apply to only the first two vehicles in line, since it is only these vehicles which are being inspected, and which employees would be in between (Exs. 93-7, 93-10, 93-23, 93-30, 93-45, 93-53, 93-54, and 93-60). Upon review, OSHA agrees but notes that, on occasion, employees are required to work behind vehicles other than the first two in line. Accordingly, OSHA has altered the final rule to provide more flexibility to the employer, but to protect employees working between vehicles.

Paragraph (k), as proposed, required that no unattended vehicle be left with its engine running (46 FR 4234). Commenters, though, pointed out that the hazard was not a running engine, but uncontrolled movement of the vehicle (Exs. 93-48, 93-54, 93-74, and 93-85). Others remarked that the provision did not take into account that diesel-powered trucks are not meant to be turned on and off, since such action will cause undue wear on the truck's power plant (Exs. 93-54, and 93-58). In addition, a parallel provision concerning powered industrial trucks, § 1917.43(b)(3), allowed more flexibility. Consequently, the Agency has modified the provision to require that no unattended vehicle shall be left with its engine running unless secured against movement.

Section 1917.45 Cranes and derricks.

Paragraph (a)(2), as proposed (46 FR 4235), stated that this section did not apply to small industrial truck-type cranes and chain hoists. It has been modified in reaction to commenters' concerns that some container handling equipment such as top loaders and side loaders which perform lifting tasks could be mistakenly classified as cranes (Exs. 93-74 and 93-85). These categories have therefore been added to the list of items in paragraph (a)(2). These pieces of equipment are properly classified as large industrial type trucks, and the requirements of § 1917.43 would apply to them.

Paragraph (b)(3) as proposed required that the approval of an organization accredited under the provisions of Part 1919 of this Chapter was necessary before an increase beyond the manufacturer's ratings or design limitations could be established for any crane or derrick, if the manufacturer was not available (46 FR 4235). Some interested parties observed that this might not assure protection, since not all the organizations accredited under Part

1919 for certifying equipment possess the in-house expertise in crane engineering design analysis (Exs. 93-48 and 93-74). These groups recommended that OSHA also require that the engineering design analysis be performed by a registered engineer competent in the field of cranes and derricks. This suggestion was set out as an alternative provision (47 FR 14724) and received wide support from written commenters (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, and 100-43). Accordingly, OSHA included the alternative language in its final rule.

Paragraph (d)(2) as proposed provided that no crane or derrick be used if it has an operational defect (46 FR 4235). One commenter argued that limiting this provision merely to operational defects was too narrow, in that structural defects might also affect safe use of the crane (Ex. 98-4). Others pointed out that some operational defects, such as a broken wiper blade on a dry day, do not affect the safe operation of the crane (Exs. 93-31 and 93-54), while still others advocated that OSHA rewrite the provision to state "no crane or derrick having visible or known defects that affect safe operation shall be used" (Exs. 93-58, 93-91, and 98-6). Upon reviewing this language and the concerns of the commenters, OSHA decided to replace the proposal with this language, believing that this alternative wording effectively addresses the issues raised by the parties stated above. This provision was also presented as an alternative rule (47 FR 14724).

Paragraph (e)(1) as proposed required the guarding of all exposed moving parts on cranes and derricks during operation (46 FR 4235). One commenter suggested that OSHA modify the proposal so that guarding is required when these exposed parts present a hazard (Ex. 93-10). OSHA recognizes that not all exposed parts present a hazard (e.g., those located 10 feet above a working surface), and so has accepted the recommendation of the commenter.

Paragraph (f)(1)(ii) as proposed required self-centering controls on all cranes and derricks (46 FR 4235). Interested parties (Exs. 93-7, 93-58, 93-61, 93-70, and 93-74) clearly expressed support for a modification of this provision. The record establishes the infeasibility of self-centering controls on many types of cranes and derricks. Some cranes such as whirley cranes would be extremely difficult, if not impossible, to operate with the additional installation of control levers for self-centering devices. Also, this requirement would not allow multi-dimensional moves by mobile cranes.

As a consequence, self-centering controls will be required on overhead bridge and container handling gantry cranes only. This requirement is effective one year after the effective date of this rule to allow owners and operators a reasonable amount of time to modify existing equipment, if necessary.

Paragraph (f)(4)(iv) has been expanded from its proposed form (46 FR 4235) to include a requirement that establishes a system of communication between the operator's cab and the foot of any ladder or accessway upon which an employee could be struck by moving parts of the crane. A commenter stated that workers had been knocked off ladders by motion of a crane's revolving house so that it is necessary for those about to use a crane ladder or stairway to receive acknowledgement from the crane operator as to their presence (Ex. 98-4). The system will allow the employee to alert the operator of his presence on the crane, allow the operator to acknowledge that presence and provide for an "all clear" notification to the operator when the employee has reached an area away from any hazard posed by moving parts. The original proposed requirement of posting a prominent warning sign at the hazardous location on any ladder or stairway has also been carried forward into this final rule. This provision was also first set out as an alternative rule (47 FR 14725).

Paragraph (f)(8), as proposed (46 FR 4235), required that crane engine exhaust gases be discharged away from areas in which employees are working. However, one commenter reported that the engines on its portal cranes were below the crane operator's level, and "any position in the 360° circle of swing could be a normal work area" (Ex. 93-54). Another commenter (Ex. 93-78) noted that in the proposal's preamble (46 FR 4203), OSHA cited to Rule 1432 of the Pacific Coast Maritime Safety Code as partial justification for the promulgation of the rule, but that the PCMS rule itself only required that these gases be discharged away from the normal working position of crane operating personnel. Because such personnel are the only employees who would always be directly exposed to the crane exhaust, this commenter and others indicated that this provision should be directed specifically at their exposures (Exs. 93-78, 93-84, 93-91, and 98-6). In response to these comments, the Agency set out such an alternative provision (47 FR 14725), which drew a favorable response from interested parties (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, and

100-43). Accordingly, OSHA adopted the alternative language in its final rule.

Paragraphs (f)(13) (i) and (ii), as proposed, provided that two means of braking be available on each independent hoisting unit of every crane or derrick, and that each brake be capable of sustaining one and one half times the crane's rated load (46 FR 4236). Some of those submitting comments attacked this provision as either unnecessary, over restrictive or too costly (Exs. 93-29, 93-36, 93-5, 93-58, and 93-59). Others pointed out that the 150% braking requirement could only be obtained on electrically powered cranes (Exs. 93-84, 93-91, and 98-6). More importantly, additional commenters informed OSHA that normal industry practice was to provide cranes with one holding brake and one controlled means of braking, a practice which was already embodied in the requirements of ANSI B30.2 (1976), Section II-1.9. The Agency listed these ANSI requirements as an alternative provision (47 FR 14725), which was widely supported by interested parties (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-31, and 100-43). In view of the fact that the proposed requirements may be unworkable for other than electrically powered cranes, and that the industry practice, as set out in the ANSI requirements and the alternative provision, has been effective, OSHA has decided to adopt the alternative provision in its final rule. OSHA believes that the ANSI provision for braking systems will provide more flexibility for marine terminal employers without compromising the safety of employees.

Paragraph (g)(3), as proposed, provided that all rail-mounted cranes be fitted with operable wind-indicating devices (46 FR 4236), which would "read out" the wind speed in the operator's cab (46 FR 4236). Interested parties criticized the proposal on several grounds, some noting that the rule should be rewritten for the sake of clarity (Ex. 93-78). Some commenters contended that wind-indicating devices are not needed on all types of rail-mounted cranes because some cranes such as whirley cranes do not present the wind surface of a container crane, and therefore are not subject to the hazards of high winds as are larger cranes (Ex. 93-7). Moreover, still other commenters noted that crane cab readout devices had proved unreliable, in that the readout's low voltage signal sent to the crane's cab was not always received, due to the voltage transmitted through long lengths of flexible wire (Exs. 93-48 and 93-74). Different ports

reported that their cranes were already equipped with audible wind alert devices, and that these devices had proved effective (Exs. 93-51 and 93-59). In addition, the Agency was informed that rail-mounted container cranes on the West Coast are required to have wind-indicating devices which give visible or audible alerts to crane operators (Ex. 93-85; Ex. 20—Rule 1429 of the Pacific Coast Maritime Safety Code). Furthermore, others called for more flexibility, proposing that the "warning speed" be established by the crane owner, not exceeding the crane manufacturer's recommendations (Exs. 93-54, 94-84, 93-91, and 98-6).

OSHA has reviewed these and other comments and has determined that paragraph (g)(3) should be revised to provide more flexibility, while providing protection equivalent to that of the proposal. Therefore, paragraph (g)(3) has been modified and expanded (paragraph (g)(3)(ii) (A) and (B) have been incorporated for greater continuity) to now require that each rail-mounted bridge or portal crane located out of an enclosed structure be fitted with an operable wind-indicating device. The device must provide either a visible or audible warning to the operator of the crane that will alert him or her of high wind conditions. Those high wind conditions are characterized as: (1) The warning speed—which can be any speed selected by the employer, provided it does not exceed the crane manufacturer's recommendations. At the warning speed, all gantry travel is stopped and steps are initiated to prepare for crane shutdown; and (2) the shutdown speed—which can also be any speed selected by the employer, provided the manufacturer's recommendations are not exceeded. At the shutdown speed, work is stopped and the crane secured. This provision was listed previously as an alternative provision (47 FR 14725).

Paragraph (g)(3)(iv), as proposed (46 FR 4236), dealt with instructions provided to the crane operator. Review of the record (Exs. 93-53, 93-76, 93-78, and 100-1) revealed a need for greater clarity concerning this provision. The Agency's modification of (g)(3)(iv) has not altered any requirement, but has made the meaning of the provision more clear. Instructions for operating in high wind conditions must be posted in crane cabs; the employer must direct operators to comply with the instructions, and; the instructions must cover procedures for responding to alerts transmitted during warning and shutdown speed, including what methods of operation to employ for

coordination with other cranes sharing the same or adjacent railways.

Paragraph (g)(4)(i)(B) had provided that at the attainment of the crane's shutdown speed, any portion of the crane spanning or partially spanning a vessel be moved clear of the vessel (46 FR 4236). A review of the record (Exs. 93-48, 93-53, and 93-74) reveals that, in some emergency situations, this may not be advisable. In some high wind conditions, it would be more prudent to secure the crane where it stood, rather than trying to move it to another location, and having the wind blow the crane away in the process. As a consequence, OSHA has stipulated in the final rule that this movement shall be effected "if safe to do so."

Paragraph (g)(10) has been modified to allow for the recognition of hand signalling as one means of communication between the operator of a gantry crane and the operation below, provided that it is not the sole means. Commenters argued that the use of hand signals in crane operations should not be prohibited, as the proposal would have done (Exs. 93-58, 93-74, and 93-85). However, review of relevant accident data reveals that, in terms of accident frequency, there has been an adverse impact on employee safety, when hand signalling was employed as the sole means of communication between the operator's station of some rail-mounted cranes and the base or operation point of these cranes. Employees may misinterpret the hand signals, the wrong hand signal may be sent or, because of distance of obstructions, the employee may just not be able to see the hand signal. Therefore, hand signalling alone is unacceptable. Accordingly, hand signalling will be permitted, but only when it is used in conjunction with telephone, radio, a sound signalling system, or some other equally effective method of communication. This change was first listed as an alternative provision (47 FR 14726). The proposal denied use of hand signals (FR 4236).

Paragraph (j)(1)(i), as proposed, only specified one acceptable method by which employees could be hoisted by the load engaging apparatus of a crane or derrick, that method being "in a boatswain's chair rigged to prevent it from accidental disengagement from the hook or supporting member" (46 FR 4237). Commenters remarked that the specificity of this paragraph would restrict usage solely to a boatswain's chair, thereby eliminating the possibility that something superior could be used, and so argued that the rule be changed to allow for greater flexibility (Exs. 93-

58, 93-74, 93-84, 93-91, 98-6).

Accordingly, this paragraph has been expanded to include other device(s) which would provide equivalent safety, such as specific design tested safety harnesses.

Paragraph (j)(2), as proposed, provided that all cranes or derricks used to hoist personnel must have hoisting mechanisms that operate in power up and power down only, with automatic brake application being provided when the crane is not hoisting or lowering (46 FR 4237). Commenters informed OSHA that some boom type mobile cranes would require extensive engineering redesign and modification to achieve compliance and, in the case of many other mobile cranes, compliance would not be technologically feasible (Exs. 93-78 and 100-29). Accordingly, this paragraph is modified to apply to only overhead and container handling gantry cranes. This provision was listed previously as an alternative rule (47 FR 14726).

Paragraph (j)(8), as proposed, prohibited crane travel while an employee was hoisted, except in emergencies (46 FR 4237). Interested parties submitting comments on this provision, however, found the proposal to be too stringent, for they noted that it is a common practice for cranes to transfer employees to and from container tiers of different heights which are located on a ship's deck (Exs. 93-48, 93-74, 93-78, and 93-85). These commenters argued that this method of employee transfer was far safer than the use of ladders or bridges to gain access to container tops, because employee exposure to falling hazards was greatly reduced. *Ibid.* Consequently, OSHA altered this paragraph in its final rule to allow for crane travel in normal tier to tier transfer of employees during container operations.

Paragraph (k)(3), as proposed (46 FR 4237), required that any crane defects found during routine daily inspection would have to be repaired before further equipment use. Commenters, though, observed that certain minor defects, such as a missing wiper blade on a dry day or an inoperative headlight, which do not affect safe operation, are normally corrected during periodic maintenance checks and so should not halt daily crane operation (Exs. 93-78 and 93-85). Others argued that an adjustment in the standard's language should be made so as to allow the crane to continue to operate when minor, non-safety related defects are uncovered (Exs. 93-54, 93-84, 93-91, and 98-6). After taking these remarks into account, the Agency decided to alter this

provision, so as to require corrective action when the observed defect may create a safety hazard. This alteration was originally set out as an alternative provision (47 FR 14726).

Section 1917.48 Conveyors.

Paragraph (d)(1), as proposed, required that brakes or equivalent means be provided to stop objects at the delivery end of the conveyor (46 FR 4238). Commenters argued for the rewording of this provision, to limit its application to only those situations where it was "necessary for safe operation" of the conveyor (Exs. 93-58, 93-84, 93-91, and 98-6). This suggested change was listed as an alternative provision (47 FR 14726), which drew significant support from interested parties (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, and 100-43). Accordingly, the Agency has modified this paragraph to account for the fact that stopping objects by brakes may not be necessary if employees are not subject to being struck by those objects, or will not be injured by conveyor malfunction caused by the failure to stop conveyed objects.

Paragraph (i)(1), as proposed, provided that unless necessary for testing, power to conveyors undergoing maintenance, repair or servicing be locked out (46 FR 4238). However, interested parties indicated the need for provision requiring both lock out and tag out of conveyors (Exs. 93-58, 93-78, 93-84, 93-84, 93-91, and 98-6). Support for strengthening the proposal in this manner was reiterated at the hearing (Ex. 300x at I-98). The Agency agrees, for tagging gives notice of reasons why the system is locked out, and why it is necessary *not* to unlock the system. OSHA has therefore changed the paragraph to provide the conveyor power sources be locked out and tagged during maintenance, repair or servicing, unless power is necessary for testing.

Paragraph (i)(2), as proposed, provided that the conveyor's starting device be locked out before attempts are made to remove a jam or overload that has stopped the conveying medium (46 FR 4238). An alternative provision (47 FR 14726) added a tag out requirement to the proposal. This alternative was well supported by parties submitting comments (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, 100-43 and 133). OSHA has therefore amended the proposal, so that the final rule contains both lock out and tag out requirements.

Section 1917.49 Spouts, chutes, hoppers, bins and associated equipment.

Paragraph (b), as proposed, required that "instantaneous and direct" communication be provided between shipside ends of cargo flow and the point within the terminal from which flow is controlled. Commenters argued that the term "instantaneous" in this setting was undefinable, and that the word was not needed in this context (Exs. 93-48, 93-74, and 133). After re-examining the provision, OSHA agrees with the commenters, and has deleted the term from the final rule.

Paragraph (c), as proposed, required all chute and hopper openings to be guarded (46 FR 4238). However, one commenter pointed out that the Agency should only require guarding when there is a potential for employee exposure (Ex. 93-96). In light of these considerations, other commenters recommended that the language of the proposal be changed so that the guarding requirement applied only in those situations "when necessary for the safety of employees" (Exs. 93-58, 93-84, 93-91, and 98-6). After re-examination of these comments, OSHA has adopted this more flexible approach, and has included the suggested language in its final rule.

Paragraph (e), which originally required that all chutes be equipped with sideboards (46 FR 4238), has been modified in a manner similar to paragraph (c). The additional phrase "when necessary for the safety of employees" was suggested by commenters (Exs. 93-84, 93-91, and 98-6), and was accepted by OSHA in its final rule.

Paragraph (g), which required that brakes or equipment means be provided at the delivery end of chutes (46 FR 4238), has been modified in the same manner as paragraphs (c) and (e). Many operations are such that no employees ever enter the area about the delivery end of the chute. Additionally, commenters (Exs. 93-48 and 93-74), informed OSHA that stopping gravity bulk material flow is impractical and can create the additional hazard of equipment overload. That fact, coupled with lack of employee exposure at the delivery end of a bulk commodity chute, has caused OSHA to exclude such chutes from the braking requirement.

Paragraph (h)(2) has been modified to include the shutdown, locking and tagging of the power supply to the equipment carrying cargo to empty bins, as part of personnel entry procedures into the bins themselves. As originally proposed (46 FR 4239), only power turn-off and lockout was required. However,

interested parties (Exs. 93-58, 93-84, 93-91, and 98-6) urged OSHA to include a tagging requirement, as well as lockout requirement. As discussed previously, OSHA recognizes that tagging gives notice of the reasons why the system is locked out, and why it is necessary not to unlock the system, thus serving as and added, protective measure of safety. Accordingly, the Agency added this safety requirement to the provision in the final rule. This addition was first listed as an alternative provision (47 FR 14726), and was well supported (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, 100-43, and 133).

Paragraph (i)(2), like paragraph (h)(2), has been modified to include the shutdown, locking and tagging of the power supply to the equipment carrying cargo to bins containing bulk commodities, as part of the employee entry procedure into the bins themselves. The proposal only required power turn off and lockout (46 FR 4239). The same interested parties requesting modification of paragraph (h)(2) also requested it of this provision (Exs. 93-58, 93-84, 93-91, and 98-6).

Paragraph (j), which as proposed required gratings or other equally protective coverings means on bin top openings (46 FR 4239), has been modified to require such protection only when such bin top openings present a hazard. This change was suggested by interested parties (93-58, 93-84, 93-91, and 98-6), set out as an alternative provision (47 FR 14727), which was subsequently well supported (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-16, 100-21, 100-37, and 100-43).

Paragraph (l)(3) has been modified in the same manner as paragraph (h)(2), in that OSHA's proposal required the shutting off and locking out of power to power shovels before adjustments are made to any power shovel, wire, or associated equipment (46 FR 4239). The record supports the use of a tagging procedure (Exs. 93-58 and 93-91) so, for the reasons presented in paragraph (h)(2), it has been included. The balance of the provision remains as proposed.

Section 1917.50 Certification of marine terminal materials handling devices.

Paragraph (a)(1) is a new provision that has been added to provide clarification to this section. A commenter noted that OSHA policy provides that 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 manufacturer's

specifications without affecting the established certification status for the equipment (Ex. 93-42). This organization urged OSHA to set this policy out explicitly in this section. *Ibid.*

Accordingly, paragraph (a)(1) sets forth the Agency's policy on matters relating to crane certification by specifying that surveys be conducted for the "conditions of use" found at the time. In other words, were an accredited organization to undertake a survey of a shore pedestal crane on a given day and on that day the crane was fitted with a clam shell bucket, the resulting survey would indicate that such was the case. However, if the employer has need to fit the crane with a magnet or a cargo hook on another occasion within the period of certification, he can certainly do so provided the configuration[s] he employs is consistent with the crane manufacturer's specifications. Such an action would not affect certification status of the crane.

Paragraph (a)(2) is also a new provision that has been included, again for clarification sought by the public (Ex. 93-42). A commenter asked that this section address cranes of foreign manufacture, noting that § 1919.71(c) requires a certifying authority to certify that the manufacturing specifications of such cranes are equivalent to U.S. practice. *Ibid.* Consequently, OSHA has adopted a requirement for marine terminals, providing that an owner's warranty of design adequacy be secured for all foreign manufactured cranes. Additionally, this provision states that the warranty must be predicated on a thorough examination of the design specifications by a registered professional engineer who is familiar with this particular equipment.

Paragraph (c)(1), as proposed, provided for a unit proof test annually (46 FR 4239). The Agency put forward this provision largely in consideration of the heavy duty cycles which many cranes, including container cranes, are subject to. However, interested parties (Exs. 93-48, 93-59, and 93-78) contended that existing international, Federal and state requirements [none of which provide for a yearly proof test] are "quite adequate" and provide "substantial protection." As a result of these comments and review of the relevant provisions of Part 1919, the Agency has determined that yearly proof tests are not necessary to assure safe operation. Therefore, OSHA has withdrawn the proposed requirement for a yearly proof test in favor of the current requirements in this section and in Part

1919 that stipulate annual examination and quadrennial testing.

Paragraph (c)(2) has been modified to allow for a certification called for by interested parties (Exs. 93-84, 93-91, and 93-6). As proposed, "inspections" of bulk cargoes, spouts and suckers were required to take place annually. A more appropriate term is "examinations" (see Definitions—§§ 1917.2(l) and (r)).

Paragraph (c)(3), as proposed (44 FR 4239), called for annual inspections of vertical pocket or bucket conveyors. As with paragraph (c)(2), commenters believed that the more rigorous annual examination, as outlined in § 1917.2(1), was the type of survey the Agency actually intended for this equipment in drafting this paragraph, and so suggested that the Agency substitute the term "examination" for "inspection." OSHA has accepted this suggestion.

Paragraph (c)(4)(i), concerning the testing and certification of house fall cargo handling gear, has been slightly modified for reasons of clarity, in response to a commenter (Ex. 93-58) who found the proposal to be confusing. The specified gear must be proof tested to 25% in excess of its safe working load upon initial certification and every four years after. Examinations of all supporting components and structures must be undertaken upon initial certification (at the time of proof testing) and every year after. No substantive change has been made from the proposal.

Paragraph (d), as proposed (42 FR 4239), noted that the disassembly or reassembly of equipment necessary for movement from job to job, or which does not affect the equipment rating will not nullify the validity of the equipment's certification. Commenters (Exs. 93-74 and 93-85) complained that the requirement was not clear, and could mean that the addition of boom lengths to the crane would require crane recertification. As it was not OSHA's intent to require recertification each time the crane's configuration was altered (see § 1917.50(a)(1)), this paragraph has been rewritten to more clearly express this intent.

Paragraph (f), as proposed, required that in addition to certification procedures, all certified equipment be maintained in accordance with the manufacturer's maintenance procedures (46 FR 4239). Certain interested parties expressed their preference for the regulatory language of § 1918.13(h), which states that certification procedures shall not be construed as a substitute for, or cause for elimination of normal operational inspection and maintenance routines (Exs. 93-74 and

93-85). Since the Agency interprets § 1918.13(h) to require the same continuing maintenance procedures as the proposal, it has no difficulty in accepting the suggested change. This language was first set out as an alternative provision (47 FR 14728).

Paragraph (g)(1) merely restates, in a more unambiguous manner, the proposed provision (46 FR 4239), which provided that equipment requiring quadrennial certification, shall have such certification done within the previous 48 months, and equipment requiring annual certification shall have had such within the previous 12 months. No annual certification is required within 12 months after any required quadrennial certification.

Subpart D—Specialized Terminals

A new section 1917.70 has been added to the final rule. This new section is simply a transposition and consolidation of the proposal's § 1918a. 71(a) and 73(a), and merely restates that the provisions of this subpart apply to specialized terminals, in addition to any other applicable requirements of this Part.

Section 1917.71 Terminals handling intermodal containers or roll-on roll-off vehicles.

Paragraphs (a) and (b), concerning the standards for marking and hoisting containers, have been revised somewhat from the proposal (46 FR 4240) in response to industry and labor commenters who preferred the existing language of § 1918.85 to that of the proposal (Exs. 93-48, 93-54, 93-74, 93-85, 93-4, and 117). However, a close, careful re-examination of the parallel provisions of § 1918.85 convinced the Agency that some of the older regulatory language is repetitious and confusing. The language in the final rule is therefore the Agency's effort to choose the clearest and most concise regulatory language found in the proposal and § 1918.85.

Paragraph (c) was proposed as § 1918a.71(f) and provided that no container shall be hoisted whose actual gross weight exceeds either the sum of the container's empty weight and the maximum cargo weight the container is designed to carry, or the capacity of the crane or device used for hoisting (46 FR 4240). However, commenters stated that the proposal might not actually meet the Agency's intent, in that some hoisting devices are able to hoist two containers at one time and that, in theory, two 20 foot containers hoisted together can contain weights in excess of the safe working loads of some cranes (Ex. 98-4). This party asserted that the provision

should apply to *container or containers*. *Ibid.* This suggestion was set out as an alternative provision (47 FR 14728) and was widely supported (Exs. 100-3, 100-4, 100-9, 100-10, 100-15, 100-21, 100-37, and 100-43). Accordingly, OSHA adopted it in the final rule.

Paragraph (d)(1) was proposed as paragraph (g)(1) (46 FR 4240), and stated that marked and designated areas within the terminal shall be set aside for passage of employees to and from work areas. Commenters argued that this requirement was too restrictive and should be liberalized to give the employer the additional option of providing transportation for employees through the terminal (Exs. 93-48, 93-54, 93-74, and 93-85). Set out as an alternative provision (47 FR 14728), this suggestion drew significant support (Exs. 100-3, 100-4, 100-9, 100-10, 100-11, 100-15, 100-21, 100-37, 100-43, and 133) and has been adopted by OSHA.

Paragraph (e) was proposed as § 1918a.71(h) and provided that employees working in traffic lanes or with container handling equipment, wear high visibility vests or equivalent protection. Some commenters supported this provision, even though they recognized that compliance may be difficult (Exs. 93-54 and 117). Others contended that the provision was impractical and unenforceable (Exs. 93-58, 93-74, 93-84, 93-91, 98-6, and 134). One commenter stated that several employers previously tried to implement this practice, but met very poor compliance results and, due to loss of vests, proved very costly (Ex. 93-48). However, another interested party suggested that OSHA modify the provision to allow the employer a measure of flexibility in complying with the intent of the rule, through use of devices other than vests (Ex. 93-10). The Agency has, after careful study of the record, set out in more detail what was meant by the proposal's phrase "equivalent protection," so as to more clearly provide employers the option of using such devices as decals and reflectors, to help safeguard personnel working in the immediate area of container handling equipment and those working in traffic lanes.

Paragraph (f)(1) was proposed as paragraph (i)(1) and required that containers of 20 feet or more in length be hoisted according to the requirements of paragraphs (i)(1)(i)-(iv) (46 FR 4240). Commenters, however, indicated that empty containers do not present the same handling risks as do loaded containers, and are not as susceptible to damage from hoisting as are loaded containers, and so requested that OSHA

make the requirements of this paragraph applicable only to loaded containers (Exs. 93-48, 93-74, and 93-85). Upon re-evaluation, OSHA agrees, and has incorporated this recommendation into its final rule.

Paragraph (f)(1)(i) was proposed as paragraph (i)(1)(i), which held that if a container is hoisted by its top fittings, the lifting forces shall be applied vertically from at least four top fittings (46 FR 4240). Several commenters noted that some containers handled in other than specialized container terminals are hoisted with specialized stevedoring gear and hooks attached to double and single spreader bars by wire rope, and even though this method of hoisting produces other than a completely vertical lift, it has performed safely and efficiently for many years (Exs. 93-74 and 93-85). This paragraph has therefore been expanded to afford some operating latitude in the lifting of intermodal containers. Although it is good practice to conduct such lifts in a vertical manner from at least four top fittings (when lifted from the top), OSHA recognizes that a neat and clean vertical lift cannot always be achieved given certain conditions of stowage. It is accordingly not OSHA's intent to prohibit cargo movement if a true vertical lift cannot be achieved. However, methods of hoisting shall not damage the structural integrity of the containers. Therefore, the final rule provides that when a container is hoisted by its top fittings, the lifting forces shall be applied vertically from at least four such fittings, or by means which will safely do so without damage to the container. The alternative provision called for the lifting forces to be applied, "near" vertically, but, on re-examination, this phrase appeared to be too ambiguous and unenforceable (Exs. 117 and 133).

Paragraph (f)(2)(i) was proposed as paragraph (i)(2)(i), and required that those types of container spreaders using lanyards to activate release devices not be used except when there is no possibility of the lanyard accidentally releasing a suspended container (46 FR 4240). Commenters argued that the proposal's "no possibility" requirement set in an unattainable standard, and so should be modified to be more practical (Exs. 93-48, 93-74, and 93-85). An alternative provision had only called for "precautions" to be taken (47 FR 14728), but one commenter claimed that this rephrasing was inadequate to protect longshoremen from a known cause of death (Ex. 117). The Agency agrees, and has concluded that if all possible precautions are exercised, no lanyard

will bring about an accidental release of a container. Therefore, paragraph (f)(2)(i) has been modified to allow intermodal container spreaders employing lanyards for activation of load disengagement to be used *only if all* possible precautions are taken (e.g., prevention of lanyard from being free-swinging) to prevent accidental release of the load).

Paragraph (f)(3) was proposed as paragraph (i)(3), and required that containers moved by flatbed truck or chassis be secured to prevent dislodgement in transit (46 FR 4240). Several parties submitting comments feared that the term "secured" could be narrowly interpreted to mean secured solely by twist locks; in addition they observed that chassis equipped with pins, flanges, or gathering arms or similar devices that prevent containers from sliding should be recognized as acceptable, since the provide protection equal to chassis equipped with locking devices (Exs. 93-48, 93-74, and 93-85). These commenters believe that these means, which are presently used, are safer for employees than twist locks, since employees would not have to be exposed to container moving traffic in terminal yards to secure and release the twist locks. *Ibid.* This suggestion was listed as an alternative provision (47 FR 14728), and was greeted with approval by commenters (Exs. 100-3, 100-4, 100-9, 100-10, 100-11, 100-16, 100-21, 100-31, 100-37, 100-43, and 133). Consequently, OSHA decided to adopt this suggestion in the final rule. The Agency believes that this provision, coupled with those in § 1917.44 (General rules applicable to vehicles), will afford ample protection to marine terminal workers against the hazard of containers in transit.

Paragraph (h), covering release of container chassis locks, is a new provision, which was first set out as an alternative rule (47 FR 14728). A commenter reported that there have been many instances in which chassis have been lifted off the ground because the container chassis locks were not released (Ex. 98-4). In addition, this hazard has been recognized by West Coast labor and management, for Rule 1610 of the Pacific Coast Maritime Safety Code (Ex. 20) provides "containers shall not be hoisted from chassis unless chassis locks are released." Accordingly, this provision served as the alternative rule. Since industry has already recognized this hazard, and since the alternative rule was well supported (Exs. 100-3, 100-9, 100-10, 100-15, 100-16, 100-21, 100-43, and 133), the Agency incorporates it into the final rule.

Subpart E—Personal Protective Equipment

Section 1917.91 Eye protection.

Paragraph (a)(1), as proposed, required employers to provide (at no cost to employees) eye protection equipment (goggles, safety glasses) whenever employees are engaged in work that is hazardous to the eyes and to ensure that they be worn (46 FR 4241). Some parties "had no quarrel" with this provision, since these parties already provided protective glasses at no cost to the employee (Ex. 93-54). Other commenters, however, strongly opposed the employer payment requirement for this item and for other items of personal protective equipment provided under this subpart (Exs. 93-23, 93-48, 93-74, 93-75, 93-84, 93-85, 93-91, and 98-6), arguing that the issue of payment for such items has been a matter traditionally subject to the collective bargaining process. But, another commenter argued just as forcefully that the Act clearly places on employers the responsibility for providing safe and healthful workplaces, and contended that this responsibility included the payment for all protective measures, including personal protective equipment (Ex. 118). This party pointed to the fact that OSHA has recognized the employer's responsibility to pay for protective equipment in its promulgation of various health standards, e.g., § 1910.1000(d)(3)—special clothing for asbestos exposure; § 1910.1017(g)(1)—respiratory protection for vinyl chloride exposure; § 1910.1018(j)(1)—protective work clothing and equipment for arsenic exposure. *Ibid.*

Though the Act places on employers the responsibility for providing safe and healthful workplaces for employees, and though this duty requires the employers to provide employees with personal protective equipment mandated by OSHA regulation, this responsibility does not include payment for this equipment in all instances. In those cases where the employer is called upon by OSHA not only to supply the required item of equipment, but also to properly maintain it, and where the employer maintains control over the item by retaining it at the workplace after the employee using the item has completed work for the day, the employer must supply such items at no cost to the employee. Articles such as respirators and special protective clothing, which the employer is required to supply and maintain, and which the company retains on its premises are items of personal protective equipment which the employer must provide at no cost to the employee.

However, in those instances where the employer is required by regulation to provide personal protective equipment, but does not retain control over the item, in that the employee is permitted to take the items from the workplace after the workday and put it to personal use, the employer is not required to pay for the article of personal protective equipment. Articles such as safety glasses, safety shoes and hardhats, which the employer is required by regulation to provide, but which are taken by employees from the workplace, and can be used by employees away from the job, are items that the employer does not have to furnish free of cost. What portion of the cost of this limited group of articles is borne by the employer or the employee is a matter left to the parties to resolve. OSHA is aware that some employers pay all or part of the price of these articles, at least with regard to the initial purchase (Exs. 93-27, 93-30, 93-48, 93-54, 93-74, 93-84, and 93-85), and supports this practice. At this time, however, OSHA does not believe that the Agency should require the employer to furnish these items of personal protective equipment free of charge.

Accordingly, paragraph (a)(1) has been altered to require employers to provide employees with eye protection equipment when employees perform work hazardous to the eyes.

Section 1917.93 Head protection.

Paragraph (a), as proposed (46 FR 4241) required that employees exposed to impact, falling or flying objects or electric shock or burns wear protective hats, and that employers would furnish these hats at no cost. As discussed previously, the final rule will not require employers to pay for these protective hats, but does require that the employer must provide these hats and, as part of an ongoing safety program, must direct employees to use them.

Section 1917.94 Foot protection.

Paragraph (a), as proposed (46 FR 4241), required that employees exposed to impact, falling objects or puncture hazards shall wear safety shoes, which the employer was to provide at no cost to the employee. Again, for the reasons discussed concerning § 1917.91(a)(1), the employer is not required to pay for the cost of safety shoes.

Section 1917.95 Other protective measures.

Paragraph (a)(1), as proposed (46 FR 4241), required that the employer provide "protective" clothing when ordinary clothing is unsuitable, and special protective clothing when circumstances necessitate its use. One

commenter noted the difficulty in distinguishing between ordinary and protective work clothing, in that work gloves, coats, jackets and rain gear, which are commonly supplied by the employee, could be viewed as both protective work clothing and ordinary clothes (Ex. 93-64). Accordingly, the Agency has altered this provision so that it relates only to special protective clothing, such as that worn in handling asbestos spills, or other matters where ordinary clothing does not provide sufficient protection.

Paragraph (a)(2), as proposed (46 FR 4241), required that protective clothing previously worn shall be cleaned and disinfected by the employer before issuance to another employee. Commenters observed that in some circumstances it is not necessary to clean such clothing after an employee has worn them (Exs. 93-84, 93-91, and 98-6). OSHA recognizes that in some instances this clothing may have been issued, but the work task might not have soiled the clothing, or the task might even have been cancelled after the issuance of the clothing. Therefore, the Agency has amended this paragraph to require cleaning and disinfecting of this clothing when necessary.

Paragraph (b)(1) was proposed as paragraph (c)(1) and required that the employer provide personal flotation devices for those employees, such as line handlers, who are engaged in work in which they may be pulled into the water (46 FR 4241). However, one commenter pointed out that there are many circumstances where employees can safely handle mooring lines without life vests, but in some situations, such as working on poor working surfaces, or at remote locations or on an apron overcrowded with cargo or other obstacles, life vests are necessary for safety (Ex. 117). Accordingly, OSHA has modified this paragraph to call for use of personal flotation devices in such limited, but potentially hazardous situations.

Subpart F—Terminal Facilities

Section 1917.111 Maintenance and load limits.

Paragraph (b), as proposed, required the posting of load limits of all floors on which cargo was handled or stored (46 FR 4241). However, commenters (Exs. 93-58 and 93-72) pointed out that this posting requirement is unnecessary on ground levels where compacted earth and asphalt cover provide adequate support of load pressures. The final rule excludes floors of this type from the posting requirement.

Section 1917.112 Guarding of edges.

Paragraph (a), as proposed, specified that vehicle curbs and bull rails at least 10 inches in height be provided at waterside edges where vehicular travel is permitted (46 FR 4241). Many commenters found the proposal unreasonable, in that present curbs and bull rails of 6 inches have served adequately, so the cost of retrofitting appeared to these parties as unjustified (Exs. 93-58, 93-74, 93-84, 93-85, 93-91, and 98-6). They argued that the 10-inch requirement be "grandfathered" so that curbs and bull rails installed after the effective date of the standard would have to be 10 inches. *Ibid.* OSHA has adopted this suggestion into its final rule. Furthermore, it should be noted that the requirements of this provision were designed to prevent vehicles from falling, rolling or being accidentally driven into the water and that this provision does not apply to those waterside areas at which vehicles are prohibited.

Paragraph (e)(1) has been modified to provide that midrails, as well as top rails, be supplied on stairways having four (4) or more risers. Suggested by one commenter (Ex. 98-4), this modification was first set out as an alternative rule (47 FR 14729), which gained substantial support from those submitting comments (Exs. 100-3, 100-9, 100-10, 100-11, 100-16, 100-21, 100-37, 100-43, and 133). The balance of the proposal remains unchanged.

Section 1917.116 Elevators and escalators

Paragraph (c), as proposed, required that no elevator or escalator with an operational defect be used (46 FR 4242). One commenter suggested that OSHA change the phrase "operational defect" to "defect which affects safety" (Ex. 93-31.) The Agency listed this suggestion as an alternative provision (47 FR 14729), which drew significant support from those submitting comments (Exs. 100-3, 100-9, 100-10, 100-15, 100-16, 100-21, 100-37, 100-43, and 133). OSHA has incorporated the alternative language into the final rule.

Paragraph (e), as proposed, required that elevators and escalators be thoroughly inspected at least yearly, that additional monthly "safe operation" inspections be carried out by a designated person, and that both the annual and monthly reports be posted in elevators, with escalator reports being posted in the vicinity of the escalator or being available at the terminal (46 FR 4242). Commenters argued that there is no need to post the result of monthly inspections, so long as the reports are

available (Ex. 93-78), and that posting the annual inspection report is sufficient and is also required by most states and municipalities (Ex. 93-31). OSHA accepted this recommended change, and the balance of this provision remains as proposed. This suggestion first appeared as an alternative provision (47 FR 14730).

Section 1917.118 Fixed ladders.

Paragraph (a)(4), as proposed, listed, as exemptions to this section, special purpose ladders such as fruit pickers' ladders, shelf ladders, combination step and extension ladders, and library ladders (46 FR 4243). It was correctly pointed out by a commenter (Ex. 93-73) that these, in fact, are not fixed ladders, and that the Agency had failed to list such special purpose ladders as firefighting and fixed emergency ladders as ladders to be exempt. OSHA has modified this provision accordingly, so that ladders used only for firefighting or emergency purposes are exempt from this section.

Paragraph (e)(5)(iv), as proposed, required that cages or wells on fixed ladders extend to within 8 feet above the ground or base (46 FR 4241). An interested party (Ex. 83-51) noted that, in some marine terminal operations, cages extending that low would create additional hazards associated with vehicular traffic safety, especially with regard to necessary height clearance for trucks. Accordingly, the Agency has amended the final rule to provide that in cases where the cage or well would extend into traffic and where relocation of these ladders is not possible, the cage or well is permitted to be a maximum of 20 feet above the ground. This flexibility is consistent with the record, with the Agency's desire to decrease vehicular accidents and with the accident experience relative to fixed ladders at marine terminals.

Paragraph (f) listed requirements relating to individual rung ladders on walls and conical manholes. One commenter remarked that the paragraph had failed to list "river cells," in addition to walls and conical manholes (Ex. 93-96). OSHA has modified the final rule accordingly.

Section 1917.119 Portable ladders.

Paragraph (b)(4), as proposed, provided that the width between side rails at the base of manufactured portable ladders be at least 15 inches for ladders 10 feet or less in length, and that there be a width increase of at least 1/4-inch for each additional 2 feet of ladder length (46 FR 4244). However, the American Ladder Institute contended that the minimum width between side

rails at the base should be 12 inches, instead of 15 (Ex. 93-73). This suggestion was set out as an alternative provision (47 FR 14730), and met with extensive support (Exs. 100-3, 100-9, 100-10, 100-11, 100-15, 100-21, 100-37, and 100-43). OSHA has adopted the suggestion of the Institute in its final rule.

Paragraph (c) as proposed, required that portable manufactured ladders obtained after the effective date of this rule bear identification indicating adherence to the ladder construction requirements of applicable ANSI standards (46 FR 4244). The American Ladder Institute alerted the Agency to the fact that the ANSI standards referenced in the proposal (1974) had been superseded by more recent (1980) ANSI standards (Ex. 93-73). Accordingly, OSHA amended the final rule to incorporate these updated standards. This modified rule first appeared as an alternative provision (47 FR 14730).

Paragraph (d)(3), as proposed, required that the width between side rails at the base of job-made portable ladders be at least 15 inches for ladders 10 feet or less in length, and that there be a width increase of at least 1/4-inch for each additional 2-feet of ladder length (46 FR 4244). As with paragraph (b)(4), the American Ladder Institute advocated that the minimum width figure be reduced to 12 inches (Ex. 93-73). This position was set out as an alternative provision (47 FR 14730), and was substantially supported by interested parties submitting written comments (Exs. 100-3, 100-9, 100-10, 100-15, 100-21, 100-37, and 100-43). Consequently, OSHA adopted the alternative in its final rule.

Paragraph (f)(3), as proposed, required that metal and wire reinforced ladders be prohibited from use when employees on the ladder might come into contact with electrical conductors (46 FR 4245). However, the Ladder Institute argued that it was safe to work on metal or wire reinforced ladders if the conductors are not energized, and accordingly suggested that OSHA change the phrase "electrical conductors" to "energized electrical conductors" (Ex. 93-73). OSHA followed this suggestion and so altered the final rule by adding the term "energized" to this provision. This change presumes that the conductors will be checked to see if they are energized before a ladder is placed on the conductors. This suggestion first appeared as an alternative provision (47 FR 14730).

Paragraph (f)(9), as proposed provided that ladders be fitted with slip resistant bases and be lashed, blocked or

otherwise secured at top or bottom to prevent the ladder from slipping (46 FR 4245). A commenter, though, pointed out that there were many situations where lashing or blocking is either impossible or impractical, and advocated that in those instances, OSHA require that a ladder with a slip-resistant base be used in conjunction with a ground attendant (Ex. 93-74). The Agency has modified the provision to permit the employer to use this practice where listing or blocking cannot be effectively performed. This suggestion was initially lashed as an alternative provision (47 FR 14730-14731).

Section 1917.123 Illumination.

Of all the provisions proposed by OSHA, this section stands out as that which generated the most discussion and concern. The Agency has reviewed the rulemaking record, and has concluded that the levels of illumination which are adequate for the safe conduct of work are an average minimum of 5 foot-candles for active work areas, 1 foot-candle for other work areas and ½ foot-candle for security purposes. In addition, OSHA has carefully attempted to delineate in the clearest possible manner the difference between the terms "active" and "other" work areas.

The proposal initially set the illumination levels at 10 foot-candles for active work areas, and 5 foot-candles for other work areas. This provision provoked extensive criticism from those submitting comments. Several parties contended that OSHA had not demonstrated any safety justification for the proposed levels (Exs. 93-53, 93-74, 93-78, and 93-85), while others contended that reaching these levels would cause significant light pollution (Exs. 93-9, 93-43, and 93-59). But by far the most repeated and sharpest criticism of the proposal concerned its project cost. The need for new fixtures and new light poles, combined with the attendant construction and maintenance costs to meet the proposal was estimated at over \$100 million (Exs. 93-5, 93-7, 93-17, 93-35, 93-41, 93-48, 93-51, 93-58, 93-60, and 93-70). Many ports, however, reported that their existing level of illumination for active work areas was already at 5 foot-candles (Exs. 93-27, 93-29, 93-31, 93-48, 93-51, 93-59, and 93-70), while one company noted that its illumination levels were presently 7.5 foot-candles for active work areas and 3.5 foot-candles for other work areas (Ex. 93-83). Moreover, many of these commenters suggested that the Agency examine relevant state illumination standards such as those of California and Washington (Exs. 93-45 and 93-25), and ANSI standards such as ANSI A11.1-

1979 and ANSI/IES RP-7-1979 (Exs. 93-25, 93-48, 93-74, 93-78, 93-84, 93-91, and 98-6), all of which set 5 foot-candles as the illumination level for active work areas. It should be noted, however, that one commenter asked OSHA to raise the proposal's illumination level for active work areas from 10 foot-candles to 20 (Ex. 98-4).

An alternative provision (47 FR 14731) called for illumination levels of 5 foot-candles for active work areas, 1 foot-candle for other areas and ½ foot-candle for security purposes. This alternative language was largely supported by interested parties submitting comments (Exs. 100-3, 100-8, 100-9, 100-10, 100-11, 100-15, 100-16, 100-37, 100-43, 100-45, 100-53, and 133), though some commenters proposed that the alternative language with respect to matters other than the numerical value of the illumination levels, needed to be further clarified (Exs. 100-21 and 100-53). Basically, these commenters were concerned with the circumstances and conditions under which the terminal operator would have to set an illumination level of 5 foot-candles.

This matter was discussed more fully during the course of the hearing and in post-hearing comments. Some advocated that OSHA could clarify this matter by adopting the illumination table present in ANSI RP-7-1979 (Ex. 330x at 20). However, the table contains different illumination ratings, in terms of foot-candles, for low and high activity levels, which were additionally crossed with, and modified by different ratings for slight and high hazard levels requiring visual detection (Ex. 100-21). Others testifying voiced concern that though the table may be understandable to an illuminating engineer, it was complicated in application and could be subject to misinterpretation (Ex. 330x at 76). During the hearing, OSHA asked some witnesses for their interpretation of the term "active work area," but these individuals professed difficulty in coming up with a clear, workable definition (Exs. 332x at 286-287 and 400x at 494-495). In post-hearing comments, all interested parties agreed that active work areas included active cargo transfer points, where the cargo is transferred from shore to vessel and vessel to shore, and included the area of the pier or wharf adjacent to the vessel (Exs. 129, 130, 132, 134, and 136). However, one commenter argued that the term should also include locations where spotting and removing of containers from the storage areas is carried out (Ex. 136).

Upon careful review of these comments, OSHA has defined "active

work areas" in the final rule as those that are in the closest proximity to the vessel, where vehicular traffic converges into a central and more active physical locale. "Other work areas" are those supplemental portions of the terminal (such as farm areas) where the transfer or handling of cargo is not subject to the type of vehicular convergence and physical activity that is the case at vessel to shore/shore to vessel cargo transfer points. It is not the intent of this illumination provision to mandate that 5 foot-candles be provided at every location where a container may be grounded or wheeled, nor is it OSHA's intent to have 5 foot-candles provided where a stacker may land a case in a backland farm area. These locations are generally best described as open storage areas, which, under the terms of this rule, are considered "other work areas." The area of most concern and that considered to be the "active work area," for the purposes of this provision, is the area at the apron, where hustlers (tractors) and straddle carriers are converging in a container/ro-ro bottom/roll-off operation and where forklifts are converging in a breakbulk operation. It is the high point of activity, the area with the greatest population of men and machines and, as a consequence, the area of greatest risk.

Where occasional work tasks undertaken in an area require more light than that which is provided on a permanent basis, supplemental lighting shall be employed.

In its review of the record (Ex. 330x, pg. 22), the Agency has concluded that the lighting shall be measured at the working surface in the plane in which the working surface presents itself. OSHA had proposed that light intensity be measured on a horizontal plane at the work surface (46 FR 4245). However, it was pointed out at the hearing that the angle of the work surface differs with the task, and that, accordingly, the most accurate measurement of light intensity may not be in the plane horizontal to the work surface. OSHA has also included in this provision a requirement that lights shall, as far as possible, be fixed so that they will not shine in the eyes of employees. Commenters alerted OSHA to the problems associated with glare (Exs. 93-5, 93-84, 93-91, and 98-6), and this modification has been instituted accordingly.

Section 1917.124 Passage between levels and across openings.

Paragraphs (b)(1) through (9), as proposed, put forward the same requirements for dockboards and ramps (46 FR 4246). In its review of the record

(Exs. 93-74 and 93-85). OSHA notes that some parties have misinterpreted both the applicability and content of this provision. The Agency has, as a consequence, included definitions of "dockboards" and "ramps" within the provision and has instituted additional modifications to clarify its intent. These definitions comprise the total of paragraph (b).

Paragraph (c)(1) formerly (b)(1), as proposed, required that dockboards not be subjected to loads exceeding the manufacturer's recommended rating and provided that the rating be marked on dockboards and ramps or alternatively be available at the terminal (46 FR 4246). A commenter (Ex. 93-85) alerted OSHA to the fact that many of the covered pieces of equipment are not manufactured items, and as such do not possess load ratings. Accordingly, the strength requirement for dockboards in the final rule requires that they be strong enough to support the loads imposed on them.

Section 1917.125 Guarding temporary hazards.

Proposed as Section 126, this provision stated that certain temporary hazards must be guarded by barricades, railings, etc., or by other equally effective means (46 FR 4246). During the rulemaking, it was pointed out (Exs. 93-48 and 93-74) the word "visible" should be added in front of the term "barricades" to make this guarding requirement more effective by providing a greater safeguard to employees. The "sufficient illumination" segment has been deleted since the lighting requirements found at § 1917.123 are applicable.

Subpart G—Related Terminal Operations and Equipment

Section 1917.151 Machine guarding.

Paragraph (b)(2), as proposed, required that machines that produce chips or dust be fitted with effective exhaust systems at the point of origin of the chips or dust (46 FR 4246). During the rulemaking, commenters (Exs. 83-74, 93-85, and 93-101) argued that the requirement, as written, would make it necessary to provide safeguards even if "there was no significant hazard to the operator." They asserted that no other effective means of protection was proposed as an alternative. *Ibid.* OSHA has modified this provision accordingly so that the employer shall provide exhaust systems or equally effective means when a hazard is present. This modification was first set out as an alternative provision (47 FR 4732).

Paragraph (b)(6) has been modified in much the same manner as paragraph (b)(2). As originally proposed, all motors on terminal machinery would have had to be wired in such a manner as to prevent automatic restart after loss of power (46 FR 4246). Commenters pointed out that this safeguard need only be provided when injury to the operator might result if automatic restart occurs, and that this suggestion parallels the General Industry rule, § 1910.23(d) (Exs. 93-74 and 93-85). OSHA has adopted this suggestion.

Paragraph (b)(8), as proposed, provided that maintenance of machines and equipment be in accordance with the manufacturer's instructions (46 FR 4246). Commenters informed OSHA that for many simple, existing machines, manufacturer's instructions do not exist (Exs. 93-74 and 93-85). Accordingly, the Agency has altered the provision to require that all machines be maintained in "safe working condition." This modification was first listed as an alternative provision (47 FR 14732).

Paragraph (b)(10) has been modified to prohibit use of machines with defects affecting safe operation. As proposed, all machinery and equipment that display an operational defect shall not be used (46 FR 4246). However, an operational defect may not render a machine unsafe. Upon reconsideration, OSHA altered this paragraph to reflect this fact.

Paragraph (h)(1), as proposed, stated that rotating parts of machinery less than 8 feet above ground level must be guarded (46 FR 4247). A commenter (Ex. 93-23), remarked that this requirement was inconsistent with the General Industry's standard for guarding by location, 29 CFR 1910.219, which only requires a 7 foot distance above ground level. Since the Agency could find no adverse accident experience associated with the 7 foot height, OSHA has modified this provision accordingly.

Section 1917.152 Welding, cutting and heating (hot work).

Paragraph (c)(4), as proposed, provided that additional employees be supplied to guard against fire during and after hot work, and required that employees be instructed in the recognition of potential fire hazards and the use of firefighting equipment (46 FR 4247-48). In its study of this rulemaking, OSHA has concluded that normal fire prevention measures have proved to be effective at marine terminals. Commenters pointed out that OSHA's General Industry standards (§ 1910.251) only require fire watches under certain limited conditions (Exs. 93-74 and 93-85). Accordingly, OSHA amended the

final rule to stipulate that when the hot work operation is such that normal fire precautions are not sufficient, additional personnel shall be assigned fire watch duty for sufficient times during and after the operation. Additionally, all personnel involved in the hot work operation shall be instructed as to potential fire hazards and the use of firefighting equipment.

Paragraph (c)(7)(iii), as proposed, prohibited hot work in certain areas, one of which was near the storage of bulk sulphur (46 FR 4248). Considerable evidence has come into the record (Exs. 93-23, 9, pg. 428), that indicates that this ban is unnecessary if measures are taken for the safe conduct of hot work around bulk sulphur. As a consequence, bulk sulphur is excluded from this prohibition, if suitable precautions are followed, the person in charge of the operation is knowledgeable in sulphur fire prevention and control, and the person performing the work has been instructed in preventing and extinguishing sulphur fires.

Paragraph (d)(8), as proposed, provided that piping systems conveying flammable and combustible liquids to the spraying booth or area be of metal or bonded and grounded. This was an obvious error in printing. Comment has come into the record (Ex. 93-31) that recognized this flaw and supported OSHA's intent to have those systems made of metal and be both bonded and grounded. This provision has been modified accordingly.

Section 1917.156 Fuel handling and storage.

Paragraph (b)(6)(ii), as proposed, prohibited the use of automatic latch open type devices on any powered dispensing nozzle. In light of OSHA's rulemaking on this subject and its results (47 FR 39161) and comment received into the public record in this rulemaking (Ex. 98-5), OSHA has modified this provision so as to allow for their use.

VI. Regulatory Analysis Assessment

Introduction and Executive Summary

The Occupational Safety and Health Administration (OSHA) is promulgating a standard to protect workers from occupational exposure to safety hazards at marine terminals. The following economic analysis of the standard for marine terminal facilities has been prepared in accordance with the requirements of Executive Order 12291 (February 17, 1981), and the Regulatory Flexibility Act of 1980 (Pub. L. 96-353, 94 Stat. 1164 (5 U.S.C. 601 et seq.)).

Overview of Present Regulatory Environment

The three-digit SIC (Water Transportation, SIC 446), which contains marine terminals, has had the highest incidence rate of lost workdays among all three-digit SIC industries in nine of the 10 years between 1972 and 1981. In addition, marine terminals are currently regulated by two different standards—the Longshoring Regulations in 29 CFR Part 1918 and the General Industry Regulations in 29 CFR Part 1910. There are several provisions in Part 1918 that are not the same as their Part 1910 counterparts and these conflicts have led to confusion concerning compliance requirements. As a result, several groups (i.e., American Association of Port Authorities, New York Shipping Association, Pacific Maritime Association, and West Gulf Maritime Association) have requested that OSHA "make the industry whole" by consolidating all the regulations applicable to the marine terminal portion of the cargo-handling industry into a comprehensive set of regulations that parallel those for the shipboard portion of the operation.

In response to these concerns, OSHA investigated the possibility of updating and consolidating these regulations. After extensive public comment and several public meetings, OSHA developed the new standard to meet these concerns.

Overview of the Standard

The standard covers an estimated 5,362 marine terminals. The population at risk includes not only the estimated 75,810 directly affected cargo handlers but also seamen, vendors, maintenance and repair personnel, terminal employees, customs employees, and others. The major areas in which benefits will be received are in reductions in number and severity of injuries due to traffic and crane operations as well as in the prevention of injuries due to employee training and wearing appropriate personal protective equipment.

The standard has seven subparts upon which the analysis was based.

- Subpart A—Scope and Definitions
- Subpart B—Marine Terminal Operations
- Subpart C—Cargo-Handling Gear and Equipment
- Subpart D—Specialized Terminals
- Subpart E—Personal Protective Equipment
- Subpart F—Terminal Facilities
- Subpart G—Related Terminal Operations and Equipment

The major provisions of the standard are the following:

- Within two years of the standard's promulgation, all supervisors will have to have taken a course in safety.
- Employees shall wear personal safety equipment.
- Nighttime working areas shall be lighted to at least 5 foot-candles, in higher risk locales.
- Traffic signs shall be used and traffic rules must be implemented.
- Cranes shall have functioning wind-indicating devices.

OSHA estimates that full implementation of the standard will eliminate from three (3) to four (4) fatalities and from 311 to 381 lost workday injuries per year to full-time marine terminal employers. In addition, there will be some reduction to injuries to the other workers.

OSHA also estimates that there will be additional benefits of the standard in the form of \$1.6 million in reduced property damage and \$4.9 million in reduced administrative costs per year.

Compliance Costs of the Proposal

In order to assure that all of the costs and resulting impacts of the proposal are reflected in this analysis, OSHA emphasized the highest cost estimate. The cost of compliance and projected impacts, therefore, are expected to be less than OSHA's estimates.

Industry conditions and practices in 1982 were used as the baseline from which to measure the costs of compliance. OSHA estimates that the first-year cost of compliance would be \$45.9 million (in 1982 dollars) of which 79 percent are investment costs and the remaining 21 percent are operation and maintenance costs. Annualizing investment costs over a 10 year period at a 10 percent discount rate yields \$5.9 million in annualized investment costs. Combining this with the yearly operation and maintenance cost of \$9.6 million yields an annualized cost of \$15.5 million of which annualized investment costs represent 38 percent. The single most expensive provision in the standard is the lighting provision which constitutes 55 percent of the standard's total cost. With respect to the percentage of the costs of the standard borne by each of the four major categories of terminals, general cargo terminals will bear 63.2 percent, dry bulk terminals will bear 32.1 percent, container terminals will bear 4.3 percent, and menhaden terminals will bear 0.4 percent.

The variable costs are proportional to the firm's size and small business will not find it more difficult than larger businesses to comply. OSHA estimates total first-year costs of compliance for a

small business to be about \$1,150 per firm and \$54.75 per employee.

There are no special provisions made for small business in the final rule. Nevertheless, the standard's costs to small entities and businesses in general have been reduced from the estimated \$4,265 per firm based on the January 16, 1981, proposal. The difference is due largely to the elimination of the provision requiring employers to pay for employee foot and head protection.

In conclusion, OSHA certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The above discussion summarizes the key findings of the Final Regulatory Impact and Regulatory Flexibility Analysis of the Marine Terminal Facilities Standard as prepared by OSHA. This analysis includes: (1) A profile of the marine terminals industry, (2) an assessment of technological feasibility, (3) estimates of compliance costs, risk reduction and benefits, and (4) an analysis of cost-effectiveness and of the effects on employment, market structure, and small businesses. The complete analysis is based on data and information presented in OSHA's *Final Regulatory Impact Assessment and Regulatory Flexibility Certification of the Marine Terminal Facilities Standard*, and in a report performed under contract for OSHA by Centaur Associates, Inc. Their report, *Economic Impact Statement/Assessment for the Alternative Language Marine Terminal Facilities Standard* and the OSHA document are available in the record of this rulemaking.

To perform a cost-effectiveness analysis, the avoided property loss and administrative savings are subtracted from the \$15.5 million in annualized cost. This net annualized cost is then divided by the estimated reduction in casualties due to the standard. In order not to overstate these estimates, OSHA used the lower estimates of the reduction in fatalities and lost-time injuries to arrive at an estimated cost of \$29.3 thousand per casualty avoided.

Other economic impacts of the standard are minor. There would be a minimal impact upon prices and no resultant change in the amount of cargo transported by water. There would be an estimated annual productivity loss of 248.3 thousand person hours, which is approximately 6.2 hours per worker. No employment effects are foreseen and there are no additional significant recordkeeping costs.

Overview of Alternatives Considered

OSHA considered three other regulatory alternatives. The first alternative was to maintain the current situation with its excessive and unacceptable rate of injuries and deaths. Furthermore, this alternative continues the administrative inefficiency of two standards (29 CFR Parts 1910 and 1918) governing one industry.

The second alternative was to combine the relevant portions of Part 1910 and existing Part 1918 into one standard. This would not resolve conflicts between Parts 1910 and Part 1918. Similarly, this alternative would not contain the provisions needed to regulate traffic, to provide employee training, to ensure the wearing of personal protective equipment, and to establish safe practices for crane operations.

The third regulatory option considered by OSHA was presented in the January 16, 1981, marine terminals notice of proposed rulemaking (NPRM). The NPRM is similar to the final rule but differs from it in two respects. The first is that the scope of the NPRM included two types of marine terminals excluded from the final rule: bulk liquid facilities and fully automated coal terminals adjacent to electric utilities. The second is that there are important differences in provisions between the NPRM and the final rule. One important difference is that the NPRM had a 10 foot-candle illumination requirement in active work areas whereas the final rule has a 5 foot-candle illumination requirement. The second important difference is that the NPRM required employers to pay for all mandatory personal protective equipment while the final rule requires only that the employer pay for some of these items.

Regulatory Flexibility Certification

The Regulatory Flexibility Act of 1980 (Pub. L. 93-353, 94 Stat. 1164 [5 U.S.C. 601 et seq.]) requires that special consideration be given to a regulation's economic impact upon small entities. During the public comment period, OSHA received no specific comments concerning its proposed definition that, in this industry, "small entities" are those with fewer than 100 full-time equivalent employees. Most small entities affected by the standard are stevedoring firms.

The estimated, 1,307 small businesses in the marine terminals industry comprise 79 percent of all firms affected by the regulation. Only 12.7 percent of all industry employees, however, work for small businesses.

In order to assess the effects of firm size on the distribution of costs, OSHA determined both the fixed and the variable costs of compliance. The fixed costs primarily affect large entities because only they can afford the expense of owning the substantial land needed for a terminal. OSHA projects that port authorities and private terminal owners will bear 78 percent of the total first-year costs of compliance.

The variable costs are proportional to the firm's size and small businesses will not find it more difficult than larger businesses to comply. OSHA estimates total first-year costs of compliance for a small business to be about \$1,150 per firm and \$54.75 per employee.

There are no special provisions made for small business in the final rule. Nevertheless, the standard's cost to small entities and businesses in general have been reduced from the estimated \$4,265 per firm based on the January 16, 1981, proposal. The difference is due largely to the elimination of the provision requiring employers to pay for employee foot and head protection.

In conclusion, OSHA certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The above discussion summarizes the key findings of the Final Regulatory Impact and Regulatory Flexibility Analysis of the Marine Terminal Facilities Standard as prepared by OSHA. This analysis includes: (1) a profile of the marine terminals industry, (2) an assessment of technological feasibility, (3) estimates of compliance costs, risk reduction and benefits, and (4) an analysis of cost-effectiveness and of the effects on employment, market structure, and small businesses. The complete analysis is based on data and information presented in OSHA's *Final Regulatory Impact Assessment and Regulatory Flexibility Certification of the Marine Terminal Facilities Standard*, and in a report performed under contract for OSHA by Centaur Associates, Inc. Their report, *Economic Impact Statement/Assessment for the Alternative Language Marine Terminal Facilities Standard* and the OSHA document are available in the record of this rulemaking.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1980 (Pub. L. 96-511), the reporting or recordkeeping provisions that are included in this regulation have been or will be submitted for approval to the Office of Management and Budget (OMB). They are not effective until OMB approval has been obtained and the public notified to

that effect through a technical amendment to this regulation.

VII. List of Subjects in 29 CFR Part 1917

Maritime, Longshoring, Cargo, Intermodal Container, Crane Certification, Occupational Safety and Health, Safety.

VIII. Authority

This document was prepared under the direction of Thorne G. Auchter, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Accordingly, under sections 4(b)(2), 6(b) and 8(c) of the Occupational Safety and Health Act of 1970 (84 Stat. 1592, 1593, 1599, 29 U.S.C. 653, 655, 657) and section 41 of the Longshoremen's and Harborworkers's Compensation Act (44 Stat. 1444 as amended; 33 U.S.C. 941), Secretary of Labor's Order No. 8-76 (41 FR 25059) and 29 CFR Part 1911, a new Part 1917 is added to Title 29, Code of Federal Regulations, and 29 CFR 1910.16 is hereby amended, as set forth below.

Signed at Washington, D.C., this 28th day of June 1983.

Thorne G. Auchter,
Assistant Secretary of Labor.

29 CFR Chapter XVII is hereby amended as follows:

1. By amending § 1910.16 by revising the title and paragraph (a), by revising and redesignating paragraph (b) of § 1910.16 as paragraph (c), by adding a new paragraph (b), and by adding a new paragraph (c)(4) to § 1910.16, as follows:

§ 1910.16 Longshoring and marine terminals.

(a) *Adoption and extension of safety and health standards for longshoring.* The standards prescribed by Part 1918, Subparts A through J of this title and in effect on April 28, 1971 are adopted as occupational safety and health standards to any employment and place of employment of every employee engaged in longshoring operations or a related employment aboard a vessel on the navigable waters of the United States.

(b) *Safety and health standards for marine terminals.* Part 1917 of this title shall apply exclusively, according to the provisions thereof, to employment within a marine terminal, except as follows:

(1) The provisions of Part 1917 do not apply to the following:

(i) Facilities used solely for the bulk storage, handling and transfer of 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 to specific working conditions.

(iii) Fully automated bulk coal handling facilities contiguous to electrical power generating plants.

(2) Part 1910 does not apply to marine terminals except for the following:

(i) *Electrical*. Subpart S;

(ii) *Toxic and hazardous substances*. Subpart Z applies where specifically referenced in Part 1917 except that the requirements of Subpart Z do not apply 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;

(iii) *Noise*. Subpart G, § 1910.95;

(iv) *Commercial diving operations*. Subpart T;

(v) *Safety requirements for scaffolding*. Subpart D, § 1910.28;

(vi) *Abrasive blasting*. Subpart G, § 1910.94(a);

(vii) *Access to employee exposure and medical records*. Subpart C, § 1910.20; and

(viii) *Respiratory protection*. Subpart I, § 1910.134.

(c) *Definitions*. * * *

(4) "Marine Terminal" means wharves, bulkheads, quays, piers, docks and other berthing locations and adjacent storage or contiguous areas and structures associated with the primary movements of cargo or materials from vessel to shore or shore to vessel including structures which are devoted to receiving, handling, holding, consolidation and loading or delivery of waterborne shipments and passengers, including areas devoted to the maintenance of the terminal or equipment. The term does not include production or manufacturing areas having their own docking facilities and located at a marine terminal nor does the term include storage facilities directly associated with those production or manufacturing areas.

2. By adding a new Part 1917, Marine Terminals to read as follows:

PART 1917—MARINE TERMINALS

Subpart A—Scope and Definitions

Sec.

1917.1 Scope and applicability.

1917.2 Definitions.

Subpart B—Marine Terminal Operations

1917.11 Housekeeping.

1917.12 Slippery conditions.

1917.13 Slings.

Sec.

1917.14 Stacking of cargo and pallets.

1917.15 Coopering.

1917.16 Line handling.

1917.17 Railroad facilities.

1917.18 Log handling.

1917.19 Movement of barges and rail cars.

1917.20 Interference with communications.

1917.21 Open fires.

1917.22 Hazardous cargo.

1917.23 Hazardous atmospheres and substances (see § 1917.2(p)).

1917.24 Carbon monoxide.

1917.25 Fumigants, pesticides, insecticides and hazardous preservatives (see § 1917.2(p)).

1917.26 First aid and lifesaving facilities.

1917.27 Personnel.

Subpart C—Cargo Handling Gear and Equipment

1917.41 House falls.

1917.42 Miscellaneous auxiliary gear.

1917.43 Powered industrial trucks.

1917.44 General rules applicable to vehicles.

1917.45 Cranes and derricks (see also § 1917.51).

1917.46 Crane load and limit devices.

1917.47 Winches.

1917.48 Conveyors.

1917.49 Spouts, chutes, hoppers, bins, and associated equipment.

1917.50 Certification of marine terminal material handling devices.

1917.51 Hand tools.

Subpart D—Specialized Terminals

1917.70 General.

1917.71 Terminals handling intermodal container or roll-on roll-off operations.

1917.72 Grain elevator terminals [Reserved]

1917.73 Terminal facilities handling menhaden and similar species of fish.

Subpart E—Personal Protection

1917.91 Eye protection.

1917.92 Respiratory protection.

1917.93 Head protection.

1917.94 Foot protection.

1917.95 Other protective measures.

Subpart F—Terminal Facilities

1917.111 Maintenance and load limits.

1917.112 Guarding of edges.

1917.113 Clearance heights.

1917.114 Cargo doors.

1917.115 Platforms and skids.

1917.116 Elevators and escalators.

1917.117 Manlifts.

1917.118 Fixed ladders.

1917.119 Portable ladders.

1917.120 Fixed stairways.

1917.121 Spiral stairways.

1917.122 Employee exits.

1917.123 Illumination.

1917.124 Passage between levels and across openings.

1917.125 Guarding temporary hazards.

1917.126 River banks.

1917.127 Sanitation.

1917.128 Signs and marking.

Subpart G—Related Terminal Operations and Equipment

1917.151 Machine guarding.

1917.152 Welding, cutting and heating (hot work).

1917.153 Spray painting.

Sec.

1917.154 Compressed air.

1917.155 Air receivers.

1917.156 Fuel handling and storage.

1917.157 Battery charging and changing.

1917.158 Prohibited operations.

Authority: Sec. 6(b), 8(c), 84 Stat. 1593, 1594 (29 U.S.C. 655, 657), Sec. 41, 44 Stat. 1444 (33 U.S.C. 941), Secretary of Labor's Order No. 8-76 (41 FR 25091, 29 CFR Part 1911).

Subpart A—Scope and Definitions

§ 1917.1 Scope and applicability.

(a) The regulations of this part apply to employment within a marine terminal as defined in § 1917.2(u), 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, or 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.

(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) *Electrical*. Subpart S;

(ii) *Toxic and hazardous substances*. Subpart Z applies where specifically referenced in this Part 1917, except that the requirements of Subpart Z do not apply 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;¹

(iii) *Noise*. Subpart G, § 1910.95;

(iv) *Commercial diving operations*. Subpart T;

(v) *Safety requirements for scaffolding*. Subpart D, § 1910.28;

(vi) *Abrasive blasting*. Subpart G, § 1910.94(a);

(vii) *Access to employee exposure and medical records*. Subpart C, § 1910.20; and

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.

(viii) *Respiratory protection*. Subpart I, § 1910.134.

§ 1917.2 Definitions.

(a) "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.

(b) "Authorized," in reference to an employee's assignment, means selected by the employer for that purpose.

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

(d) "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.

(e) "Confined space" means a space having all of the following characteristics:

- (1) Small size;
- (2) Severely limited natural ventilation;
- (3) Capability to accumulate or contain a hazardous atmosphere;
- (4) Exits that are not readily accessible; and
- (5) A design not meant for continuous human occupancy.

Examples of confined spaces are intermodal tank containers, brailwater tanks and portable tanks.

(f) "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.

(g) "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.

(h) "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.

(i) "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.

(j) "Dockboard" (bridge plate or car plate) means a device utilized to span the gap between railroad cars, or between railroad cars or highway vehicles and the loading dock or platform. A car plate may be fixed, adjustable, portable, powered or unpowered.

(k) "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.

(l) "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.

(m) "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.

(n) "Front-end attachments." (1) As applied to power-operated industrial trucks, means the various devices, such as roll clamps, rotating and sideshifting carriages, 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.

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

(o) "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.

(p) "Hazardous cargo, material, substance or atmosphere" means:

(1) Any substance listed in 29 CFR Part 1910, Subpart Z;

(2) Any material in the Hazardous Materials Table and Hazardous Materials Communications Regulations of the Department of Transportation, 49 CFR Part 172;

(3) 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 Part 173; or

(4) Any atmosphere with an oxygen content of less than 19.5%.

(q) "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.

(r) "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.

(s) "Intermodal container" means a reusable cargo container of rigid construction and rectangular configuration, intended to contain one or more articles of cargo or bulk commodities for transportation by water and one or more other transport modes without intermediate cargo handling. 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, demountable or with attached wheels. It does not include cylinders, drums, crates, cases, cartons, packages, sacks, unitized loads or any other form of packaging.

(t) "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.

(u) "Marine Terminal" means wharves, bulkheads, quays, piers, docks and other berthing locations and adjacent storage or contiguous areas and structures associated with the primary movements of cargo or materials from vessel to shore or shore to vessel including structures which are devoted to receiving, handling, holding, consolidation and loading or delivery of waterborne shipments and passengers, including areas devoted to the maintenance of the terminal or equipment. The term does not include production or manufacturing areas having their own docking facilities and located at a marine terminal nor does the term include storage facilities directly associated with those production or manufacturing areas.

Subpart B—Marine Terminal Operations

§ 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 buildings shall be similarly unobstructed.

§ 1917.12 Slippery conditions.

The employer shall eliminate, to the extent possible, conditions causing slippery working and walking surfaces in 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 unitized 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(e).

§ 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. (See also § 1917.95(b)).

(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 on 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 transit. Special precautions shall be taken if the doors being opened are visibly damaged.

(i) If power industrial trucks are used to open freight car 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 power 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 creat overhead, caught-in, caught-between or stuck 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 repaired work interferes with communication of warnings or instructions.

§ 1917.21 Open fires.

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

§ 1917.22 Hazardous cargo.² (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.

§ 1917.23 Hazardous atmospheres and substances. (See § 1917.2(p)).

(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 Menhaden terminals; § 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 persons 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 person shall enter hazardous atmospheres, in which case the following provisions shall apply:

(1) Persons entering a space containing a hazardous atmosphere shall be protected by respiratory and emergency protective equipment meeting the requirements 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 (0.005%) as an 8-hour time-weighted average and employees shall be removed from the enclosed space if the carbon monoxide concentration exceeds 100 parts per million (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 § 1917.2(p)).

(a) When the employer is aware that cargo in a space is or has been stowed, handled, or treated with a fumigant, pesticide, insecticide, or hazardous preservative, a determination shall be made as to whether a hazardous atmosphere is present in the space, and only employees protected as required in paragraph (e) of this section shall enter the space if it is hazardous.

(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 thirty (30) days.

(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 requirements 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, 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 a space.

(f) Signs shall be clearly posted where fumigants, pesticides or hazardous preservatives have created a hazardous atmosphere. These signs shall note the danger, identify specific chemical hazards, and give appropriate information and precautions, including instructions for the emergency treatment of employees affected by any chemical in use.

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

§ 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 kits shall be weatherproof and contain individual sealed packages for each item that must be kept sterile. Each kit shall include at least the following items:

Gauze roller bandages, 1 inch and 2 inch (25.4 mm and 50.8 mm); Gauze compress bandages, 4 inch (101.6 mm); Adhesive bandages, 1 inch (25.4 mm); Triangular bandage, 40 inch (101.6 cm); Ammonia inhalants and ampules; Antiseptic applicators or swabs; Eye dressing; Wire or thin board splints; Forceps and tourniquet; and First aid dressing.

(d) Stretchers permanently equipped with bridles for hoisting shall be readily accessible. A blanket or other suitable covering shall be available.

(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 (27.42 m) 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 which may suddenly incapacitate him shall be permitted to operate a crane, winch or other power-operated cargo handling apparatus or a power-operated vehicle.

(b) *Supervisory accident prevention proficiency.* (1) After October 3, 1985 immediate supervisors of cargo-handling operations 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.³

Subpart C—Cargo Handling Gear and Equipment**§ 1917.41 House falls.**

(a) Span beams shall be secured to prevent accidental dislodgement.

(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 in 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 available at the terminal. 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 clips. "U" bolts shall be applied with the "U" section in contact with the dead end of the rope.

³ 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.

TABLE C-1—NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

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)
3/4(1.9)	3	4	3 3/4(9.5)
1(2.5)	4	5	4 1/2(11.4)
1 1/4(3.2)	4	5	5 1/4(13.3)
1 1/2(3.8)	5	7	6(15.2)
1 3/4(4.4)	6	7	6 3/4(17.1)
2(5.1)	6	8	7 1/4(18.1)
2 1/4(6.1)	7	8	8 1/4(21.0)
2 1/2(6.4)	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 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 pulling cargo, shall consist of one continuous piece without knot or splice.

(c) *Natural fiber rope.* (1) The employer shall ascertain the manufacturer's ratings for the specific natural fiber rope used and have such ratings available at the terminal. The manufacturer's 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 shall 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 manufacturer's ratings and use recommendations for the specific synthetic fiber rope used and shall have such ratings available at the terminal.

(2) Unless otherwise recommended by the manufacturer, when synthetic fiber ropes are substituted for manila ropes of less than three inches (7.62 cm) in circumference, the substitute shall be of equal size. Where substituted for manila rope of three inches or more in circumference, the size of the synthetic rope shall be determined from the formula:

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

where C = the required circumference of the synthetic rope in inches, C_s = the circumference to the nearest one-quarter inch of a synthetic rope having a breaking strength not less than that of the size manila rope that would be required by paragraph (c) of this section, and C_m = the circumference of manila

rope in inches which would be required by paragraph (c) of this section. 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 rope 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.

(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 B30.9-1971.

(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 in 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(6.3)	(0.6)	3/16	(0.1)
3/8	(1.0)	3/16	(0.2)
1/2	(1.3)	3/16	(0.3)
5/8	(1.6)	3/16	(0.4)
3/4	(1.9)	5/16	(0.4)
7/8	(2.2)	1/2	(0.4)
1	(2.5)	1/2	(0.5)
1 1/8	(2.9)	1/2	(0.6)
1 1/4	(3.2)	1/2	(0.6)
1 3/8	(3.5)	5/8	(0.7)
1 1/2	(3.8)	5/8	(0.8)
1 3/4	(4.4)	1 1/8	(0.9)

(4) Chains shall only be repaired under qualified supervision. Links or portions of chain defective under any of the criteria of paragraph (h)(3)(v) of this section shall be replaced with properly dimensioned links or connections of material similar to that of the original chain. Before repaired chains are returned to service, they shall be tested to the proof test 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 at the terminal.

(5) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months. Heat treatment certificates shall be available at the terminal. 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)	
1/4	(1.3)	3/8	(1.6)	1.4
3/8	(1.6)	1/2	(1.9)	2.2
1/2	(1.9)	5/8	(2.2)	3.2
3/4	(2.2)	1	(2.5)	4.3
1	(2.5)	1 1/8	(2.9)	5.6
1 1/8	(2.9)	1 1/4	(3.2)	6.7
1 1/4	(3.2)	1 1/2	(3.5)	8.2
1 1/2	(3.5)	1 5/8	(3.8)	10.0
1 5/8	(3.8)	2	(4.1)	11.9
2	(4.4)	2 1/8	(5.0)	16.2
	(5.0)	2 1/2	(5.7)	21.2

(j) *Hooks other than hand hooks.* (1) The manufacturer's recommended safe working loads for hooks shall not be exceeded. After October 3, 1983, hooks other than hand hooks shall be tested in accordance with § 1917.51(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 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 of fastenings or 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 (76.2 mm). 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 (7.6 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 safety 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, the employer shall ensure that fork lift trucks are 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 (15.2 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) Fork lift 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) When the truck has controls which are elevated with the lifting carriage, means shall be provided for employees on the platform to shut off power to the vehicle.

(iv) Employees on the platform shall be protected from exposure to moving truck parts.

(v) The platform floor shall be skid resistant.

(vi) A truck operator shall be at the truck's controls when employees are elevated unless the truck's controls are elevated with the lifting carriage.

(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.

(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 (2.6 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 except in cases where the provisions of paragraphs (c) and (m) of this section are preempted by applicable regulations of the Department of Transportation.*

(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 (4.5 m) shall be maintained between the

* The United States Coast Guard at 33 CFR 126.15(d) and (e) has additional regulations applicable to vehicles in terminals.

* 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. 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.

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) Multi-piece rim wheels. (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) The employer shall ensure that only employees trained in the procedures required in paragraph (p)(4) of this section and who have demonstrated their ability to service multi-piece rim wheels shall be assigned such duties.

(ii) The employer shall ensure that each employee demonstrates his ability to service multi-piece rim wheels, including 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 employer shall ensure that the following procedures are 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/cm²) 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.⁶

(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.

§ 1917.45 Cranes and derricks (See also § 1917.51).

(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.

⁶NHTSA charts are available from General Services Division, National Highway Traffic Safety Administration, Attention: N48-51, 400 Seventh Street, SW., Washington, D.C. 20590. Industry charts are available upon request from the manufacturer.

(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 certifying 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 sideload 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)(1).

(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. 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 and good visibility shall be maintained through the glass. Clothing, tools and equipment shall be stored so as not to interfere with access, operation, and the operator's view.

(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 manufacturer's 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 a controlled braking means.

(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 crane's 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 (0.9 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.

(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 superstructure 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 transmitting lines are deenergized and visibly grounded at point of work, or unless insulating barriers not a part of or an attachment to the crane have been erected to prevent physical contact with lines, cranes may be operated near power lines only in accordance with 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 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 m) plus 0.4 inch (10 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 (1.2 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) Equipment 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 overhead and container gantry cranes used to hoist personnel shall operate 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 (7.6 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.

(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 Crane load and limit 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) Accuracy of the devices required by this section 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 from no less than 95 percent of the actual true total load (5 percent overload) to 110 percent of the actual true total load (10 percent underload). Such accuracy shall be required over the range of the daily operating variables to be expected 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 while handling container known to be and identified as empty, or loaded, and in either case in compliance with the provisions of § 1917.71 of this Part, 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 Conveyors.

(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) Conveyor using electrically released brakes shall be constructed so that the brakes cannot be released until power is applied, and 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, bins, 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.

(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)(i) 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.

(ii) 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, shall be tested as a unit in accordance with the following table before initially being put into use.

Safe working load	Proof load
Up to 20 short tons.....	25 percent in excess.
Over 20 to 50 short tons.....	5 short tons in excess.
Over 50 short tons.....	10 percent in excess.

(ii) Every spreader not a part of ship's gear and used for hoisting intermodal

containers shall be tested to a proof load equal to 25 percent in excess of its rated capacity. Additionally, any spreader which suffers damage necessitating structural repair shall be retested after repair and before being returned to service.

(iii) Certificates attesting to the required tests 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) The certification requirements of this section do not apply to the following equipment:

(1) Industrial trucks and small industrial crane trucks; and

(2) Any straddle truck not capable of straddling two or more intermodal containers 16 feet (4.88 m) in width.

§ 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.

Subpart D—Specialized Terminals

§ 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) 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) or by shipping documents.

(7) 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 its actual gross weight exceeds the weight marked as required in paragraph (a)(3) 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) Employees working in the immediate area of container handling equipment or in the terminal's traffic lanes shall wear high visibility vests, decals, reflectors or equivalent protection.

(f) Containers shall be handled using lifting fittings or other arrangements suitable and intended for the purpose as set forth in paragraphs (i)(1) through (i)(3) of this section, except when 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 by the top fittings, the lifting forces shall be applied vertically from at least four (4) such fittings or by means which will safely do so without damage to the container, and using the lifting fittings provided.

(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° to the horizontal in the case of 40 foot (12.2 m) containers, 37° in the case of 30 foot (9.1 m) containers, and 45° in the case of 20 foot (6.1 m) containers.

(iii) Lifting containers by fork lift trucks or by grapples 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.

(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.

§ 1917.72 Grain elevator terminals. [Reserved]

§ 1917.73 Terminal facilities handling menhaden and similar species of fish.

(a)(1) Tanks in terminal areas used for receiving or storing brailwater for recirculating into vessel holds in discharging operations shall be opened or ventilated to minimize contamination of water circulated to the vessel. Brailwater tanks shall be thoroughly drained upon completion of each day's operations and shall be left open to the air. Drainage is unnecessary when brailwater 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 brailwater 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 brailwater from vessels.

Subpart E—Personal Protection

§ 1917.91 Eye protection.

(a)(1) When employees perform work hazardous to the eyes, the employer shall provide eye protection equipment marked or labeled as meeting the manufacturing specifications of American National Standards Practice for Occupational and Educational Eye and Face Protection, ANSI Z87.1-1968, and shall direct that it be used.

(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)(viii))

§ 1917.93 Head protection.

(a) The employer shall direct that employees exposed to impact, falling or flying objects, or electric shocks or burns wear protective hats.

(b) Protective hats shall bear identifying marks or labels indicating compliance with the manufacturing provisions of American National Standard Safety Requirements for Industrial Head Protection, ANSI Z89.1-1969.

(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 direct that employees exposed to impact, falling objects, or puncture hazards wear safety shoes, or equivalent protection.

(b) Protective shoes shall bear identifying marks or labels indicating compliance with the manufacturing provisions of American National Standard for Men's Safety Toe Footwear, ANSI Z41.1-1967.

§ 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)(1) The employer shall provide, and shall direct the wearing of personal flotation devices 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) Personal flotation devices shall be United States Coast Guard approved Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or equivalent, in accordance with 46 CFR Part 160 (Coast Guard Lifesaving Equipment Specifications), and 33 CFR 175.23 (Coast Guard table of devices equivalent to personal flotation devices).

(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.

Subpart F—Terminal Facilities

§ 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 6 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 (effective date of standard) 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.

(3) Where guardrails are impracticable due to machinery requirements or work processes, an alternate means of protecting employees from falling, such as nets, shall be used.

(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 (.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 (15.2 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 (220 N) applied in any direction. Drainage clearance under toeboards is permitted.

(e) *Stair railings.* 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 (0.9 m) nor less than 32 inches (0.8 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 § 1917.119(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 (1120 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) The lower pulley shall be supported by the lowest landing.

(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 3½ 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 (1120 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 (1120 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 9 to 16½ 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 cm) apart, center to center.

(3)(i) Ladders installed before October 3, 1983 shall have a width between side rails of at least 10 inches (25.4 cm).

(ii) 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 (10.2 cm), except that in

ladders installed after October 3, 1983, the minimum distance shall be 7 inches (17.8 cm) unless physical limitations make a lesser distance, not less than 4½ inches (11.5 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° 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 § 1917.112(c) shall be provided at least every 30 feet, 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 (46 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 ± 2 inches (25.4 ± 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 (0.9 m) above landings; and

(iv) Extend to within 8 feet (2.4 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 41 cm) apart, with a minimum width of 10 inches (25.4 cm), and projecting at least $4\frac{1}{2}$ inches (1 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 (896 N) load without deformation.

(2) Rungs shall be evenly spaced from 9 to $16\frac{1}{2}$ 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 cm) for ladders 10 feet (3.05 m) or less in overall length, and shall increase at least $\frac{1}{4}$ inch (0.6 cm) for each additional 2 feet (0.61 m) of ladder length.

(c) *Standards for manufactured portable ladders.* Portable manufactured ladders obtained after October 3, 1983 shall bear identification indicating that they meet the appropriate ladder construction requirements of the following standards:

ANSI A14.1-1981 Safety Requirements for Portable Wood Ladders

ANSI A14.2-1982 Safety Requirements for Portable Metal Ladders

ANSI A14.5-1981 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 cm), center to center;

(2) Are capable of supporting a 250 pound (1100 N) load without deformation; and

(3) Have a minimum width between side rails of 12 inches (30 cm) for ladders 10 feet (3.05 m) in height. Width between rails shall increase at least $\frac{1}{4}$ inch (0.6 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 ladder 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° to 50° 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 (448 N) and a minimum concentrated load of 300 pounds (1344 N) at the center of any treadspan. Riser height shall be from 6 to 7.5 inches (15.2 to 19.0 cm), stair width a minimum of 22 inches (56 cm) 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 (51 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 (45.7 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 ± 7.6 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° to 75° 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 (10.2 cm) in depth and 18 inches (45.7 cm) in width with a uniformly spaced vertical rise between treads of 6 to 9.5 inches (15.2 to 24.1 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.

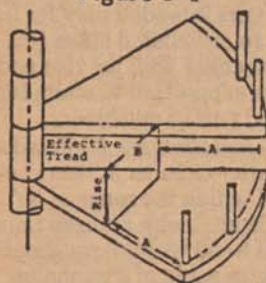
§ 1917.121 Spiral stairways.

(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;

Figure F-1



SPIRAL STAIRWAY—MINIMUM DIMENSIONS

	A (Half-tread width)	B
Normal use by employees.....	11 inches (27.9 cm).	6 inches (15.2 cm).
Limited access.....	9 inches (22.9 cm).	5 inches (12.7 cm).

(2) Stairway risers shall be uniform and shall range from 6½ to 10½ inches (16.5 to 26.7 cm) in height;

(3) Minimum loading capability shall be 100 pounds per square foot (448 N), and minimum tread center concentrated loading shall be 300 pounds (1344 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 (3.3 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 (71.1 cm).

§ 1917.123 Illumination.⁷

(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 ½ 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.

§ 1917.124 Passage between levels and across openings.

(a) *General*. The employer shall provide safe means of passage between different surface levels and across openings.

(b) *Definitions*. "Dockboards (car and bridge plates)" mean devices for spanning short distances between rail cars or highway vehicles and loading platforms which do not expose employees to falls greater than 4 feet (1.2 m).

⁷ The United States 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."

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

(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.

(d) *Ramps*. (1) Ramps shall be strong enough to support the loads imposed on them, provided with sideboards, properly secured and well maintained.

(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 (1.2 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.

§ 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 employer shall ensure that the outer perimeter of the working surface is protected by posting or other portable protection such as roping off, and that employees wear a personal flotation device meeting the requirements of § 1917.95(c).

§ 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 closest 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.

Subpart G—Related Terminal Operations and Equipment

§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-hand tripping 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 or 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 belt-locking 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 rip saws and hand-fed circular crosscut table saws.* Unless fixed or manually adjustable enclosures or guarding provides equivalent protection, hand-fed circular rip saws 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 cutoff 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 the 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 saw 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 wheels 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 operations.

(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 1/8-inch (3.2 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 (2.1 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 coming into contact with moving parts. This requirement does not apply to manually operated sprockets.

§ 1917.152 Welding, cutting and heating (hot work).^{*}

(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 fire hazards.

(2) When hot work must be performed in a location that is not free of fire 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 are 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 magnet, 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 sparks, 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;

^{*}The United States 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.

(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 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 $1\frac{1}{2}$ 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 (10.2 cm of each 30.5 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 couplings 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 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 regulators. 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 be 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 requirements 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, top 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) Replacement 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 requirements 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 requirements 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 requirements 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-arc 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 requirements 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 (10.2 cm) from the area of heat application or employees shall be protected by supplied air respirators in accordance with the requirements of § 1910.134.

(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 3/8 inch.....	4 or 5.
Medium gas welding, 3/8-1/2 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.

§ 1917.153 Spray painting.

(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 indoor 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 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 accumulations 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 or 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 (6m) 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 (3m) 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 (15.2 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 connection; 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) Charges 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.

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