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Part IV

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Occupational Safety and Health Administration

Marine Terminals; Notice of Proposed Rulemaking

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1910 and 1918a

[Docket No. S-506]

Marine Terminals; Proposed Rulemaking

AGENCY: Occupational Safety and Health Administration Department of Labor.

ACTION: Proposed standard.

SUMMARY: The Occupational Safety and Health Administration (OSHA) is proposing to add a new part, 29 CFR Part 1918a, safety and health regulations for marine terminals.

The proposed standards covers cargo handling and related activites at marine terminals and addresses the safety and health hazards associated with the shoreside portion of the marine cargo-handling industry. Marine cargo-handling operations that take place aboard vessels will continue to be regulated under 29 CFR Part 1918, the safety and health regulations for longshoring.

This proposed rule is a vertical standard, i.e., one which 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, would continue to apply to marine terminals and have been incorporated by reference in the vertical standard. The new Part 1918a would apply exclusively to marine terminals, except for those provisions of Part 1910 referenced in the new Part.

This proposal contains requirements for marine terminal operations, cargo handling gear and equipment, personal protective equipment, operations such as welding and spray painting, and specialized terminals such as container terminals and menhaden facilities. The water transportation services industry, which is largely comprised of the marine cargo-handling industry, has an occupational injury incidence more than twice the average rate of industries in the private sector, and a severity rate seven times as great. The principal hazards addressed by this proposal are injuries and accidents associated with hoisting gear, hazardous atmospheres, materials handling, powered industrial vehicles, ship's gear, vehicle and pedestrian traffic, and other marine cargo-handling operations.

DATES: Written comments and any requests for a hearing must be postmarked on or before May 15, 1981.

ADDRESS: Written comments and requests for a hearing should be submitted to the Docket Officer, Docket No. S-506, Occupational Safety and Health Administration, Room S 6212, U.S. Department of Labor, Washington, D.C. 20210, (202) 523-7894.

FOR FURTHER INFORMATION CONTACT: Mr. Basil Needham, acting director, Office of Maritime Safety Standards, Occupational safety and Health administration, U.S. Department of Labor, 200 Constitution Avenue, NW., room N3471, Washington. D.C. 20210, Telephone: (202) 523-7234.

SUPPLEMENTARY INFORMATION:

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 (P.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 activites 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 longshorign activities taking place aboard vessels.

Passage of the Occupational Safety and Health Act (the Act) (84 Stat. 1580; 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 as OSHA 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 either 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 Proposal.

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.

All available material and data have since been given careful review, in particular the issues raised by the SAC and accident and injury data related to marine terminal operations. OSHA has also continued to monitor industry trends, such as the increasing use of intermodal containers, and coverage for hazards associated with these relatively recent industry developments has been incorporated into the proposal.

Any specific final recommendations made by the SAC on provisions of the draft marine terminal proposal are discussed in the Summary and Explanation section of this preamble, in connection with the relevant provisions of the proposal; references to Advisory Committee discussions that were inconclusive and did not result in a specific recommendation have not been included in this preamble. However, transcripts of the Committee's deliberations and a copy of their recommendations are in the rulemaking record (Ex. 2–12).

This proposed standard was written to enhance the safety of dock workers, 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 proposal has been written in straightforward, performance-based language, which has allowed OSHA to reduce the volume of these proposed regulations to ⅙ 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 proposed 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 proposal'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 proposal 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 proposal, to ensure that the proposed 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 in areas in "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 as to which the Coast Guard has exercised its statutory authority to promulgate standards affecting occupational safety and health.

The shortened forms listed below are used throughout this preamble to refer to the following sources: Standards Advisory Committee—SAC; American National Standards Institute, Safety Requirements for Marine Terminals—ANSI MH9.1; OSHA's safety and health regulations for longshoring—Part 1918; OSHA's general industry standards—Part 1910; and exhibits in the rulemaking record—Ex. .

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 reveals that the injury incidence for marine cargo-handling operations is more than twice that of the national average. More specifically, BLS found an average injury incidence for the private industrial sector of 9.2 injuries per 100 full-time workers, while the rate for water transportation services (SIC 446, made up in large part by the marine cargo-handling industry) was 21.5 per 100 employees (Ex. 18).

Even more disturbing are the comparative BLS figures on accident severity. The severity rate, computed on the basis of lost workdays per worker, was seven times greater for maritime employees than the national average. Though only 62.1 workdays were lost on the average to occupational injury (per 100 full-time workers), those industries supplying water transportation services suffered losses of 454 lost workdays per 100 workers (Ex. 18). Even when compared to the accident severity rate of a high hazard industry such as construction, the accident figures for cargo handling operations are still significant and unsettling. The lost workday incidence rate for construction was only 108.1 days per 100 workers, leaving the maritime industry with an accident severity rate four times greater than that of construction (Ex. 18).

The particular hazards encountered at marine terminals are as varied as the cargoes that move through terminal gates. Technological advances in waterborne trade such as the development of container ships, roll on-roll off (Ro-Ro) vessels and "lighter aboard ship" (LASH) barges have eliminated many hazards, but created new ones. In an effort to pinpoint the major types of maritime accidents, OSHA contacted Cooper and Company of Stanford, Connecticut to study this problem. The company surveyed approximately 7,000 injury reports (Employer's First Notice of Injury or Illness) for 1974, and issued a report in 1975 which listed, by percentage, the 20 leading types of accidents associated with longshoring activities (Ex. 52):

	Percentage
Slip/Trip on Dock Deck	15.7
Stress/Strain, Lifting/Carrying	6.4
Caught Between Load/Object	6.1
Hit by Lashing Gear	5.6
Hit by Load/Draft	5.4
Foreign Body in Eye	4.7
Hit by Falling Cargo	4.6
Hurt Handling Drums	4.4
Cut on Cargo	4.1
Hit by Dunnage	4.1
Foot Through Dunnage/Cargo	3.3
Hit by Industrial Truck	3.3
Sensitivity to Cargo/Fumes	3.1
Slipped on Ladder	2.9
Step on Nails	2.6
Cut on Hook	2.5
Hit by Falling Object	2.5
Hit by Sling/Bridle	2.2
Hit by Rolling Pipe/Steel	2.2
Hurt Avoiding Accident	1.7

Additionally, the Agency sought to determine the types of accidents that generated the greatest cost, in terms of dollars expended for medical and

compensation purposes. To make this determination, OSHA relied on a study performed by the Liberty Mutual Insurance Company. This study, published in the February 1978 edition of American Seaport Magazine, reported that Liberty Mutual reviewed 297 "high cost" accidents occurring in the marine cargo-handling industry. The insurance company found that more than 69 percent of the total costs and 66 percent of the total number of cases surveyed fell within two broad classes of accidents, "falls" and "struck by falling objects." To more firmly underline this point, Liberty Mutual (Ex. 60) reproduced this accident data in the following tabular form:

Stevedoring Operations—A Review of 297 High Cost Accidents

[Figures in parentheses equal percentage]

	Number of accidents	Cost of accidents
Falls	115 (39)	$1,985,800 (37.6)
Struck by falling objects	80 (27)	1,665,200 (31.6)
All others	102 (34)	1,629,400 (30.8)
Total number	297	
Total cost		5,258,400

From the above: 66 percent of the total number and 69.2 percent of the total cost were from "Falls" and "Struck by falling objects."

Falls

Types of falls	No. of cases	Total cost [1]	Average cost [1]
Fell to working surface	40	$405,000	$10,800
Fell between cargo	22	436,500	19,900
Fell from ship's ladders/portable ladders	16	438,400	27,400
Fell to lower level	16	241,900	14,700
Fell from piled cargo, piled dunnage, piled hatch boards, etc.	14	342,000	24,400
Fell from forklift trucks and other similar equipment	7	121,600	17,300

[1] Medical and compensation costs.

Struck by Falling Objects

Type of object	No. of cases	Total cost [1]	Average cost [1]
Cargo (from drafts, stacked cargo, or while manually handling)	55	$1,282,302	$23,314
Hatch gear	10		
Empty pallets	4		
Parts from gear failure	3	382,898	15,316
Dunnage	3		
Other	5		

[1] Medical and compensation costs.

Agency review of some of its recent accident data confirmed Liberty Mutual's finding regarding the existence of "falls" and "struck by objects" as major accident categories in the maritime environment. Accident figures for longshoring activities in the Port of New York (Ex. 29) during the first six months of 1980 revealed that out of a total of 1,256 reported accidents, 289 were attributed to "slips, trips and falls," and 119 consisted of instances where employees were struck by falling cargo. Moreover, another 247 accidents occurred as a result of employees being struck by or against drafts, or by other objects being handled. Another major source of injury was operation of mobile equipment (168 accidents). Additionally foot injuries (122) represented almost 10 percent of the total number of injuries for this six-month period (Ex. 29). An OSHA survey of the West Coast accident experience for marine cargo handling operations during this same period found that out of a total of 2,643 reported accidents, falls accounted for 684 injuries and "struck by or against" accidents numbered 711. Injuries associated with the operation of mobile equipment totaled 204, while foot injuries (348) formed 13.2 percent of the total West Coast accident figure (Ex. 30).

Another way the Agency chose to focus on the major sources of maritime accidents for rulemaking purposes was to examine the fatal maritime accidents reported to OSHA during the period July 1972–April 1980. A brief summary of ten of the more than 180 fatal accidents reviewed is provided below, along with a reference to the relevant provision in the proposal (Ex. 80–90).

New York, New York—December 1973

An employee inspecting a container gantry crane was thrown from his position atop a trolleying drum house, when the entire trolley apparatus traveled past the out reach stops of the crane. The employee struck the container spreader in his fall, and though quickly pulled from the water, never regained consciousness (See § 1918a.45(g)(6)).

Everett, Massachusetts—August 1974

A worker engaged in a welding operation adjacent to a set of large rollers was drawn into an eight inch space between the rollers and was crushed. No provision had been made to lock out the electric power that activiated this equipment. The power was accidentally turned on, resulting in this employee's death (See § 1918a.151(b)(7)).

Tampa, Florida—May 1975

An employee suffocated in tons of citrus pellets, when he attempted to clear the flow of a jam within a silo without benefit of a safety harness and lifeline. The jam suddenly cleared and the worker was swept under twenty feet of the bulk cargo. On the sport rescuers were helpless and watched him disappear under the cargo (See § 1918a.49(i)(3)).

Miami, Florida—September, 1975

A terminal worker accidentally fell into an opening atop a hopper car filled with corn grain. the opening was unguarded, facilitating easy entry, and the employee died, asphyxiated by the cargo (See § 1918a.49(c)).

Port Newark, New Jersey—March, 1976

The driver of a large fork lift (stacker) struck a yard tractor at a cross aisle where visibility was obstructed by container stows. The driver of the yard tractor was operating on the wrong side of a two-lane thoroughfare (See § 1918a.44(d)) and neither driver was required to sound a warning or stop at the cross aisle, despite poor visibility (See § 1918a.43(b)(8) and § 1918a.44(e)). The driver of the yard tractor was thrown from his vehicle and killed.

Baltimore, Maryland—March, 1976

Two employees were killed and another seriously injured when two large rail mounted container gantry cranes were pushed down their tracks by strong winds. Wind warnings were issued prior to the accident. There were intermittent gusts of 40 and 50 mph throughout the four hour period prior to the accident. Audible wind warning alarms had been made inoperable. No policy existed at the port for discontinuing operations at a specific wind velocity. The cranes were swept off the end of the apron and into the adjacent waters (See § 1918a.45(g)).

San Juan, Puerto Rico—October, 1976

A checker was crushed to death when a yard tractor driver accidentally hit the tractor's accelerator pedal. The checker was noting marks at the rear of a mounted container that was in a truck line. The yard tractor that struck him was waiting immediately behind the container (See § 1918a.71(i)).

San Juan, Puerto Rico—March, 1977

While containers were being unloaded from a vessel by a crane the crane's cargo fall broke and a loaded container fell striking three longshoremen below. The crane had exceeded its operable rating and the container was overloaded (See § 1918a.45(b)(2) and § 1918a.71(f)).

St. Louis, Missouri—February, 1980

A terminal worker was killed when he fell 6 feet from an unguarded platform above a hopper. The employee was controlling the flow of fertilizer through

the hopper when he lost his balance and fell over the open edge (See § 1918a.49(b)).

Port Elizabeth, New Jersey—June, 1980

Three rail mounted container gantry cranes were swept down their tracks by high winds. weather alerts and high wind warnings were issued as early as four hours before the incident. Upon investigation, the Agency learned that much of the equipment needed to secure the cranes had fallen into disrepair and was not serviceable (See § 1918a.45(g)).

As noted above, these accidents form only a fraction of the accident data surveyed and represent only a small protion of the hazards that this proposal addresses. However, it is possible that OSHA may not have surveyed all the relevent classes of accidents that occur at marine terminals, and therefore may not have provided protection in the proposal from all major hazards present at a terminal. OSHA is therefore solicitous of any accident information relevant to the hazards found at a terminal especially if it relates to one of the provisions in the proposed standard.

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. OSHA therefore believes that a marine terminal standard is reasonably necessary for the protection of these employees from a wide range of workplace hazards.

(A) Vertical vs. Horizontal Standards

This proposed marine terminal standard is drafted 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 proposal's scope section, OSHA's general industry standards are incorporated by reference. In general, vertical standards encourage voluntary 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). It is also more efficient to train field personnel in general safety programs tailored to the horizontal general industry standards than to train field staff in individual programs designed for specific industries.

The Standards Advisory Committee discussed the merits of vertical versus horizontal standards at some length. The committee recommended that some provisions of OSHA's general industry standards continue to apply in marine terminals, but the group also recommended that a vertical standard be written to apply to those aspects "that are unique to Marine Terminal Facilities" (Ex. 2:ia). However, OSHA has subsequently received several letters (Ex. 58), many from former members of the SAC, urging the Agency to adopt a predominantly vertical marine terminal standard and testifying to the difficulty and confusion associated with trying to comply with two sets of standards (Parts 1910 and 1918).

In many respects, marine cargo handling is a single operation, despite the fact that it has both ashore and afloat segments. Both segments of the marine cargo-handling industry employ longshoremen, both use many of the same types of equipment, and both require many of the same operational procedures. The line between cargo handling aboard a vessel and such work ashore has traditionally and for regulatory purposes been drawn "at the foot of the gangway." In practice, however, loading or discharging cargo from a vessel is one continuous operation which cannot logically be divided into two distinct functions. For example, regardless of whether fork lifts are used in the hold of a ship or inside a terminal, whether ship's gear or house fall gear is used to hoist cargo, or whether vessel cranes or shore cranes perform the lift, the tasks to be done, the hazards to be addressed, the workers involved, and the type of equipment to be used are essentially the same. The fact that cargo handlers involved in both shipside and shoreside aspects of the operation use the same distinctive terms, such as dunnage, burtoning gear, recoopering, stowage, and apron, attests to the common tradition and the unitary nature of the marine cargo-handling industry.

Despite this commonality, however, there are substantial differences between the work environments of longshoremen on board ship and those working ashore. For example, shipboard conditions vary greatly among particular ships, and the restricted spaces and close clearances typical of work aboard ship exacerbate many of the hazards commonly associated with cargo-handling. The equipment and machinery used to handle cargo aboard ship also differ somewhat from those used ashore. For example, vessel cranes and hoisting gear ususally have lower rated capacities than their shore-based counterparts. In addition, there are significantly fewer powered industrial trucks aboard ships than in terminals. Further, certain equipment frequently used in cargo-handling at marine terminals, such as railcars, conveyors, chutes, and hoppers, is not found aboard vessels. These differences in shipboard and shoreside work environments are substantial enough to warrant careful consideration of the hazards unique to each aspect of the industry and have led OSHA to propose this marine terminal standard as a document distinct from, but complementary to, the Agency's longshoring standard. Ultimately, appropriate changes in part 1918 will be proposed to make it consistent with the marine terminal standard.

The entire marine cargo-handling environment, both shipside and shoreside, is also unique in several respects, especially in comparison to other industries. For example, longshoremen must continually work in the harsh environment of the waterfront, which requires exposure both to work-related hazards, such as falling cargo, and to environmental hazards, such as drowning and working around machinery in high winds. Additionally, dock workers perform some of the same high-hazard tasks, and confront many of the same heavy-industry hazards, as those typically associated with the construction industry. Examples of such hazards include falls, crushing and caught-in injuries, and traffic accidents, which are common in container terminals. Cargo handling and construction work are also both seasonal and weather-dependent, and both industries have a high proportion of part-time and transient employees. Longshoremen are also likely to be exposed more frequently and often for longer periods to certain hazardous work situations, such as work in restricted spaces and hazardous atmospheres, than would be the case for many workers in general industry. The excessive occupational injury and illness incidence for the marine cargo-handling industry, more than twice the national private sector average, testifies to the hazardous nature of longshoring (Ex.18: 62, 69). The Hazard section of the preamble above, describes in greater detail the accidents and injuries to which longshoremen are subject.

After careful consideration of the advantages and disadvantages of vertical and horizontal standards,

OSHA had decided to propose 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. OSHA also has a vertical standard for the consrtuction industry (29 CFR part 1926), another particularly hazardous industry with a large workforce (the average occupational injury and illness incidence per 100 full-time construction workers is nearly twice the average for workers in the private sector as a whole).

Proposed Part 1918a references those provisions of Part 1910 that would continue to apply to shoreside cargo handling, but is otherwise self-contained in its coverage of marine terminals.

OSHA particularly welcomes comments both as to the merits and the limitations of a vertical standard for marine terminals. In addition, OSHA would appreciate information about the appropriateness of developing detailed coverage under the vertical marine terminal standard for certain operations and types of equipment, such as abrasive blasting and scaffolds, which under this proposal would continue to be covered under the general industry standards.

(B) Performance vs. Specification Standards

Another issue raised during the development of this proposal concerned performances versus specification standards. 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 crietria to be met to achieve a particular safety objective. For example, a specification standard often requires specific sizes, materials, or types of equipment, and thus allows little or no variation or innovation. OSHA has received many comments in the past about standards that have forced employers to move, retrofit, or replace existing equipment in order to comply with an inflexible specification requirement. This lack of flexibility fails to take the adequacy of many existing facilities into account and discourages design and use innovations. Although enforceability is enhanced by specification standards, they may be unduly restrictive; on the other hand, a performance standard may be too broad to be meaningful. The present general industry standards (29 CFR Part 1910) are primarily specification standards, while the longshoring standards (29 CFR Part 1918) take a predominantly performance approach.

In keeping with OSHA's commitment to clarity, brevity, flexibility, and practicality, and to encourage employers to comply voluntarily, this marine terminal proposal has adopted the performance approach except in those cases in which employee safety would be enhanced by more specific requirements. OSHA has followed this approach in other recent standards (see Fire Protection final rule, 45 FR 60656, September 12, 1980). The Agency is interested in receiving substantive comments from persons who feel that certain of the proposed provisions would benefit either from a greater degree of specification or from a more goal-oriented approach.

(1) *Review of general industry standards for marine terminal applicability.*

The shift in emphasis from specification to performance-based standards, coupled with the Agency's earlier decision to establish a vertical standard for this industry, made it necessary to review the requirements of Part 1910 for applicability to marine terminals. After an extensive examination of the pertinent provisions of Part 1910, OSHA decided that it would not be appropriate to include a large number of these provisions in the marine terminal proposal. The guidelines used to determine which general industry rules to exclude are explained below.

Among the types of provisions in Part 1910 that OSHA chose not to propose for marine terminal application where those directed primarily at the manufacturer (design or construction specifications), and other rules of Part 1910 addressed to industrial or environmental conditions not present at marine terminals. Also, regulatory actions taken in the past by the United States Coast Guard as to certain working conditions in the area of waterfront safety preempt the Agency from exercising its authority as to these working conditions under § 4(b)(1) of the Act.

Pursuant to its statutory mandate under the Port and Waterways Safety Act (33 U.S.C. § 1221 et seq.) to provide rules for the promotion of waterfront safety, the Coast Guard promulgated a series of regulations that set out in detail the practices to be observed by employers to protect against the hazards of fire (see 33 CFR Part 126). Since the Coast Guard has already taken regulatory action as to these working conditions affecting safety and health in which it possesses primary statutory authority, OSHA cannot also regulate in the area. Section 4(b)(1) of the Occupational Safety and Health Act (29 U.S.C. 653(b)(1)) provides that nothing in the Act "shall apply to 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." Accordingly, OSHA's general industry fire protection regulations at Subpart L of Part 1910 could not be incorporated into this proposal.

It should be noted that the Coast Guard issued an advance notice of proposed rulemaking (43 FR 15108) on April 10, 1978, which outlined plans to significantly expand and update the Coast Guard's coverage of fire protection on the waterfront. When the Coast Guard has proposed and then promulgated these fire protection rules, they will apply in marine terminals and will further enhance employee safety.

Many provisions of Part 1910 could not be adopted in this proposal, for practical reasons. Provisions from the general industry standards that deal with equipment or processes not used at marine terminals are not included. For example, § 1910.213 requires that employers provide guarding on a large variety of woodworking machinery. However, many of the machines covered by this section, such as jointers, tenoning machines and veneer cutters, are not found at marine terminals, and therefore do not need to be addressed by this proposal. Consequently, OSHA saw no need to include paragraphs (j) through (q) of § 1910.213 in the proposed standard. In addition, certain provisions on spray painting in the general industry standard, such as the rules covering use of electrostatic hand spraying equipment (§ 1910.107(i)) and the use of drying, curing or fusion units (§ 1910.107(j)), were not made part of this proposal because these types of spray painting equipment are not found at marine terminals. Further, three parts of paragraph (f)(2) of § 1910.184 were left out of the proposal, since the slings and grommets covered are to small to be used in cargo handling operations at marine terminals.

Certain other specification provisions of the general industry standards were not adopted in the proposal because technological innovation has made them obsolete. For example, § 1910.184(h)(3)(ii), which sets the

requisite number of tucks for eye splices made in synthetic rope, has not been adopted because the production of new types of synthetic rope has made these requirements outdated. The provisions of this general industry rule can only be applied safely to those few types of synthetic rope specifically addressed by this rule, because the properties of the new varieties of synthetic rope on the market differ from those of the types of rope covered in § 1910.184(h)(3)(ii). Due to such technological advances in the manufacture of synthetic rope, OSHA believes that the rope manufacturer's recommendations provide a greater measure of safety than the general industry requirement, and the marine terminal proposal therefore mandates the use of these recommendations. Additionally, the Agency has decided not to include the tables from § 1910.184 listing the rated lifting capacities of wire and fiber rope (see Tables N–184–3, to N–184–10; N–184–16 to N–184–19). Again, these tables only contain ratings for certain types of wire and fiber rope. They do not cover new types of wire and fiber rope developed since the standard was promulgated.

The number of outdated provisions of Part 1910 that are not being proposed for marine terminals is small in comparison to the number of provisions not included in the proposal because they are design or contruction specifications. In their place, OSHA has proposed performance standards aimed at providing equivalent safety but simultaneously providing the employer with greater flexibility in choosing means of compliance. Several examples of the use of performance standards in place of design or specification requirements are included in the proposal's section on machine guarding, § 1918a.151. For instance, the proposal does not include the general industry design description of hoods and spreaders for hand-fed ripsaws (§ 1910.213(c)(1) and (2)). Instead, though the proposal specifically requires hoods and spreaders, it also contains a general performance rule requiring the employer to ensure that these saws are guarded to keep employees clear of any danger zone (§ 1918a.151(b)(1); (c)(1) and (2)).

Similarly, the marine terminal proposal does not incorporate the lengthy general industry requirements governing the use of certain types of powered industrial trucks in hazardous atmospheres. Instead the proposed standard provides that work in a hazardous atmosphere be performed only by powered industrial trucks approved by a nationally recognized testing laboratory for use in that atmosphere (compare § 1910.178(b) with § 1918a.43(d)). The rigid general industry specification covering construction of ladder cages has been replaced by a proposed provision that simply states that cages be of rigid construction to prevent an employee from falling through or dislodging the cage (compare § 1910.27(d)(1)(i) with § 1918a.119(e)(5)(i). Another example of substituting performance rules for specification standards concerns strength requirements for guardrails. Section 1910.23 contains specific measurements that wood, pipe and structural steel stair railings must meet to comply with the standard, while the proposal simply states that a stair railing must be capable of withstanding a force of at least 200 pounds applied in any direction (compare § 1910.23(e)(3)(i) through (iii) with § 1918a.112(e)(1)).

The preceding examples of general industry provisions that are not included in this proposed standard do not comprise an exhaustive list of the provisions that have not been incorporated in this proposal for marine terminals. However, OSHA believes this discussion and these examples will illustrate the principles which were followed in reviewing Part 1910 provisions for applicability in the marine terminal environment.

In general, the format and substance of this proposal reflect OSHA's efforts to eliminate needless regulations and to simplify and update others. To achieve these goals with regard to this proposed standard, OSHA has adopted a performance approach to drafting new rules and to revising existing ones. Staff review of Part 1910 convinced the Agency that many general industry provisions could be left out of the marine terminal proposal without reducing the level of protection now provided to longshoremen by these rules. Furthermore, OSHA believes that some of the lengthy, detailed and complex specification-based general industry regulations can be greatly simplified by substituting performance language for existing provisions. By not including some Part 1910 provisions and by modifying others, the Agency has sought both to streamline and to strengthen the safety requirements proposed for marine terminals. Where provisions from the general industry standards have been judged appropriate and applicable to the marine terminal environment they have been adapted to meet the marine terminal industry's specific safety and health requirements.

Certain sections of this proposed standard, such as those pertaining to cranes, have also been based principally on provisions in 29 CFR Part 1918 (longshoring), while other requirements, such as those for welding, have been based primarily on related provisions of 29 CFR Part 1915 (Ship Repairing), Part 1916 (Shipbuilding), and Part 1917 (Shipbreaking); these standards, and certain provisions of the ANSI MH9.1 consensus standard, were used as the basis for certain provisions of the proposal because they were more specifically directed at the hazards of this industry than were the relevant requirements of the general industry standards.

Intersted parties are requested to submit any information related to the coverage of this proposed marine terminal standard. For example, are specific hazards adequately addressed in the proposal? Are dock workers exposed to safety and health hazards which this proposal does not cover? Have extraneous provisions been included in the proposal? Are there any areas of general industry coverage that have not been included in the proposal that should be? OSHA would particularly appreciate information on these issues.

Although many proposed requirements are based on provisions of the longshoring standard (Part 1918), they may vary somewhat in content or language from the parallel longshoring requirements because the longshoring rules have not been updated or substantively revised since 1971. However, OSHA intends to revise these rules in the near future. After the marine terminal standard (Part 1918a) is promulgated as a final rule and revisions to the longshoring standard (Part 1918) have been proposed and promulgated, employers and employees will be able to turn to these parallel standards to find compatible provisions applicable to the ashore and afloat segments of the marine cargo-handling industry.

V. Summary and Explanation of the Proposal

Section 1918a.1 Scope and applicability. Proposed § 1918a.1 outlines the scope and applicability of the marine terminal proposal, Part 1918a. The proposed standard would apply to container, menhaden, roll-on—roll-off, LPG, LNG, general cargo, and liquid and dry bulk terminals, including those at ocean ports and facilities located on the inland waterways. It would also apply to areas devoted entirely to the storage and handling of bulk liquids, such as petroleum, wine, coconut oil, castor oil, or paraffin, or associated packaged liquid products or gases such as drums of lubricating oil or compressed gas cylinders. The proposal

contains no additional provisions directed solely at operations in grain elevator terminals, although such terminals would be covered by an applicable provisions, such as those for electrical equipment and power trucks, of this marine terminal standard after it has been proposed and promulgated. OSHA is currently developing a proposed general industry safety and health regulation for grain-handling facilities. Applicable provisions of the general industry grain-handling standard are expected to be proposed for inclusion in these marine terminal regulations in the future.

The proposed standard would 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 proposed standard would 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, while the Coast Guard has traditionally had the responsibility in marine terminals for maintaining port security (including fire protection and such operations as welding and hot work) under 33 CFR Part 126; for the handling and storage of hazardous materials as defined in 49 CFR Part 172; and the handling of explosives and dangerous commodities, under 46 CFR Part 146. Among facilities designated in the Coast Guard regulations (33 CFR Part 126) are the 15 liquid petroleum gas (LPG) and liquid natural gas (LNG) terminals presently in operation in the United States.

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

In addition, as proposed paragraph (a)(2)(v) states, the scaffold section of the general industry standards (§ 1910.28) would continue to apply in marine terminals. A recent statistical estimate suggests that as many as 32,000 work-related falls from scaffolds occur each year in the United States (Ex. 59: Table 1). Although it is not possible to separate these data into marine terminal as opposed to general industry and construction cases, some of these injuries undoubtedly occurred in marine terminals. Although scaffolds are not used frequently in terminals, they are occasionally needed to perform minor repair tasks or chores such as window washing. At present, OSHA is developing construction and general industry rules for scaffolds, in connection with the Agency's planned overall revision of the walking and 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 marine terminal proposal, 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.

OSHA particularly welcomes comment on the suitability of the current general industry scaffold standards (§ 1910.28), which are presently being applied, for the marine terminal environment. For example, are all of the types of scaffolds covered in Part 1910 used in terminals? What tasks are commonly performed on a scaffold in a terminal? Do terminal employees perform these jobs, or does the terminal owner usually contract such work out? What are the heights at which scaffolds are positioned? What types of fall protection do workers in a terminal use when on a scaffold? In addition, OSHA is interested in receiving any case reports or injury statistics related to marine terminal accidents involving the use of scaffolds.

Proposed paragraph (a)(2)(vi) proposes that abrasive blasting operations conducted in marine terminals also continue to be covered by the relevant requirements of the general industry standards (§ 1910.94(a)). As with scaffolds, OSHA is interested in receiving comment on the appropriateness of this coverage to the marine terminal situation. The Agency is aware that most terminals do not perform abrasive blasting; however, this process is performed in some terminals to prepare surfaces for spray painting or other treatment. Employees exposed to abrasive blasting inhale respirable particles of the sand or material used as the abrasive and the material being blasted, and are at risk of developing silicosis or other pneumoconiotic diseases as a result of this exposure. For example, if a mineral grit, such as "Black Beauty," a by-product of copper smelting, is used as the abrasive agent, chromium and beryllium dust and fumes are released, exposing workers in the vicinity to the toxic fumes of these metals. OSHA has issued a field directive requiring atmospheric monitoring when Black Beauty is used as the abrasive agent (Ex. 62).

OSHA is presently revising the general industry abrasive blasting standards, and comment received in the course of that rulemaking, in addition to information obtained in response to this marine terminal proposal, will be evaluated for suitability of application to marine terminals. Provisions determined to be appropriate to abrasive blasting operations in this environment would then be proposed for inclusion in the final marine terminal standard. OSHA invites comment on the adequacy and appropriateness of the current general industry abrasive blasting rules (§ 1910.94(a)) for marine terminals. The Agency would also welcome data on the number of marine terminal abrasive blasting operations, the size of the affected workforce, the abrasives used, and the composition of the materials most commonly blasted. In addition, any information on abrasive blasting-related occupational illness and disease among marine terminal wokers would help OSHA to develop this section of the final rule.

Section 1918a.2 Definitions. Section 1918a.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. 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 and

smelters. These facilities are principally concerned with manufacturing rather than cargo handling, and would therefore continue to be regulated under the general industry rather than the marine terminal standards.

In keeping with OSHA's shift to performance language to encourage voluntary compliance and to permit greater flexibility, the proposal applies the "danger zone" concept to the guarding of conveyors (see § 1918a.48) and machines (see § 1918a.151). As defined in the proposal, a danger zone is 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.

OSHA has adopted the danger zone approach in preference to including individual provisions requiring guarding for each type of hazard, e.g., nip points, shear lines, gears, sprockets, and transfer mechanisms. The difficulty with attempting to specify every hazardous part or area is that some hazards may be overlooked in the standard, leaving a gap in employee protection. An advantage of using the danger zone concept is that it permits employers to use their judgment about which machine parts or areas at or near a machine do in fact expose employees to workplace hazards. For example, although an unguarded nip point near an employee's work station presents a significant caught-in hazard, a nip point located 10 feet above the working surface presents no such hazard. Similarly, the unguarded edge of a belt conveyor at which, for example, assembly workers are stationed would constitute a danger zone, while an edge on an unattended overland conveyor would not present a hazard to employees.

OSHA welcomes comments on this proposed danger zone concept. For example, does it cover all the hazards associated with moving machine parts and conveyors? Are there individual hazards that should be addressed separately in the proposal?

Subpart B—Marine Terminal Operations

Section 1918a.11 Housekeeping. Subpart B deals with characteristic operations associated with marine terminals, such as cargo handling, line handling, and work in hazardous atmospheres.

Section 1918a.11(a) contains general housekeeping provisions that are based essentially on requirements in § 1918.91 and on sections 3.1.12 and 3.1.13 of ANSI MH9.1 and which accord with SAC recommendations (Ex. 2: 13i) on this topic. The provisions in this section are designed to prevent tripping and falling accidents, injuries caused by sharp objects such as nails, and struck-by accidents caused by falling objects. Paragraph (b) is similar to § 1918.43(a)(1) and is included because some vessels still use hatch beams and covers, and this equipment is occasionally placed ashore in the terminal. Proposed paragraph (c) is a housekeeping precaution that is designed to ensure that employees have unobstructed access to vehicles, buildings, and vessels at all times.

Section 1918a.12 Slippery conditions. Section 1918a.12 contains a performance requirement stipulating that employers eliminate walking-and-working surface hazards at work stations and walkways, both inside and outside the terminal's structures. Examples of these hazards are slippery floors caused by spilled liquids or by oil leaking from equipment, and icy surfaces on piers or aprons. Means of eliminating these hazards might include applying sawdust or other absorbent material to the slippery area, cleaning up spills entirely, or applying sand or salt. ANSI MH9.1 (section 3.1.16) is more detailed in its coverage of this topic than the proposed requirement, which uses a more performance-based approach. The proposed provision's language reflects the fact that weather conditions, for example, may make it impossible for an employer to keep all terminal walking and working surfaces completely slip-free at all times. This would be particularly difficult to accomplish in outdoor areas exposed to the marine environment. However, since recent estimates (Ex. 59: Table 1) indicate that falls on the same level account for approximately 9% of all occupational injuries, the importance of efforts to eliminate slip and fall hazards cannot be overemphasized.

Section 1918a.13 Slinging. Slinging cargo is addressed in proposed § 1918a.13, and the provisions are based essentially on equivalent regulations in Part 1918 and section 8.3.1 of the MH9.1. Paragraph (a) is based on §§ 1918.82(a) and 1918.81(a), and requires that drafts (loads of cargo) be built or hoisted in a way that will prevent the cargo from falling during hoisting; particular ways of achieving this goal are not specified. The proposed provision also stipulates that drafts be safely slung before hoisting, and that any loose protruding pieces be removed to prevent employee injury. Examples of means that might be used to comply are restraining logs in bunks and banding or tying the topmost tier of the draft. Methods of hoisting that reduce the risk of the draft slipping during the lift are, for example, lifting the draft squarely in the middle of the draft, and taking care not to "jerk" the winch mechanism. This provision is not intended to apply to the preliminary hoisting of cargo, such as the small amount of lifting involved in "breaking out" (hoisting cargo a few inches to allow slings or other gear to be passed under the load).

Proposed paragraph (b), based on § 1918.81(e), allows baled cargo to be lifted by straps only if the straps are strong enough to support the weight of the bale and only if a minimum of two hooks, each placed in a separate strap, is used to provide an additional safety factor should a band or strap break or a hook disengage during hoisting.

In paragraph (c), OSHA is proposing a newly developed provision restricting the means of hoisting bundles of certain types of cargo. For example, some types of cargo, such as pig iron, dunnage, or copper ingots, should not be hoisted by straps that are not intended for hoisting use; unless the bands, straps, or ties are designed for hoisting and are strong enough to support the load, a means such as slings must be used to contain these loads during hoisting.

Proposed paragraph (d) is also a newly developed provision, and it deals with the hazards associated with hoisting unitized loads, which have come into widespread use in the last decade. Finished lumber, bales of wood pulp, and paper products bound together are among the drafts most commonly unitized. The handling gear for hoisting these often bulky and heavy loads is usually specifically designed for the load in question. However, in the absence of any regulatory requirement, OSHA and its predecessor agency (and several agencies of foreign governments) have occasionally determined that the particular means of unitization and handling are safe by witnessing an on-site trial deliberately conducted under adverse working conditions. In such cases, approval has been granted on an individual basis. The provisions proposed in paragraph (e) simply place these procedures on a firmer regulatory basis. The testing process must be certified by an agency accredited under Part 1919, to ensure impartiality. The provisions in paragraph (e) do not require that each load or unit from a shipment be tested, but they are intended to apply to particular types of unitized loads and to a particular means of handling them. The suitability and

safety of each type of load and each means of hoisting would only need to be established and documented once.

Proposed paragraph (f) stipulates that unitized loads with seriously damaged banding or strapping be handled by whatever special and additional means, such as slings, may be necessary to ensure the safety of employees below.

Paragraph (g) proposes that case hooks only be used to hoist cases specifically intended to be used with these hooks. This rule is not intended to prohibit "breaking out" of cargo, i.e., lifting it a few inches to pass slings or other gear beneath the load, but is intended to guard against accidents that may occur if types of packaging unsuited to handling with case hooks are hoisted by this means. Cases intended for handling with hooks have stencilled marks indicating where the hooks are to go, and these cases are intended to be used for one lift only. A similar provision is found in § 1918.81(d).

Proposed paragraph (h) is based on § 1918.81(f) and requires that ropes (tag lines) be used to guide loads requiring manual guidance, to prevent the load from injuring employees. This provision would only apply to special types of lifts, for example hoisting a 30-foot-long crate that must be maneuvered with ropes to keep it from striking against a structure and breaking. The provision also stipulates that any guide ropes used be long enough to aid in directing the load.

Paragraph (i) is a cross-reference to a proposed provision covering the handling of intermodal containers.

Section 1918a.14 Stacking of cargo and pallets. Proposed § 1918a.14 stipulates that cargo and pallets stacked in tiers be placed so they will not slide or collapse; MH9.1 contains a similar requirement (section 4.2.9.5); the equivalent provision for shipboard application appears at § 1918.83(a) but is restricted to cargo because pallets stacked high enough to be a hazard are rarely found on board ship. The proposed provision essentially agrees with the recommendation of the SAC (Ex. 2: 83i); it is not intended to imply that cargo or pallets need to be stacked so securely that they will be able to withstand a major impact, such as being hit by a vehicle.

Section 1918a.15 Coopering. The proposed section on repair of damaged or leaking cargo packaging (coopering) (§ 1918a.15) provides that packaging repair activities be performed in a manner that is not hazardous to coopering employees, but it does not restrict this work to particular locations because it is not always possible to move damaged cargo to a special repair site. Examples of cargo and cargo packaging which would be difficult or impossible to move to a special repair area are sacks of coffee beans and barrels of nails. The proposed requirement does not prohibit coopering in place as long as the employees doing the repair work are not exposed to vehicle traffic, overhead loads, or other hazards.

Section 1918a.16 Line handling. Section 1918a.16 covers line handling, a topic also addressed by ANSI MH9.1 (section 3.14). The proposed provisions ensure a safe walkway for linemen required to handle heavy mooring lines along the water edge of the terminal area, and in cases where the walkway between the vessel's berth and a terminal structure (stringpiece or apron) is too narrow, the proposal requires a grab rail or grab line for linemen to grasp. Another provision directed at the same hazard, falling into the water and drowning, appears at proposed § 1918a.95(c).

Section 1918a.17 Railroad facilities. Railroad facilities and operations at marine terminals are addressed in § 1918a.17; no other OSHA standard specifically covers these facilities, although section 3.12.3 of MH9.1 does. Proposed paragraph (a) prohibits employees working in a railcar that has a defective and unsafe floor; if the floor is rusted out or otherwise unsafe, a steel plate or other means of supplemental flooring would have to be supplied before work continues.

Proposed paragraph (b) is intended to avoid the injuries that might occur if employees walk between or climb through railcars on the way to or from their work stations; section 3.12.4 of ANSI MH9.1 addresses the same hazard. This provision does not apply to walking between standing railcars that are more than 10 feet apart on the same track, because OSHA believes this distance is sufficient to ensure that no employee will be caught between two cars if one of the cars moves. OSHA would welcome accident data or other information concerning the adequacy of this distance for employee protection.

Paragraph (c) ensures that no employees are accidentally left in a railcar at the close of works; a similar provision appears at section 3.12.5 of ANSI MH9.1. For example, an employee cleaning a tank car may accidentally be locked up in the car overnight, with the tank secured, and be killed by toxic fumes or lack of oxygen.

Accidental railcar movement is addressed in proposed paragraph (d), and the provision agrees essentially with section 3.12.6 of ANSI MH9.1. Inadvertent movement of a car could injure employees working in or around the car; an example of means of preventing railcar movement is chocks.

The Advisory Committee recommended (Ex. 2: 51i) a "blue flag" requirement (a warning flag placed to notify railcar operators that men are working between two cars). OSHA has adopted this recommendation, although the color of the warning flag is not specified, in proposed paragraph (e) because workers in, on, or under a railcar are exposed to serious injury if an engine or car hits the car in which they are working. OSHA welcomes data about the hazards of working in this situation and information about other alternate means, such as derails, which might be used to provide equivalent protection against this hazard.

The next proposed provision, paragraph (f), requires material protruding from railcars to be removed or repositioned before cars are moved, to prevent projections from hitting employees walking or working near the cars.

In paragraph (g), OSHA addresses the potential for injury associated with the uncontrolled and unanticipated movement of unpowered railcars (a practice colloquially known as "humping" railcars) in areas where employees are walking, driving, or working. The proposed provision is not intended to apply to railcars being moved by locomotives, car pullers, winches or by other controlled and suitable means or to prohibit car-dumping operations in a bulk terminal. The requirement would apply, however, when a shift engine is used to push a railcar and then stops, sending the car rolling down the track. The SAC committee made two recommendations on this matter (Ex. 2: 52i): That only "positive means" be used to move unpowered cars, and that railcars without engines not be moved unless "provisions are made to safely control the movement. . . ." The proposed requirement incorporates these suggestions and would provide the employee protection envisaged by these recommendations.

Freight car doors, addressed by proposed paragraphs (h), (i) and (j), may cause accidents. For example, damaged car doors may fall on workers trying to open them or a worker opening a car door may be crushed by a stream of cargo that has shifted against the door during transit. In addition, if the forks of a fork lift truck are used to pry open a car door, the wheels of the truck may become wedged between the railcar and the platform, or the door of the car may fall on the truck driver. Section 3.13 of ANSI MH9.1 prohibits using power

trucks to open or close jammed railcar doors, but OSHA believes that industrial trucks fitted with specially designed door-opening attachments can perform this operation safely. The proposal does stipulate, however, that power trucks that do not have such attachments may not be used to open jammed doors; in such cases, car door openers are required to be fitted to the doors of the car. Proposed paragraph (i) also requires drivers to stand clear while freight car doors are being opened, to avoid being hit by falling cargo. OSHA has issued an interpretation for general industry on the use of acceptable attachments for opening freight car doors (Ex. 25).

Proposed paragraph (k) requires that employees leave flat cars and gondolas when loads are being moved overhead; employees are needed in the railcars to do such things as hook up drafts and land and stow cargo, but having them leave the cars during actual overhead hoisting should prevent many serious crushing and falling injuries. Another provision of the proposal (§ 1918a.71(g)(2)) also prohibits standing or walking under suspended containers. Proposed paragraph (k) also requires the end gates on the railcar to be secured so that an employee leaning against a gate will not fall off the railcar.

In paragraph (l), OSHA is proposing a new provision that requires the operator of the railcar dump mechanism used in handling high-volume bulk cargo (such as coal) to have an unobstructed view of the cars being dumped, to avoid dumping cars that have employees in them or dumping material on employees working near the cars.

Proposed paragraph (m) requires hand switches that are recessed to be enclosed with a cover or other device to provide a level working surface for vehicles and employees engaged in cargo handling on the apron. Section 3.12 of MH9.1 recommends identical coverage.

Warning signs to protect employees from being hit by a railcar are addressed in proposed paragraphs (n) and (o). The first provision requires signs to give employes warning of potential railcar movement at such places as blind corners, doorways opening directly onto the tracks, or at any other place where an employee might accidentally step in front of a moving railcar because it is not possible to see the tracks adequately. ANSI MH9.1 addresses this potential hazard in a similar way in section 3.12.1.

Proposed paragraph (o) requires warning signs to alert employees of insufficient clearance (less than 2 feet) between a railcar and another object, structure or the water; this requirement would prevent an employee from being crushed or from falling into the water.

Section 1918a.18 Log handling. Section 1918a.18 covers log handling cargo operations; it is based on the Washington state standard (WAC 296–56–520, (Ex. 3:45)) and was developed with the assistance of the staff of the Washington Division of Safety, Department of Labor and Industries. Much of the cargo handled in Pacific Northwest ports consists of outbound logs, although other ports also handle cargo of this type. The SAC recommended adoption of the provisions in this section (Ex. 2:143i, 144i).

Paragraph (a) proposes that log containers (bunks) have rounded corners and parts to prevent damage to slings, which could, in turn, cause a load to fall. Proposed paragraph (b) requires that logs be prevented from rolling off the sides of vehicles and striking nearby employees; binders or lashings might be used for this purpose.

The next proposed provision, (c), stipulates that at least two slings (or other gear intended for the purpose) be used to handle logs to prevent them from sliding or slipping from the sling during hoisting. Proposed paragraph (d) prohibits stacking of more than one tier of logs, to prevent the hazard caused by spreading and rolling logs that have been improperly stacked. The same hazard is addressed by proposed paragraph (e), which requires that logs be adequately supported to prevent spreading during hoisting.

Section 1918a.19 Movement of barges and railcars. Section 1918a.19, which covers the movement of barges and railcars in marine terminal areas, is similar in intent to the requirements appearing at § 1918.84(c) and at section 3.12.8 of ANSI MH9.1. The proposed provision prohibits using runners and rigging from vessel cargo booms, cranes, derricks, or other unsuitable equipment to move barges or railcars, and parallels the protection against this hazard provided in the longshoring standard. The proposal, however, extends the prohibition to shore cranes and other shore-based equipment. The proposed requirement is intended to prevent the widespread practice of moving barges and cars by hooking them to the ship's cargo gear or to vessel or shore-based cranes, a practice which can lead to the crane capsizing because large and improper stresses are imposed on the boom at angles for which the equipment was not designed, or which may structurally damage the crane or derrick, causing subsequent failure.

Section 1918a.20 Interference with communications. Cargo handling is a complex operation requiring close cooperation and effective communication among supervisory personnel, operators, and other workers. Section 1918a.20 requires that high noise levels, such as those that might be caused by scaling the sides of vessels, not be permitted to interfere with the communication essential to safe cargo handling; this paragraph is based on a similar provision from § 1918.95(a).

Section 1918a.21 Open fires. A prohibition against any open fire in a marine terminal (§ 1918a.21) has been incorporated into the proposal on the recommendation of the SAC (Ex. 2:15i); some committee members felt that any open fire, including a fire in a drum and used to warm employees' hands, represented a significant safety hazard in the marine terminal environment. OSHA invites specific comment on fire hazards in terminals, to aid the Agency in preparing the final rule on this topic. For example, would restricting open fires to designated areas provide adequate employee protection against unwanted fires?

Section 1918a.22 Hazardous cargo. Section 1918a.22 deals with the subject of hazardous cargo, and is based on OSHA's general industry coverage of atmospheric contaminants, and the Coast Guard (Department of Transportation) Hazardous Materials Tables. As defined in proposed § 1918a.2(p), any substance covered in Subpart Z of OSHA's general industry rules or included in the Hazardous Materials Table or Hazardous Materials Regulations of the Coast Guard, Department of Transportation (49 CFR Part 172) would be considered hazardous cargo. In addition, any substance not specifically described by name in the table or regulations of 49 CFR Part 172 noted above, but which would be categorized as hazardous in 49 CFR Part 172, e.g., a combustible liquid or an explosive material, would also be considered hazardous cargo. This category of hazardous materials has been included in the proposal to ensure that hazardous chemicals and substances that were developed or determined to be hazardous after publication of the lists in Subpart Z and 49 CFR Part 172 will be handled in a manner that will protect employees from harmful exposure. The proliferation of new chemicals and combinations makes the inclusion of this additional safeguard essential.

It is important to note, however, that although any substance included in the proposed definition of "hazardous" has

the potential to cause harm, specific circumstances vary, depending on the toxicity of the substance involved, the duration of the exposure, and the susceptibility of the individual exposed. In the case of hazardous cargo moving in trade, these circumstances occur rarely and only by accident, because cargo of this type is contained in sealed and intact packaging, which prevents employee exposure entirely. It is only when such packaging leaks or breaks that hazardous exposures can occur. The precautions for handling hazardous cargo included in the proposal are intended to prevent such occurrences if at all possible and to protect employees from harmful effects when they do occasionally occur. Examples of such potentially hazardous cargo are chlorine, hydrochloric acid, asbestos and many other chemicals.

Proposed paragraph (a) requires the employer to determine the nature of the hazardous cargo to be handled and then to inform employees both of any potential hazards and special precautions required to handle the cargo and the proper methods for cleaning up any leaks or spills.

Proposed paragraph (b) requires that hazardous cargo be handled by methods that will prevent damage to the container, to minimize the risk of employee exposure. Examples of appropriate precautions might be nets or lashings.

Paragraph (c) proposes precautions to be taken to reduce exposure to hazardous substances that have leaked or spilled from containers. For example, if leaks or spills occur, employers are required to clear the danger area of personnel other than those engaged in the cleanup operations, to provide appropriate protective and cleanup equipment, and to instruct employees in the proper method of cleaning and disposing of the hazardous substance. The provisions in proposed § 1918a.22 are similar to provisions 8.2.1, 8.2.2., and 8.2.3 of ANSI MH9.1, and to material recommended by the SAC (Ex. 2:140i–141i).

Section 1918a.23 Hazardous atmospheres and substances. Proposed § 1918a.23, Hazardous atmospheres and substances, is designed to provide protection from atmospheric hazards which are not specifically addressed in other proposed sections. The Advisory Committee recommended (Ex. 2: 56i) that this section of the draft standard not be included in the proposal. Instead, the SAC recommended including a single section covering all hazardous atmospheres in confined spaces. This recommendation was not adopted because OSHA believes that atmospheric hazards should be addressed wherever they occur in the terminal environment, regardless of the type of space in which they occur. Accordingly, this proposed section is intended to apply to vehicles, tanks, rooms and other spaces, to contaminants such as the vast array of hazardous chemicals carried as marine cargo, and to oxygen-deficient atmospheres occurring in any marine terminal situation. The substances, types of terminals, and operations specifically excluded in paragraph (a) are addressed individually in other sections of the proposal.

In the final standard, OSHA is considering incorporating the requirements from proposed §§ 1918a.23, 1918a.24, and 1918a.25 into a single section covering all types of hazardous atmospheres found in marine terminals. This consolidation would eliminate many redundant provisions, and would appear to offer equivalent employee protection. OSHA welcomes comments on the advantages and disadvantages of covering hazardous atmospheres in a single, rather than in separate, sections.

Paragraph (b) is generally based on § 1918.86 of the maritime regulations, although it has been adapted to apply to shoreside conditions. It requires that any necessary testing to determine whether a hazardous atmosphere exists be conducted by a properly equipped person designated by the employer, and that records of test results be kept for a minimum of 30 days, in accordance with a SAC recommendation (Ex. 2: 56ii).

The proposed provision appearing at (c) stipulates that in situations where mechanical ventilation is required to maintain an adequate and safe atmosphere, atmospheric tests be conducted as often necessary to ensure that the atmosphere is below permissible levels for the chemical involved.

Paragraph (d) addresses entry into hazardous atmospheres. The proposed requirements specify that only a designated and properly equipped and instructed person be allowed to enter a hazardous atmosphere, which might be necessary in a rescue attempt or to clean up after a spill. This section of the proposal also requires that prepared and equipped standby observers monitor the activity of any employees in spaces containing hazardous atmospheres, and that no ignition sources be permitted in such spaces. The importanct of training both workers and standbys involved in entry and work in hazardous atmospheres cannot be overstated. Accidents in these situations are often fatal and multiple, involving both workers and rescuers (Ex. 24).

The requirements in proposed paragraph (d)(4) recognize that atmospheres containing oxygen levels of less than 19.5% are inadequater for performing hard work; humans breathing oxygen-deficient atmospheres are unable to perform strenuous exercise or even to sustain a moderate level of exertion. Cleaning a tank car in a terminal is an example of work in an atmosphere that might be oxygen-deficient. The proposed 19.5% level is consistent with Coast Guard requirements (Ex. 65). OSHA's existing maritime regulations (29 CFR Parts 1915, 1916, 1917, and 1918) allow a minimum of 16.5% oxygen, but these provisions are presently under review and will be changed in the near future.

Although proposed paragraph (e) addresses a subject, asbestos, already covered by Subpart Z of the general industry regulations (29 CFR Part 1910), the Advisory Committee recommended (Ex. 2: 132i) inclusion of a provision dealing with the proper method of cleaning asbestos spills, a suggestion with which OSHA concurs. In practice, asbestos-containing cargo is almost never moved in trade in anything but heavily protected, sealed and intact packaging. However, the proposed requirements would provide employee protection in the event of asbestos spills.

Section 1918a.24 Carbon monoxide. Section 1918a.24 addresses carbon monoxide, a common hazard which is also dealt with in § 1918.93(a) of the longshoring regulations and in ANSI MH9.1 (section 3.18). Proposed paragraph (a) specifieds maximum carbon monoxide levels of 50 ppm as a time-weighted average, with a 75 ppm ceiling level. These levels agree with those of the Coast Guard (46 CFR Section 35.70–20(d)), and OSHA general industry standards (Supart Z of Part 1910), but OSHA's existing longshoring regulations (§ 1918.93(a)) allow a 100 ppm ceiling; the Agency plans to propose reduction of this figure to 75 ppm when Part 1918 is revised in the near future.

Proposed paragraph (b) contains a performance requirement and is intended to provide worker protection while allowing employers to test at intervals determined by the particular situation. For example, most transit sheds and other similar structures in marine terminals have high ceilings and numerous openings, so that maintaining a safe atmosphere generally poses no difficulty. However, since many vehicles may operate in these spaces simultaneously and not all spaces have

good ventilation, the employer should be prepared to monitor such work areas. Refrigerated and similar confined spaces that have very limited natural ventilation would require almost constant testing and additional ventilation to protect employees adequately. Enclosed highway vehicles or railcars in which an operating internal combustion engine is working might also develop a sufficient carbon monoxide level to be hazardous to an employee working in the car. OSHA is particularly interested in receiving comments giving other examples of marine terminal work situations in which hazardous carbon monoxide levels occur.

Proposed paragraph (c) requires that only designated persons using NIOSH-certified carbon monoxide measuring instruments make these tests, to ensure accurate testing and interpretation of the results. The tests required in this section should be made in the specific area where employees are working, to avoid misleading results such as may occur when samples are drawn from sources distant from the employee exposure area. The last paragraph in this section specifies that records of all tests required in this section be maintained for 30 days.

Section 1918a.25 Fumigants, pesticides, insecticides, and hazardous preservatives. Section 1918a.25, Fumigants, pesticides, insecticides, and hazardous preservatives, is directed to the atmospheric contamination associated with the use of these substances. Cargo that is frequently fumigated includes grain, tobacco, cotton, and other agricultural products; exposure to fumigating agents may cause severe illness or even death, depending on the toxicity of the agent, the level of exposure, and the susceptibility of the individual exposed.

Proposed paragraph (a) states that employers must ensure that only equipped and designated employees enter a space if cargo has been stored, handled, or treated in the space with one of these substances.

Proposed paragraph (b) specifies that tests to determine concentrations of chemicals be appropriate for the specific hazard or hazards involved, be conducted by persons designated by the employer, and be performed as often as necessary to protect employees. The recordkeeping provision that applies to this section appears at proposed paragraph (c) and requires that records of tests be kept for a minimum of 30 days. Provision (d) stipulates that only designated persons be permitted to apply chemicals to cargo; the Environmental Protection Agency (EPA) and several state agencies presently require that persons applying fumigants have EPA or state approval, which would be deemed to meet this requirement.

Paragraph (e) makes clear that only designated persons who have been instructed about the hazard and the applicable precautions and who know how to use the appropriate protective and emergency equipment are permitted to enter a space containing a hazardous atmosphere; further, persons entering must be protected both by respiratory and emergency equipment meeting the requirements of Subpart E of this part, and equipped and prepared standby observers must monitor employee activity within the space.

In paragraph (f), OSHA proposes that danger signs identifying hazards and precautions and providing emergency treatment instructions be posted in any area in which a pesticide, fumigant or hazardous preservative has created a hazardous atmosphere. This proposed provision is in keeping with modern safety and health practices and OSHA's efforts to increase the level of employee awareness of specific workplace hazards.

Section 1918a.26 First aid and lifesaving facilities. Proposed § 1918a.26 treats the subject of first aid and lifesaving facilities and is based primarily on § 1918.96 of the longshoring regulations and section 8.10 of ANSI MH9.1. The SAC recommended that employers be required to "keep related records of occupational diseases" (Ex.2:156ai), a recommendation not adopted because OSHA's existing medical recordkeeping requirements (29 CFR Part 1904) are more specific and more comprehensive than those recommended by the Committee.

Paragraph (a) stipulates that employees be instructed to report all work-related injuries to their employers; this proposed provision is designed to improve on-site treatment of occupational injuries and accidents, and simultaneously to reduce worker morbidity and lost workdays in this high-hazard work environment. Accurate employee reporting also aids in increasing the responsiveness of accident prevention programs to particular workplace hazards.

In proposed paragraph (b), OSHA defines the employer's responsibilities to provide first aid; the requirement is based on § 1918.96(a) of the longshoring regulations and is more extensive than the parallel general industry provisions (§ 1910.151). The proposal states that the employer must keep a first aid kit at the site where work is being performed, and must additionally ensure that a person holding a current first aid certificate is at the terminal. No particular first aid course or approving agency is designated, so long as the certificate is issued by a responsible organization which requires successful completion of a course as evidence of qualification. An example of an acceptable organization is the American Red Cross. Employees qualified at levels above that of first aid, for example as paramedics, would be deemed to satisfy this requirement without a first aid certificate.

First aid kits must be weatherproof if they will be exposed to the weather, and each sterile item must be sealed individually. Individual items and, in some cases, sizes are specified; burn dressing is not required, as it is in the longshoring standard, because medical opinion now advises against its use. This proposed list of items, intended as a minimal requirement, would in many cases be augmented by items appropriate to the particular environment or type of work involved. Except for the deletion from the list of burn dressing and the addition of first aid dressing, the proposed list is identical to the one in § 1918.96(b) and section 8.10.2 of ANSI MH9.1.

Paragraph (d), which covers stretchers, parallels a similar requirement for shipboard use (§ 1918.96(d)), but does not specify the number or type of stretchers required, as section 8.10.3 of ANSI MH9.1 does. OSHA believes that a "readily accessible" stretcher (available within five minutes) and blanket will provide adequate employee protection. The requirement that the stretcher be permanently equipped with bridles for hoisting, which are essential when hoisting employees from a vessel, has been retained for the marine terminal environment because employees may occasionally have to be hoisted, for example over the side of a gondola car or from a crane.

The next paragraph, (e), proposes that a phone or equivalent means, i.e., radio, be available for emergency use; adoption of this language was recommended by the SAC (Ex.2:157i), and is intended to allow greater flexibility, without compromising safety, than is provided by a similar rule appearing at section 8.10.4 of the ANSI MH9.1 standard, which allows only a telephone. The expression "readily available" means within a three-to-five minute period.

Liferings and ladders to prevent employees from drowning are addressed in paragraph (f), which requires that both items of safety equipment be available within 200 feet of each waterside work area. A ladder is

necessary to allow an employee who has fallen into the water to climb back up to the dock or to be rescued. The proposed requirement recognizes that cargo is not worked along many sections of frontage and there is no threat to worker safety in these areas. All active frontage work areas would be equipped, under the proposed provision, with ladders and rings within 200 feet of any such area. Section 1918.96(e) of the longshoring regulations contains similar coverage. Ninety feet of lifeline must be attached to each U.S. Coast Guard approved lifering, a requirement based on an equivalent provision in § 1918.96(e) and on the Coast Guard rules. In addition, any employee working on a bridge or structure leading from the terminal to a distant vessel berthing installation is required to wear a work vest to prevent drowning in case he falls into the water. These berthing installations are isolated from the main terminal area, sometimes by as much as one mile, and immediate rescue might therefore not be possible.

Section 1918a.27 Personnel. Section 1918a. 27 addresses personnel qualifications. Proposed paragraph (a) is directed to the hazards associated with power-operated hoisting equipment, conveyors, or vehicles, including industrial trucks, and requires that all employees, except supervised trainees, be familiar with signs, signals, and operating instructions before operating such equipment or giving signals to the operators of hoisting machinery. This rule is based on § 1918.97(a) and is similar to paragraph 8.9 of ANSI MH9.1. The SAC recommended (Ex. 2:155i) adding "and recognized as competent by the employer" after "trained and experienced employees," a recommendation which OSHA has not adopted because it is the training and experience which are essential to safe operation; any training recognized by a responsible group or organization would therefore be deemed to meet this requirement.

In paragraph (a)(2), OSHA proposes requiring all machinery operators assigned after the final standard's effective date to pass a practical on-the-job operating examination and to be instructed by the employer in standard operating procedures. This provision is designed to upgrade the training and experience levels of equipment operators without requiring licensing or formal training. OSHA supports and encourages joint labor-management training efforts, which have often sponsored such courses in the past. The specific content of the practical examination and the topics of the training course are left to the employer's discretion.

Proposed paragraph (a)(3) is very similar to § 1918.97(b), and provides that employees with medical conditions that could be incapacitating not operate powered machinery. It is intended to protect both the employee with the medical disability and other employees working with that employee. The draft version of this requirement reviewed by the SAC allowed employees with disabilities to operate power-operated equipment, provided they were annually certified by a physician as fit for such employment; the Advisory Committee recommended deletion of this waiver requirement (Ex.2:156i), a recommendation that has subsequently been adopted in the proposal. The type of medical condition addressed by this proposed provision is one which could be suddenly incapacitating, such as serious heart disease, seizure disorder, or insulin-dependent diabetes. OSHA believes that employees with a history of such a serious medical condition should not operate powered equipment.

Paragraph (b) is a newly developed provision similar in intent to a requirement that has appeared in a labor-management contract for this industry (Ex. 27: 4). The proposed rule, which requires that supervisors be trained in accident prevention, would only apply to supervisors of more than five employees. It is designed to increase awareness of hazards and methods of accident prevention at the supervisory level, and thus indirectly at all levels of the work force. The requirement allows a phase-in period, to permit supervisors time to acquire such training. However, after the delayed effective date specified in this paragraph (two years from the final standard's effective date), newly assigned supervisors would be required to take such a course within three months of assignment. The training required would include, in addition to instructions in matters specifically pertaining to the operation to be supervised, instruction in those topics specified in proposed paragraph (b)(2). An earlier SAC version of this requirement stipulated that supervisors have "documentary evidence of satisfactory completion of a 30-hour training course in accident prevention"; the majority recommendation of the committee (Ex. 2: 156i) was that the 30-hour specification be deleted. OSHA believes that accident prevention training is the key to reducing workplace accidents, but agrees with the Committee's judgment that the precise length of the training course does not need to be specified. Since this provision is not based on a similar requirement in any existing maritime regulation, OSHA particularly seeks comments and any relevant information on this matter. The Agency would also welcome suggestions for topics that should be included in the training course.

Subpart C—Cargo Handling Gear and Equipment

Section 1918a.41 House falls. This subpart of the standard is devoted to the gear, machinery, and equipment used to handle cargo. The first proposed section, § 1918a.41, concerns house falls used with ship's gear in union purchase cargo-handling (using cargo runners from the ship and the terminal's hoisting equipment together), a subject not addressed in the present longshoring regulations (although section 4.1 of the ANSI MH9.1 does cover house falls). House fall gear includes spans and supporting members, winches, blocks, and standing and running rigging attached to a terminal facility and used in conjunction with the vessel's gear to load or unload cargo. This provision has been included because, although the use of conventional ship's gear and house falls has declined drastically in recent years, these rigging arrangements are still used at some locations (especially at inland terminals) and are often poorly maintained. Proposed paragraph (a) requires that span beams be secured to prevent them from falling. The next provision, (b), states that safe means of access to the house fall block must be provided for employees working with such rigging arrangements. The specific means is not specified, but fixed ladder and personnel guarding provisions specified in other sections of this document (§§ 1918a.112 and 1918a.120) would also apply here, if these means of providing access are chosen.

In paragraph (c), OSHA requires a visual inspection of loose gear used in house falls before each day's use. House fall gear is often located in difficult to reach places, and maintenance is therefore easy to overlook. The provision also prohibits the use of defective loose gear.

Section 1918a.42 Miscellaneous auxiliary gear. Section 1918a.42, Miscellaneous auxiliary gear, deals with several types of cargo-handling equipment, such as ropes, shackles, slings, and pallets. Each type of equipment is addressed separately. Proposed paragraph (a) covers loose gear, such as slings, chains, bridles, blocks, and hooks; provision (a)(1) requires that loose gear be inspected before use, not be used if defective, and be stored or placed to avoid being

damaged. Paragraph (a)(2) requires that loose gear be inspected visually during use to detect defects in the gear. Defective gear may not be used, and hooks, shackles, and similar gear must be discarded if distorted, because it is not possible to repair damage of this type without permanently damaging the gear itself. The proposed provisions in paragraph (a) derive from § 1918.61(a) and § 1918.66(c), but have been modified for shoreside application; they are also consistent with industry practice and with rules 302 and 331 of the 1979 revision of the Pacific Coast Marine Safety Code (Ex. 20: 13, 17). They are designed to ensure that defects in the gear, which could, for example, cause the load to be dropped, are detected and appropriately dealt with.

Paragraph (b) proposes the adoption of a new approach to the rating of wire rope and wire rope slings; the existing longshoring regulations (§ 1918.63) and other OSHA regulations (for example, § 1910.184(f)(1), Slings) provide tables listing wire rope ratings, which are to be used in preference to the manufacturer's rating for the rope in question. The present proposal does not include these rating tables, because rope manufacturers provide ratings for their products; ropes of the same size, material and construction but made by different manufacturers or in different countries may have different ratings, and the tables in the existing regulations do not cover many of the ropes presently in use in marine terminals. The proposal requires that the employer ascertain and have available the manufacturer's ratings for all wire rope and wire rope slings obtained after the date noted in the proposed standard. This provision also requires that manufacturer's ratings not be exceeded and that a safety factor of at least five be maintained for the common sizes of running wire used in falls, purchases, or light load slings; this is in accordance with a similar provision in § 1918.63(a).

Proposed paragraph (b) goes on to specify situations in which wire rope safety factors of five do not have to be maintained: in specialized equipment such as cranes that are designed to be used with lesser safety factors; in standing rigging applications such as guys on a house fall mast; and in heavy lifts and other purposes where rope with a safety factor of five would be impractical but for which the employer can demonstrate equivalent safety. These exceptions are necessary in these applications, for example in mobile cranes, where the Society of Automotive Engineers Standard SAE J959 has established a safety factor of three for standing wire and three and one-half for running wire, or in heavy lift applications where a safety factor of five cannot be achieved and the method of handling (slowly and without shock loads) ensures safety. Large-capacity cranes are not designed to carry wire rope with a safety factor of five, because the rope would be too large and too heavy for the crane to lift. In standing wire uses, such as guys, a lesser safety factor is also adequate.

Proposed provision (b)(2) prohibits any wire rope or sling from being used with any of the defects listed, and is a revision of § 1918.63(e)(4) of the longshoring regulations. The proposed requirements are essentially consistent with similar provisions of § 1910.184(f)(5), and some, ((b)(2)(i), (ii), and (iii)), are identical to those of the general industry standards. Proposed items (b)(2) (v) and (vi) are new provisions necessary to ensure safe use of wire rope; any strand or wire slippage in end attachments is a clear indication of rope wear, and more than one broken wire within an inch or so of an end attachment indicates impending fatigue failure.

Proposed paragraph (b)(3) is modified somewhat from a similar provision in § 1918.63(b). It stipulates that ends of splices, if covered, be covered so that the covering can be removed to determine the condition of the splices, and that methods used to blunt ends not damage the wire itself.

The proposed paragraph dealing with wire rope clips, (b)(4), is based on a provision in the longshoring regulations, § 1918.63(c), except that the proposal requires that the manufacturer's use recommendations be followed, and that Table C–1 be used for "U" bolt clips only in the absence of the manufacturer's recommendations. As noted above, this method is preferable to relying on manufacturers' ratings and recommendations in this instance because a single table cannot address all the types of clips now available for use in marine terminals, and because manufacturers provide use recommendations with their products. However, Table C–1 has been brought up to date and expanded to include clip requirements for ropes of one-half inch (or less) in diameter, which are now in common use. Requirements for spacing of clips for ropes smaller than one-half inch have not been included since those for one-half inch rope are suitable for lesser sizes as well.

Proposed provision (b)(5) prohibits securing wire rope by means of knots, and has been adapted from a similar requirement in the longshoring regulations, § 1918.63(d). Knots cannot be used to secure wire rope because this means of securing may reduce the rope's strength capability by as much as 50%. The proper working of a wire rope "machine" depends on the inner core and the outer lays working in unison, which cannot occur when the rope is bent.

Proposed paragraphs (b)(6), (7), and (8) apply to wire rope eyes and eye splices, and are essentially based on provisions 1918.63(e)(3), 1918.63(e)(1), and 1918.63(e)(2) of the longshoring regulations, respectively. Proposed paragraph (b)(6) prohibits the use of wire rope clips or knots to form eyes in bridles, slings, bull wires, or single parts used for hoisting, but is not meant to apply to standing rigging applications, such as guys, or to eyes used with lashings for cargo or dead ends of multipart purchases, where clips may be used. The proposed requirements for tucks in eye splices in paragraph (b)(7) are traditional, and similar rules appear in seamanship texts and other standard sources (Ex. 66: 570). Proposed paragraph (b)(8) also reflects standard industry practice, and is identical to the section on the same topic in the existing longshoring regulations.

Proposed paragraph (c) covers natural fiber rope, and follows the proposal's approach of relying on manufacturers' ratings, rather than tables, for rated capacities of rope. Though no requirement on splices similar to proposed provision (c)(2) is included in the existing longshoring regulations, the proposal reflects current industry practice and is identical to the requirement in § 1910.184(h)(3)(i).

Synthetic rope is addressed in proposed paragraph (d); reliance on manufacturers' ratings is particularly important with this type of rope because it is made of a variety of combinations of synthetic materials, each with different capabilities, ratings, and use recommendations. There are several publications dealing with synthetic ropes (Ex. 37, 38) and the various characteristics of each type. For example, nylon has the largest amount of stretch and is therefore inappropriate for hoisting, and some materials cannot be used around a drum because they will melt when stressed in this manner. No specific requirements are given for splices because such matters are covered by the manufacturer's recommendations. The general industry standard does not cover synthetic rope except that used in slings (§ 1910.184(h)).

Proposed paragraph (d)(2) is similar to § 1918.62(b). The formula and directions for substituting synthetic rope for manila rope less than three inches in circumference were devised by the rope

industry for the Bureau of Labor Standards, the American Bureau of Shipping, and the U.S. Coast Guard (Ex. 23: 5; Ex. 5: 18; Ex. 36: 5–9). This provision also appears in section 4.2.5 of ANSI MH9.1, and is the standard for the American Bureau of Shipping and the U.S. Coast Guard.

Proposed paragraph (e) defines the conditions requiring synthetic and natural fiber rope to be removed from service because continued use would be hazardous; this provision derives from and is compatible with § 1910.184(h)95), and also reflects current industry practice.

The proposed requirement for thimbles (paragraph (f)), which protect rope from excessive wear when it is attached to a ring or similar device, is newly developed and does not appear in Parts 1910 or 1918. It stipulates that properly fitting thimbles must be used when a rope is permanently secured to an attachment. Rope used in a temporary configuration, for example in a pendant, would not be required to be protected by a thimble.

The proposed provision addressed to synthetic web slings (paragraph (g)) was drafted after consideration of the applicability of § 1910.184(i) to the marine terminal setting; the increasing use of synthetic web slings makes requirements such as these necessary for safety. Paragraph (g)(1) is broader than the equivalent provision in the general industry standards (§ 1910.184(i)) because preslung cargo arriving in U.S. ports in international trade is occasionally bound by synthetic web slings which, though adequate, are not always marked with the manufacturer's rated capacities. Allowing sling ratings to be ascertained from the manufacturer would permit shippers or carriers to obtain ratings and thus to continue to use unmarked slings. Provision (g)(2) lists conditions under which synthetic web slings must be retired from service, and is identical to § 1910.184(i)(9), except for the additional disqualifying defect, "damage to fitting," that has been included in the proposed list. A damaged fitting may damage the sling to which it is attached or it may itself fail.

Proposed paragraph (g)(3) prohibits repair and reuse of synthetic web slings, because there is no method of repairing these devices without damaging them structurally.

In paragraph (g)(4), OSHA proposes that these slings only be used in accordance with manufacturer's use recommendations, which specify under which conditions slings of this type may be used. For example, nylon slings may not be used around acids, phenolics, or fumes, and web slings with aluminum fittings may not be used near caustic liquids.

Fittings are required by proposed paragraph (g)(5) to be smooth to prevent tearing of the sling, and they must also have rated capacities equal to that of the sling so the fittings will not fail under load.

Chains and chain slings used in hoisting applications are addressed in proposed paragraph (h), and the requirements essentially parallel those of the existing longshoring regulations (§ 1918.64). These provisions also require employers to depend on manufacturer's ratings rather than complex tables for rated capacities and use recommendations, and further state that these ratings must be available at the terminal.

Proposed paragraph (h)(2) prohibits using proof coil steel chain (common or hardware chain), or other chain not intended for hoisting, for slinging or hoisting purposes. Chain of this type is not strong enough for this use and would fail under load.

Paragraph (h)(3) states the inspection requirements for chains used in hoisting, and is based on similar provisions in the existing longshoring regulations (§ 1918.64 (b), (c), and (d)), which will be made identical to the proposed provisions when the longshoring rules are revised. Proposed paragraphs (i) and (ii) require visual inspection, by designated employees, of sling chains and their end fastenings before each day's use, and during use as necessary, to ensure that they have no operational defects.

A more thorough quarterly inspection of chains is required in proposed paragraph (h)(3)(iii). The month of the thorough inspection must be indicated by appropriate means, such as painting a link; using a tag to indicate that the chain has been inspected is usually unsatisfactory, because the tag often tears off during a lift. Proposed paragraph (h)(3)(iv) requires that any chain showing the maximum allowable wear at any point of the link, as specified in Table C–2, be withdrawn from service. In addition, paragraph (v) states that any sling showing an increase of more than five percent in a measured section or having a bent, twisted or damaged link or a raised scarf or defective weld must be removed from service. Damage of these types significantly reduces the strength of the chain.

Proposed paragraph (h)(4) concerns repairing chains and returning them to service, and is similar to the coverage of the same topic in the longshoring regulations (§ 1918.64(e)), except for the addition of requirements that proof tests not conducted by the manufacturer be certified by an agency accredited under Part 1919 of this chapter, and that test results be available at the terminal. Requiring certification will ensure that chains are inspected and tested at regular intervals.

Proposed provision (h)(5) goes beyond the equivalent provision of the longshoring regulations (§ 1918.64(f)) because it requires wrought iron chains in constand use to be annealed or normalized at least every six months, whether or not the manufacturer so recommends; the present rules only require annealing if the manufacturer has recommended it. Both normalizing and annealing involve heating, which restores the metal to its original strength. The proposed rule also requires that certificates attesting to this treatment be available at the terminal. Wrought iron chains for hoisting have not been manufactured for many years, but some chains made of this material are still in use, particularly on the inland waterways. The final proposed requirement of this paragraph prohibits annealing of alloy chains, which do not require such treatment and might be seriously damaged by the process.

The first two proposed provisions of paragraph (h)(6) are identical in effect to those of § 1918.64(g); they prohibit hoisting with chains that are kinked, knotted, bolted, or wired, because these actions stress the chain excessively and may thus damage it. The final proposed requirement in paragraph (h)(6) is intended to prevent the use of makeshift links or fasteners in cargo hoisting; this topic is not currently addressed in the longshoring regulations, but will be covered when Part 1918 is revised in the future. Makeshift gear arrangements may not withstand the weight of the loads hoisted in cargo handling operations.

Proposed paragraph (h)(7) requires hooks, rings, links, and attachments on sling chains to have rated capacities at least equal to those of the chains to which they are attached; this provision would prevent loading a sling with a heavier load than the sling attachments could bear. This requirement is very similar to a provision appearing at § 1910.184(e)(2).

Proposed paragraph (h)(8) stipulates that it must be possible to identify the size, grade, and rated capacity of chain slings from marks or other identification on the sling; this information needs to be readily available to ensure that slings are only used as the manufacturer intended. The provision is similar to that in § 1910.184(e)(1), but this topic is not

presently addressed in the longshoring regulations.

Shackles are dealt with in paragraph (i), and the first proposed provision adopts the approach favored in the proposal for other hoisting gear, that of relying on the manufacturer's ratings in preference to using a table (in this case, Table C–3) to determine the safe working loads for shackles of various sizes. This table should only be used in situations in which it is not possible to determine the manufacturer's ratings for the shackles in use. The table is intended for mild steel shackles. Most shackles in use today are made of steel alloy that are of higher quality than mild steel, and steel alloy shackles should be used with the appropriate ratings for such alloys. The equivalent longshoring regulation (§ 1918.65) relies primarily on a table to determine minimum safe working loads. Proposed paragraph (i)(2) stipulates that screw pin shackles used aloft (except in cargo hook assemblies) have moused or otherwise secured pins so that the pin cannot come loose. Shackles used in cargo hook assemblies that are not used aloft are accessible during handling, so their pins can be tightened easily and do not have to be additionally secured.

The next proposed paragraph, (j)(1), applies to hooks (excluding hand hooks), and again requires conformance with the manufacturer's rated capacities. In addition, hooks obtained after the date specified in this proposal would have to be tested as part of the certification process outlined in § 1918a.51(c)(6). Proposed paragraph (j)(2) requires hooks that are bent or sprung to be discarded; these deformations are evidence of permanent damage that cannot be repaired. The next two proposed provisions, (j)(3) and (j)(4), require case hook teeth to be in good condition to facilitate grasping and clamp-type plate hook jaws to be sound (for the same reason). Paragraphs (j)(2) through (j)(4) are based on the longshoring regulations (see § 1918.66(b), (c), (d), (e)). A proposed provision requiring loads to be applied to the throat of the hook has also been included in the proposal because loading the point overstresses and bends the hook.

Some provisions of paragraph (k), which addresses pallets, are similar to provisions in ANSI MH9.1 (section 4.2.9) and the longshoring regulations (§ 1918.67). The principle hazard of hoisting a load on a damaged pallet is that the pallet may give way while the load is suspended, causing cargo to fall on employees below. The first proposed provision, (k)(1), requires that pallets be made and maintained to carry loads safely; all fastenings on reusable pallets must therefore be of a type, such as bolts and nuts, drive screws, or helically threaded nails, that will hold securely. Proposed paragraph (k)(2) is a newly developed requirement stipulating that damaged pallets be removed from active work areas, marked as damaged, and stored away from the work site; this rule is intended to ensure that damaged pallets are not accidentally used to hoist cargo.

Proposed paragraph (k)(3) is based on § 1918.67(b), but has been expanded in recognition of the fact that wing-type pallets may occasionally have to be hoisted by means other than bar bridles; so long as these means are suitable for the load, pallet, and other pertinent conditions and provide equivalent safety, they may be used. The prohibition against hoisting lip or wing-type pallets by wire slings alone is included because this practice places employees working beneath the load at great risk, since these slings may cause the pallet to buckle and drop the load.

Loaded pallets that are visibly defective may not be hoisted, according to the proposed rule in paragraph (k)(4), until they have been placed on a second pallet that is acceptable, or are handled by other means, such as a sling, providing equivalent safety. This provision is similar to a requirement at § 1918.67(c).

Proposed paragraph (k)(5) has been shortened but is substantively identical to § 1918.67(d) of the longshoring regulations; the bridles for handling pallets of the types specified must be designed specifically for this use, in order to fit and lift these pallets securely.

The next provision, (k)(6), requires pallets not in use to be stacked or positioned in a manner that will prevent them from falling on employees or otherwise creating a hazard; the SAC recommended the proposed wording (Ex. 2:83i). The final provision proposed in this paragraph, (k)(7), prohibits the reuse of disposable pallets intended to be used for one-way transit only; these pallets are not sturdy enough to withstand repeated use.

Section 1918a.43 Powered Industrial Trucks. Section 1918a.43 contains the proposed requirements for powered industrial trucks used in marine terminals. This section was drafted after consideration of the general industry standards (Part 1910), the longshoring standards (Part 1918), the relevant ANSI standard (Ex. 67), the recommendations of the Advisory Committee, and the results of other staff research. The provisions in this section are intended to address employee hazards associated with the use of powered industrial trucks in a marine terminal; however, many of the provisions dealing with powered industrial trucks that appear in the various source documents are not directly related to employee safety and health, are unnecessarily detailed, or are design or construction specifications addressed to the manufacture, and these have therefore not been adopted for this proposal. OSHA invites comment on the adequacy of the coverage of the proposed provisions for hazards related to powered industrial trucks in the terminal environment.

Paragraph (a) delineates the scope and application of the section; the proposed provisions apply to every type of material-handling vehicle, except over-the-road vehicles, used in a marine terminal. Over-the-road vehicles are not included because these vehicles are covered by Department of Transportation regulations.

Proposed paragraph (b) prohibits an employer from modifying or adding parts to powered industrial trucks if the alteration would affect the vehicle's capacity or safe operation, unless the employer has obtained written approval either from the manufacturer or from a professional engineer before the alteration is made. The engineer must additionally have had experience with the equipment to be altered and must have consulted the manufacturer of the equipment. The instruction plates, tags, or decals on the altered equipment must be changed to reflect the new rated capacity and any changes in operating and maintenance procedures. This proposed requirement allows greater flexibility than the equivalent provision of the general industry standards (§ 1910.178(a)(4)), which only permits modifications approved by the equipment manufacturer. The types of modification to which this provision is addressed include the addition of counterweights or specialized devices, such as attachments for handling rolls of paper.

Proposed paragraph (b)(2) prohibits unauthorized riding on powered industrial trucks; however, when the employer authorizes riding, a safe arrangement, such as a seat or platform, must be provided. Section 5.1.8 of ANSI MH 9.1 also prohibits unauthorized riding; § 1910.178(m)(3) of the general industry standards is identical in intent to the proposed provision. Employees riding on industrial trucks are in danger of falling from the vehicle unless stable and secure seating is provided.

The proposed requirements for unattended industrial trucks are based on provisions in the general industry standards, § 1910.178(m)(5), and the

longshoring regulations, § 1918.73(j). They require that unattended vehicles be left with the load-engaging means, such as the fork or scoop, in the lowered position, the controls in neutral, and the brakes set. The final proposed requirement in this paragraph mandates blocking or curbing of wheels if a truck is left on an incline, as does § 1910.178(m)(7); this precaution is the usual practice throughout industry, and is intended to prevent the uncontrolled rolling of trucks.

Proposed provision (b)(4) prohibits the operation of powered industrial trucks inside a highway vehicle or railcar that has any visible structural damage, such as a floor that has rusted through, which might adversely affect employee safety. Railcars and other vehicles very often have unsafe floors. The usual temporary method of making these floors usable is to install a metal plate, a practice specifically required by Rule 1218 of the Pacific Coast Marine Safety Code (Ex. 20), by paragraph 3, Part V of the New York Shipping Association—International Longshoremen's Association's Joint Maritime Safety Code (Ex. 19) by paragraph 1910.184(m)(7) of the general industry standards and by section 5.2.10 of MH9.1.

The requirement proposed in paragraph (b)(5) requires that rated capacities be visible to the truck's operator so that overloads can be avoided.

As stipulated in proposed paragraph (b)(6), only stable and safely arranged loads weighing no more than the amount specified by the vehicle's rated capacity may be carried. This rule is based essentially on § 1918.73(f)(3) of the longshoring regulations and is similar to section 5.1.6.1 of ANSI MH9.1, but it goes beyond these provisions to address the stability and arrangement of the load; §§ 1910.178(o)(1) and 1910.178(o)(2) of the general industry standards deal with this topic in the same manner. An industrial truck may tip over, drop the load, or go out of control if it is either overloaded or if the load is not securely arranged and positioned so that the weight is properly distributed.

Three work practices that are important to industrial truck safety are proposed in paragraphs (b)(7), (b)(8), and (b)(9); these derive from equivalent requirements in the general industry rules (§ 1910.178). The first provision states that drivers must ascend and descend inclines slowly, to prevent the loaded truck from careening out of control or tipping over. A significant source of vehicle-pedestrian and vehicle-vehicle accidents is addressed in the second provision, which requires drivers to slow down and give warning of their approach at blind intersections and other places where visibility is limited.

The third work practice provision proposes that loads which would interfere significantly with the driver's view if carried in front of the driver, e.g., on the forks, be carried with the load trailing, i.e., with the truck moving in reverse.

Steering knobs, which were common before the advent of power steering, are prohibited by proposed requirement (b)(10) because they do not provide effective steering control and can themselves cause injury to the driver if the wheel spins. They are also prohibited for seated drivers in § 1918.73(i)(2), and ANSI MH9.1 (section 5.1.5) recommends against their use entirely.

Paragraph (b)(11) requires industrial trucks with cargo-lifting devices that reach across the load to lift from the far side (beyond the operator's view) to be fitted with mirrors or devices that will permit the operator to see the loading process clearly. The SAC recommended a similar requirement (Ex.2: 87ai), and MH9.1 contains a similar requirement (section 5.1.10.3). No similar rule appears in other OSHA regulations. The proposed rule would apply principally to large, specialized handling vehicles such as piggy packers that hoist containers or trailers by reaching across them and grasping them on the far side; most such vehicles are located in intermodal container-handling yards. OSHA would appreciate the views of interested parties on this proposed provision. For example, should OSHA also require that an employee on the ground supervise these lifting operations unless the operator has an unobstructed view at all times?

Paragraph (c) concerns the maintenance and repair of powered industrial trucks, which are essential to safe vehicle operation. The first proposed provision, (c)(1), states that only designated persons may perform repairs on these vehicles; it is similar to the general industry rule at § 1910.178(q)(1). The provision is intended to prevent unqualified or unauthorized persons from performing maintenance work on powered industrial trucks, a practice that may cause accidents.

The proposed requirement ((c)(2)) dealing with disconnecting the battery during electrical system repair (except when the power must be on to test or repair the system) is almost identical to the requirement at § 1910.178(q)(4), but would allow systems that must be energized during "troubleshooting" or servicing to have batteries connected only during these operations. The proposed procedure would protect employees from electric shock during repair work.

The next provision, (c)(3), proposes that replacement parts whose function might affect operational safety be equivalent in strength or performance capability to the original parts which they replace; this rule derives from a provision at § 1910.178(q)(5) and is designed to ensure that vehicles and components of their lifting apparatus are maintained and repaired in a manner that will preserve their original strength capabilities.

The proposed requirement in paragraphs (c)(4) governing brake systems on powered industrial trucks used in marine terminals has been developed specifically for this industry because failures of these systems may cause accidents. There is no equivalent provison in the general industry or MH9.1 standards, although both of these standards contain general repair and safety device provisions.

The proposed provisions in paragraph (c)(5) require that vehicles be maintained in proper working order and be checked by an authorized person each day of use, and that any safety device, such as a horn or sprocket or overhead guard, be in place and operable during use, unless specifically exempted (see paragraph (e)(iv) of this section). The last requirement in this paragraph stipulates that no truck having a fuel system leak or any other defect affecting safety, such as failing brakes, may be operated. Requirements in this paragraph are based essentially on similar provisions in the longshoring regulations (§ 1918.73(a)), ANSI MH9.1 (section 5.1), and in Part 1910 (§ 1910.178(p) (1) and (4)), and are intended to preserve the operational safety of industrial vehicles and to protect their drivers and other employees from injuries.

Paragraph (c)(6) would require that records of the daily truck inspection be kept at the terminal for at least thirty days, so that the equipment's maintenance and repair history is available at the terminal.

Truck repairs involving the fuel or ignition systems are required by proposed paragraph (c)(7) to be performed away from active work areas and in locations equipped with fire extinguishers or other protection against unwanted workplace fires. The general industry standards have a similar rule (§ 1910.178(q)(3)).

Paragraph (d) concerns power-operated industrial trucks approved for use in hazardous atmospheres. The first

proposed requirement defines "approved" as it is used in this section, i.e., approved by a nationally recognized testing laboratory for use in a particular hazardous atmosphere. According to the proposal, trucks used in such atmospheres are required to be approved except where U.S. Coast Guard regulations (33 CFR 126.15) apply; any approved vehicle must bear a label or identifying mark indicating testing laboratory approval. This topic is covered in great detail in § 1910.178 of the general industry standards; however, OSHA has concluded that in the marine terminal context, it is sufficient to state that power-operated industrial trucks used in hazardous atmospheres be approved for use in the particular hazardous atmosphere. (Classifications of hazardous locations are set forth in Subpart S of Part 1910.)

Fork lift trucks, a particularly hazardous class of powered industrial trucks, are addressed in paragraph (e). The proposed requirements appearing at (e)(1) are essentially similar to those in § 1918.73(b) and deal with overhead guards on fork lifts. The first proposed provision, (e)(1)(i), differs from the existing longshoring requirement in that overhead guards would only be required in situations in which falling loads present a hazard to the truck operator, since many tasks in a terminal are performed in open areas free of overhead hazards, such as suspended loads. The proposal also mandates that the guard be strong enough to protect against the sort of objects likely to fall against it; a guard strong enough to withstand the full impact of a capacity load would be so heavy that it would interfere with the vehicle's stability. This provision is almost identical to one appearing in the general industry standards at §>1910.178(m)(9). The proposed provisions at (e)(1)(iii) prohibit guards from obstructing the operator's view and require any openings in the guard to be smaller than any unit of cargo being handled.

Proposed paragraph (e)(1)(ii) requires guards to be built so that failure of the truck's mast tilting mechanism will not dislodge the guard; this requirement is similar in intent to paragraph (b)(4) of § 1918.73 of the longshoring regulations and section 5.1.1.4 of ANSI MH9.1. The overhead guard provision at (e)(1)(iv) states that any guard required by this paragraph may only be removed when work cannot be conducted with the guard in place, such as in areas of low clearance where the truck's operator is in no danger of hitting overhead obstructions or of being hit by falling objects; this proposed requirement parallels the rule at § 1918.73(b)(5). Paragraph (e)(1)(v) would require overhead guards to be large enough to extend over the operator during all truck operations, including forward tilt.

Paragraph (e)(2) addresses load backrest extensions, and is based on § 1910.178(e)(2) of the general industry standards. The proposal requires a load backrest extension if the fork lift operator might be exposed to a backward-falling load. This equipment would only be necessary for high lifts, in which the load is higher than the truck's mast. This subject is also covered in section 5.1.2 of MH9.1, although none of the detailed ANSI design requirements for extensions have been included in the proposal because these extensions are stock items.

Forks and their attachments and extensions are covered in paragraph (e)(3)(i), which is a similar but stronger version of a longshoring provision (§ 1918.73(e)). The proposed requirement adds that this equipment may only be used to perform the tasks for which it was intended by the manufacture; improper use of the forks (for example, to pry open a railcar or cargo door) may result in overturning the vehicle, dropping the load, or in causing other hazards. Proposed paragraph (e)(3)(ii) prohibits transporting employees on the forks of these vehicles, an extremely hazardous practice that has caused serious falls and other injuries (Ex. 49).

The proposed requirement concerning counterweights, (e)(4), states that these weights must be secured so that they will not fall. It does not require that they be permanently attached to the vehicle as long as they are secured sufficiently to prevent them from falling during vehicle movement. This provision has been drafted for this proposal and no similar requirement appears in the longshoring regulations.

The capacities and weights of fork lift trucks addressed in paragraph (e)(5). The first proposed provision, (e)(5)(i), requires employers to observe the rated capacities, with and without counterweights, of these vehicles. Rated capacities and vehicle weights (with and without counterweight) must be marked on the vehicle and be visible to the operator. Vehicle weights must be marked because cranes and ship's gear are often used to hoist these trucks, and if the capacity of the hoisting equipment is exceeded it may fail. This provision combines several requirements from § 1918.73(f) of the longshoring regulations, and the subject is also addressed in paragraph 5.1.6 of ANSI MH9.1.

The second provision of this paragraph, (e)(5)(ii), re-states the proposed requirement in (e)(5)(i) for the situation in which more than one fork lift is used to lift a load. (Two or more fork lifts are sometimes required to work together to lift a particularly bulky piece of cargo.) The proposed requires trucks working in unison not to lift a load exceeding the total combined lifting capacity of all the trucks lifting the load; exceeding this capacity could cause the vehicle or vehicles to tip over. The longshoring regulations contain the same provision (§ 1918.73(f)(4)), as does ANSI MH9.1 (section 5.1.6.2).

The practice of lifting employees on the forks of fork lift trucks is covered in proposed paragraph (e)(6). Provision (i) prohibits employees being lifted on the forks of the vehicle or on a pallet or load being hoisted on the forks. However, proposed paragraph (e)(6)(ii) would permit employees to be lifted on the forks only if a suitable platform is secured to the forks or lifting carriage. The platform would be required to have a railing meeting the requirements of § 1918a.112(c) and to be fitted with a toeboard if tools beng carried by employees might fall on employees below. The platform floor must also be skid resistant. Additionally, employees on the platform must have an emergency shut-off switch or other means of shutting off the power to the truck if they control elevation of the lifting carriage, and they must also be protected from moving truck parts and from overhead falling hazards. Unless the employees on the platform control the lift, the fork lift operator must remain at the controls at all times, and a final proposed provision allows only minor adjustment in truck position while employees are elevated on a platform. The proposed precautions for lifting employees on a platform attached to the forks or lifting carriage are compatible with requirements on the the same subject in § 1910.178(m)(12) of the general industry standards and in section 5.1.9 of ANSI MH9.1. However, the proposed provisions go considerably beyond the requirements of the OSHA general industry standards because the misuse if fork lifts to hoist personnel is reported to have caused accidents since these regulations were first developed (Ex. 49).

Paragraph (f) of proposed § 1918a.43 deals with bulk-cargo-moving industrial trucks such as front end loaders and is based on § 1918.73(c) of the longshoring regulations. Provisions of this paragraph require an operator's guard on crawler-type cargo-moving vehicles used in situations where the operator may be struck by an overhead projection or be hit by falling objects. Any guard

required, and its attachments, must be strong enough to withstand a load equal the pull necessary to deform the machine's draw bar.

Straddle trucks, not at present specifically addressed by any OSHA regulation, are covered in proposed paragraph (g). Operators mounting or dismounting from these trucks are sometimes exposed to contact with moving drive chains or other nip points. Provision (g)(1) proposes that straddle trucks have a permanent means of access, such as a ladder, equipped with any handholds necessary to ensure operator safety, and the proposed requirements of paragraph (g)(2) specify guarding of moving parts. Another source of straddle-truck accidents is addressed in proposed paragraph (g)(2)(ii), which requires personnel-deflecting guards around the leading edges of front and rear wheels when the truck is near employees, unless the truck has such protection built in. The final provision in this paragraph proposes that straddle truck operators have devices to ensure the greatest visibility possible in all directions, to avoid vehicle collision and pedestrian accidents. ANSI MH9.1 addresses these straddle truck hazards in a similar way (section 5.1.10).

Trailer-spotting tractors, also known as fifth wheels, hustlers, and by other names, are addressed in proposed paragraph (h); this topic is not presently covered by any specific OSHA regulation or by ANSI MH9.1. Trailor-spotting tractors are vehicles used exclusively and extensively within terminals to haul intermodal containers mounted on chassis; these vehicles are not covered by highway regulations. They are often not equipped with adequate handholds or adequate means of access to the fifth wheel, both of which are necessary to protect employees engaging and disengaging chassis. Secure access is addressed in paragraph (h)(1).The next proposed provision, (h)(2), stipulates that the rear windows of trailer-spotting tractor cabs be safety glass or regular glass protected by means such as screen, to avoid having the glass shattered and the driver injured by a flying brake hose.

Section 1918a.44 General rules applicable to vehicles. Section 1918a.44, covers general rules applicable to vehicles. It applies to material handing vehicles used in marine terminals, except for those matters, addressed in paragraphs (c) and (m), falling under ther jurisdiction of the Department of Transportation; examples of vehicles not covered by the proposed requirements are highway vehicles, intermodal containers on chassis, buses, and automobiles.

Paragraph (b) proposes that all private vehicles (except those carrying cargo) must park in designated areas that are not simultaneously being used for storage and parking. This proposed provision is similar to a requirement in section 5.2 of ANSI MH9.1. It is directed at accidents involving private vehicles and cargo-handling vehicles, such as the fatal accident in Houston caused by a private car colliding at night with a container chassis that had been parked in the terminal parking lot (Ex. 68). The SAC recommended that the provision prohibit using any terminal parking area for cargo storage (Ex.2: 98i), but OSHA believes that the language of the proposal allows more flexibility and achieves equivalent safety by limiting the prohibition to concurrent parking and storage use.

Proposed paragraph (c) addresses the hazard of uncontrolled trailer movement that would result from disconnecting a tractor from its trailer before the trailer's road wheels have been completely immobilized, for example by chocks. Front end support (such as that supplied by landing gear or a jack) mut also be supplied for the trailer, if support is necessary to prevent the trailer from tipping when a vehicle enters it to load or unload. The rear end of the trailer must also be supported (for example by a dock lock-on mechanism or a jack) if the trailer is of the less common type that could tip when a vehicle enters it from the rear. Both ANSI MH9.1 (section 5.2.3.) and the general industry standards (§ 1910.178(m)(7)) have similar provisions for front end support. However, the proposed requirement for rear end support is newly developed. One of the most common loading dock accidents occurs when a lift truck entering a trailer falls into the space between the trailer and the dock because the trailer has "crept" forward or tipped on end. The proposed requirements should prevent these and many other loading dock accidents.

Proposed paragraph (d) requires employers to ensure that operators of motor vehicles in a terminal observe the posted speed limits and any other traffic signs; the intent of this proposed requirement is identical to that of section 5.2.6 of ANSI MH9.1 and § 1910.178(n)(l) of the general industry standards.

Paragraph (e) proposes the posting of stop signs at blind intersections and at exits and entrances where visibility is limited, unless traffic signals, mirrors, or other means of eliminating the collision hazard are provided. Section 1910.178(n)(4) partially addresses the same hazard, as does section 5.2.7 of ANSI MH9.1. As noted above, vehicle accidents have become the most common type of accident in marine terminals.

The proposed rules in paragraph (f) mandating the establishment of vehicle routes, traffic rules, and parking areas within a terminal have been stated in performance language to be adaptable to the variety of conditions existing at container terminals. The specific means of achieving this level of traffic control is left to the employer's discretion, but the importance of these practices to employee safety cannot be overestimated.

Drivers of vehicles are required by proposed paragraph (g) to honk their horns to warn pedestrians of the approach of the vehicle, and vehicular traffic lanes crossed by employees or used for pedestrian passage must be equipped with signs or other means of warning drivers that pedestrians may be in the lane, according to proposed paragraph (h). The ANSI provision (section 3.22.8) on the same topic is almost identical to these provisions.

The hazards of areas such as check-in/check-out lines, which require both emplyees and vehicles to be present in the same area during the course of routine work assignments, are addressed in paragraphs (i) and (j). For example, employees checking the load on one vehicle might be hit by another container-carrying tractor moving into place in the check-out line. The first provision requires signs to be posted to warn drivers, while the next rule mandates a distance of at least 20 feet between the first two vehicles in a check-in or check-out line. The SAC recommendation (Ex.2: 63i) could be interpreted as requiring 15 feet between any two trucks, but it is only necessary to maintain this clearance between the first two vehicles because employees only work at the rear of the first vehicle, which then moves out of the terminal while the next vehicle moves up to be checked. Proposed paragraph (k) would prevent injuries caused by free-rolling vehicles left with their motors running.

Proposed paragraph (l)(1) states that a secure ramp must be provided for employees and vehicles to use to load or unload a vehicle whose end is elevated, and also requires the vehicle's wheels to be chocked or a dock lock-on device to be used to prevent accidents caused by inadvertent movement of the vehicle during loading or unloading; ANSI MH9.1 has a similar requirement (section 5.2.9).

Any ramp used is required by paragraph (l)(2) to have a safety factor

of four for any load being carried across the ramp.

The floors of highway vehicles, addressed in proposed paragraph (m), are required to be safe for employees and vehicles working in them, a requirement similar to an earlier proposed provision applying to railcar floors. Trailer and over-the-road vehicle floors are often rusted through or are uneven; metal plates can be used as supplemental flooring in many of these instances. Provisions in both the general industry standards (§ 1910.178(m)(7)) and ANSI MH9.1 (section 5.2.10) are directed to the same hazard.

Paragraph (N) proposes that cargo such as pipes, logs, or other products that could spread and roll, thus endangering employees working nearby, be secured against movement. Means of complying with this requirement might be lashing the cargo as a unit or placing it in a restraining device. The proposed provision would apply to flatbed trucks, platform containers and other conveyances without sides, and is included in accordance with a suggestion of the SAC (Ex.2: 99i). The ANSI MH9.1 (section 5.2.11) contains a similar requirement, although it applies to flatbed trucks only.

The proposed requirement that vehicles used to transport personnel in marine terminals be kept in good working order, with functional safety devices (paragraph (o)), has significant accident prevention value. Failure of the brake system, for example, could be caused by faulty maintenance procedures. The proposed provision derives from a requirement in the longshoring regulations (§ 1918.73(a)), but has been broadened beyond automobiles to include any vehicle used to transport personnel.

The final paragraph in § 1918a.44 proposes precautions to be taken during servicing of multi-piece rim wheels in the marine terminal environment. The proposed requirements in this section conform to those of the general industry standard for multi-piece rim wheels (§ 1910.177) recently published by OSHA (45 FR 6706, January 29, 1980). The principal hazard associated with the servicing of wheels of this type is the possibility of an employee being struck by a wheel component thrown from an inflated wheel during an explosive separation. These provisions apply only to servicing of tube-type vehicle tires that are mounted on multi-piece rims; paragraph (p)(2) defines a multi-piece rim. The hazards associated with servicing these rims are well documented and are discussed in the preamble to the general industry rule.

Proposed paragraph (p)(3) addresses employee training and competence in multi-piece rim servicing procedures, the mot important element in any safety program designed to reduce the hazards associated with these wheel rims. Proposed requirements (p)(3)(ii)(A) through (G) detail the skills an employee must demonstrate to satisfy the competence qualification. Compliance with these requirements should greatly reduce or eliminate multi-piece rim accidents in terminals, because the greatest number of injuries have been shown to be caused by improper mounting procedures, use of damaged parts, and tire overinflation (45 FR 6707, January 29, 1980).

Employers are required by proposed paragraph (p)(4) to ensure that the servicing procedures included in provisions (p)(4)(i) through (p)(4)(ix) are observed when multi-piece rims are being serviced. These procedures are substantively identical to those in the general industry rule.

Paragraph (p)(5) requires that a chart containing the Department of Transportation, National Highway Traffic Safety Administration's instruction on the topic and appropriate for the types of wheels being serviced in the terminal be available, at the terminal, in addition to a current rim manual with the manufacturer's instructions for the wheels being serviced.

Restraining devices to be used when multi-piece rims are being inflated are dealt with in proposed paragraph (p)(6). These devices are essential to employee safety if the rim separates explosively from the wheel. The type of restraining device is not specified in the proposed provision, and a device would meet the requirement as long as it constrains rim components effectively. The proposed requirement at (p)(6)(ii) states that these devices must be kept in proper working order so that they remain capable of performing their function. The final proposed provisions in this paragraph, (p)(7) and (p)(8), require inflation hoses to have a clip-on chucks and be sufficiently long so employees can stay clear of the danger area during inflation, and also prohibit the use of any servicing tools not specifically recommended in the rim manual required in (p)(5). Finally, only those wheel components that are interchangeable accordingly to the chart or manual specified in proposed paragraph (p)(8)(ii) may be used interchangeably.

Section 1918a.45 Cranes and derricks. Proposed § 1918a.45 deals with cranes and derricks which are in use in the marine terminal environment.

The use of cranes and derricks is increasing on the waterfronts of the United States, and crane accidents are frequent (Ex. 43). A study of mobile crane accidents in construction, conducted by the Construction Safety Association of Ontario, showed that one-fifth of all fatal construction accidents involve cranes (Ex. 28: 2, 3). Of these accidents 23% involved rigging failure, 53% resulted from inadequate or improper securing or handling of loads, 12% were caused by overloading of the crane, boom collapse or crane overturning, and 6% involved operator error. OSHA statistics do not identify crane accidents that have occurred in marine terminals, but the Bureau of Labor Standards, OSHA's predecessor, did analyze and tabulate crane accidents on the waterfront (Ex. 43). This analysis showed that crane accidents were increasing with the increase in the use of this type of equipment in cargo-handling operations. OSHA welcomes any additional data on crane injuries and accidents associated with the use of cranes in marine terminals.

Many of the provisions in this section of the proposal are based on similar requirements in the longshoring regulations and many have been developed on the basis of staff research and after consideration of the Advisory Committee's coments on this subject. The final SAC recommendation (Ex. 2: 100i) urged OSHA to evaluate coverage of cranes and derricks in the general industry standards (§§ 1910.179, 1910.180, and 1910.181), and to consider applicable provisions from the longshoring standards as well. The crane and derrick regulations in the proposal are the result of any analysis of these standards of applicability, appropriateness, and adequacy in the marine terminal environment. As a consequence, the proposal addresses every type of crane currently used in a terminal facility; the coverage of this topic in the general industry standards only applies to a few of the types of cranes used in a marine terminal. Further, many of the extensive and stringent cerfication requirements for cranes used in the maritime industries (see 29 CFR Part 1919) have been incorporated into this proposal; many of these provisions, for example those for inspections, are more rigorous than similar provisions in the general industry standards.

Proposed paragraph (a)(1) specifically lists types of cranes covered by this section. The type of crane specified in (a)(1)(vi) has been defined to distinguish it from an ordinary straddle truck; for

the purposes of this proposal any straddle-type unit capable of straddling two or more intermodal containers is sufficiently large to be classified as a crane. Straddle trucks that only have the capability of lifting one container are not classified as cranes because they cannot lift the container high enough to endanger employees below.

Overhead bridge cranes are also addressed in this proposed section, although they are not covered in the existing longshoring regulations because there were few cranes of this type being used in maritime applications at the time these rules were promulgated. Since then, however, the use of this type of crane has increased, and there have been several serious accidents involving runaway bridge cranes in marine terminals (Ex. 34).

Paragraph (a)(2) proposes to exclude equipment adapted from industrial trucks; this type of modified equipment is also not classified as a crane in section 1918.3(r)(5)(i) of the longshoring regulations. A further example of equipment not classified as a crane or derrick is a chain hoist, which would therefore also not be included in the scope of this section.

Proposed paragraph (b)(1) addresses ratings for cranes and derricks other than bridge cranes, and is based essentially on § 1918a.74(a)(2) of Part 1918. It requires that cranes be equipped with a rating chart visible to the operator and containing all the manufacturer's capacity ratings, such as operating radii for all permissible boom lengths and jib lengths. This information is needed by the operator to ensure that lifts are within the crane's capacity. ANSI MH9.1 (section 5.3.1.) contains a similar requirement.

Proposed paragraph (b)(2) is similar to the provision at § 1918.74(a)(5) of the longshoring regulations, and requires employers to observe the appropriate rated working load limits. The next proposed provision, (b)(3), prohibits employers from increasing load ratings unless the manufacturer of the crane has approved the increase. Since a crane's rated capacity determines the weight of the load that can be hoisted, the rating can only be increased after careful analysis of the crane's design characteristics and subsequent structural alteration of the crane. If the manufacturer's services are not available, the proposal requires the employer to obtain an engineering design analysis, performed or approved by the agency certificating the equipment under Part 1919, to ensure that increasing the designated working loads will not capsize the crane or be otherwise hazardous. The paragraph's final proposed provision requires that any structural changes to equipment necessitated by increasing the ratings be performed before the equipment is returned to service. Examples of changes that would affect a crane's rating are using a different boom or wire of a different size. The requirements are similar to but more extensive than those in the certification standard (29 CFR 1919.77).

Radius indicators or boom angle indicators visible from the operator's station are required on certain cranes by the proposed rule that appears in paragraph (c); the longshoring regulations contain a similar provision, (§ 1918.74(a)(3)), as does ANSI MH9.1 (section 5.3.21). Indicating devices of this type are essential in cases where the weight of the load that can be hoisted safely varies with the radius or angle of the boom.

Proposed paragraph (d) prohibits placing sideloading stresses upon the boom, for example by using a crane to pull railcars or drag (bull) cargo. This provision recognizes that it is not always possible to avoid a small amount of sideloading but that to exert a significant degree of sideloading is to invite boom failure or other disaster. Both the longshoring regulations and ANSI MH9.1 contain similar prohibitions (§ 1918.74(a)(7) and section 5.3.20, respectively). OSHA would appreciate comments defining or specifying the amount of sideloading that presents a hazard to employees working on or near the crane under various working conditions, and information about the kinds of operations in which sideloading is likely to be a problem. Suggestions for work practices that would prevent sideloading, such as positioning the load directly beneath the hoisting mechanism, would also be appreciated.

The next proposed provision, (d)(2), forbids operation of a crane or derrick that has a functional defect that might affect the safety of the operation adversely. Examples of such defects are damage to the boom, boom cord, or lacing or to the wire rope. Rules directed at the same hazard appear at § 1918.74(a)(8) of the longshoring regulations, section 5.3 20 of ANSI MH9.1, Rule 1428 of the 1979 Pacific Coast Marine Safety Code, and the 1970 Joint New York Maritime Safety Code (paragraph 12, Part 1) (Ex. 20; 19).

The guards addressed in proposed paragraph (e)(1) would protect employees from contact with moving machine parts such as gears and chain or belt drives; equivalent requirements appear in ANSI MH9.1 (section 5.3 17.6), § 1910.181(j)(1)(i) of the general industry standards, and in a more general manner for shipboard use in § 1918.53(a)(1) of the longshoring rules. Caught-in-and-between accidents involving nip and shear points are common around any unguarded moving machine parts, and the proposed requirement is designed to prevent these injuries. The general industry requirements stipulate that the guards used must be strong enough to withstand the weight of a 200-pound load; the proposal states this requirement in more performance-oriented language.

Proposed provision (e)(2) requires crane hoisting hooks to be latched or otherwise secured so that the load cannot accidentally disengage. This requirement has evolved from a precaution originally directed at ship's burtoning gear (two fixed booms, each with a fall, attached to a common hook) and was meant to apply in situations when, for example, auxiliary gear such as an empty bridle was used with a rapidly moving ship's hook. Cranes designed for use ashore, such as mobile cranes, which have devices such as latches on their hooks, are becoming increasingly common in the marine terminal setting.

The next proposed provision, (f)(1), directs either that operating controls be marked or that a diagram indicating control functions be posted at the operator's station; this rule is designed to reduce the hazards caused by lack of familiarity with equipment. It is not uncommon in this industry for operators to be assigned to particular cranes or types of cranes with which they are not familiar, a practice that may contribute to operator error, especially in an emergency. The language of this requirement is based on that of § 1918.74(a)(2) of the longshoring rules and section 5.3.1 of ANSI MH9.1.

The controls on derrick and cranes are required by proposed paragraph (f)(1)(ii) to be self-centering so that they will return to the "off" position if the operator accidentally releases the control. This provision would become effective one year after Part 1918a becomes effective, to allow employers sufficient lead time to modify the controls or other equipment.

Crane boom stops are addressed in proposed paragraph (f)(2); no similar requirement appears in the existing longshoring regulations, because at the time these rules were promulgated there were relatively few cranes on the waterfront that needed boom stops. Since that time, however, the increased use of cranes of the types that should have these stops has led OSHA to propose this requirement; ANSI MH9.1

contains a similar provision (section 5.3.5). It would also eliminate the possibility of the crane operating at angles too great for safe lifting. The proposed requirement excludes cranes already "fitted with operable automatic limiting devices," such as some types of portal cranes. There is some debate about the effectiveness and practicality of certain types of boom stops, and OSHA welcomes any pertinent information on this topic that will aid in drafting the final rule.

Proposed paragraph (f)(2)(ii) requires the crane's purchase block to be secured so that it will not interfere with the whip line, which is used in hauling operations.

Foot pedal controls on cranes and derricks are required by proposed paragraph (f)(3) to have non-skid surfaces to prevent the operator's foot from slipping off the pedal during operation; section 5.3.7 of ANSI MH9.1 contains a similar requirement.

Means of access to cranes and derricks are addressed in paragraph (f)(4); this proposed requirement is similar to coverage of the same topic in ANSI MH9.1 (section 5.3.12). The first provision, (f)(4), requires that ladders, stairways, or other suitable and safe means of access be provided so that employees working on or operating the crane can reach their work stations safely. Footwalks are required by proposed paragraph (f)(4)(i) to be rigid and capable of supporting a load of 100 pound per square foot.

Requirements for vertical ladders more than 20 feet high are proposed in the next paragraph, ((f)(4)(ii)); these devices are required to comply with any applicable strength, safety device, or landing platform specifications for fixed ladders proposed in §1918a.119 of this document.

Proposed paragraph (f)(4)(iii) stipulates that stairways on cranes have rigid handrails meeting the requirements of proposed §1918a.112(c)(1). The next provision, (f)(4)(iv), is designed to warn employees emerging from ladders or stairways at a level immediately below the crane's rotating house from being hit by the house. This proposed requirement has been newly developed for this marine terminal proposal. It is not intended to apply to moving machine parts such as gears and chains, already addressed by paragraph (e)(1) of this section.

The requirements proposed in paragraph (f)(5) concern the crane operator's station. The first requirement is similar to a provision in ANSI MH9.1 (section 5.3.13). It requires that the operator have a clear view of the load (or signalman, if one is involved in the operation), so that the coordination and control required to conduct crane operations safely can be maintained. The ANSI requirement specifies that the operator also be able to see the boom, but this requirement has not been proposed because the operator cannot see the boom with some types of cranes, for example with some level-luffing cranes. Any glass used in the cab of a crane or derrick is required to be safety plate glass, a precaution necessary to prevent employee injury if the cab window is broken. Plate glass is specified because laminated glass may distort the viewing image. The SAC recommended a prohibition against storing objects in the cab in a manner that would interfere with the operator's view or safe operation of the equipment (EX. 2: 103i); this recommendation is embodied in the final requirement proposed in paragraph (f)(5), and is similar to the provisions at §1910.180(i)(3)(i) and §1910.181(j)(6)(i).

Counterweights or ballast are addressed in paragraph (f)(6) of the proposal, and which is based on similar provisions of section 5.3.14 of ANSI MH9.1 and §1918.74(a)(6) of the longshoring regulations. The proposed requirement states that the manufacturer's or the design specifications pertaining to type, amount, location, and securing of ballast or counterweights must be observed, to ensure safe hoisting of loads. Accidents may be caused by the use of substitute, unsecured, additional, or improperly located ballast.

Outriggers, which increase equipment stability, are required by proposed paragraph (f)(7) to be used in accordance with design or manufacturer's specifications. The requirements proposed for floats and outrigger supports are similar to provisions in the general industry standards (§1910.180(h)(3)(ix)) and the ANSI MH9.1 (section 5.3.15); these proposed provisions, which also reflect current industry practice, are designed to ensure that outriggers are on a firm foundation while loads are being hoisted.

Proposed paragraph (f)(8) stipulates that exhaust gases from cranes discharge away from employee work stations, to avoid exposing workers to carbon monoxide and other noxious fumes. A requirement directed at the same hazard appears in ANSI MH9.1 (section 5.3.9) and in the 1979 Pacific Coast Marine Safety Code (Rule 1432) (Ex. 20).

The proposed provision addressing electrical hazards associated with cranes, (f)(9), requires guarding or an equally effective method of protecting workers exposed to energized electrical parts in the course of their work; this precaution would not apply to electrical equipment that must be energized to perform inspection, "troubleshooting," or maintenance operations. No similar provision appears in the longshoring rules or in ANSI MH9.1, but a somewhat similar requirement does appear in §1910.179(g)(2)(i).

Requiring a portable fire extinguisher on or near the cab of each crane or derrick is proposed by paragraph (f)(10); this precaution would allow the crane operator, for example, to put out an electrical fire in the cab. This provision reflects routine practice, and similar rules appear in ANSI MH9.1 (section 5.3.4), the general industry standards (§ 1910.180(i)(5)), and the International Longshoremen's Association-New York Shipping Association Joint Maritime Safety Code (1970)(Ex. 19: 52). U.S. Coast Guard regulations do not mandate fire extinguishers on all cranes in marine terminals. Extinguishers using carbon tetrachloride or chlorobromomethane, which produce toxic fumes, are prohibited.

The proposed wire-rope-on-drum provision ((f)(11)) is similar to a rule in the longshoring standard (§ 1918.52(c)(2)), but has been adapted to equipment used in marine terminals; several rules in § 1910.179(h)(2) are also similar in intent to the proposed provision, as is section 4.7.5 of the International Labour Organization Code of Practice, Safety and Health in Dock Work (Ex. 33). The precautions stipulated are designed to guarantee that sufficient and properly fastened rope remains on the drum to ensure that the rope does not slip off the drum.

Proposed paragraph (f)(12) relates to boom section assembly and disassembly, and has been newly developed because mobile crane accidents caused by failure to block the boom are very common throughout industry. In the past 22 years, for example, 30 workers in Florida alone have been killed by falling boom sections that were not blocked during assembly or disassembly (Ex. 41).

Crane and derrick brakes are covered in proposed paragraph (f)(13). Each hoisting unit is required to have at least two means of braking, one of which must directly affect the drive shaft (or other reducing gear component), which controls the hoist mechanism. Each of the brakes required must be capable of holding 1½ times the crane's rated load. ANSI MH9.1 (section 5.3.6) contains similar requirements.

The proposed requirements that appear in paragraph (g) apply to rail-mounted cranes other than those of the locomotive type. Paragraph (g)(1)

identifies specific types of cranes falling within the scope of this paragraph; overhead and gantry cranes, both of which are types of bridge cranes, are covered, as are portal cranes, which are revolving cranes with elevatable booms.

Paragraph (g)(2) requires the rated load to be marked clearly in the cab and on each side of any bridge crane; ratings must be legible from ground or floor level to be visible to all employees involved in the hoisting operation.

Wind-indicating devices, which are the subject of some controversy in the industry, are addressed in proposed paragraph (g)(3). The first provision, (g)(3)(i), requires all rail-mounted cranes (except locomotive cranes) to be individually fitted with an operable wind-indicating device. The anemometer or similar device must be set to give warning and shutdown indications appropriate to the particular crane to which it is attached. There have been many serious accidents involving cranes running away in high winds, including two fatalities (Ex. 34).

Although there is some difference of opinion in the industry over the proper location of these devices, there is no argument about the necessity for wind indicators on rail-mounted cranes. There have been many wind-related accidents involving cranes of these types, particularly the large, specialized container-handling cranes, which have more sail area than other cranes. Portal cranes have been blown the length of their tracks and fallen into the water, causing catastrophic losses. OSHA has decided, on the basis of staff research, accident records, and other evidence, that all rail-mounted cranes should be individually fitted with anemometers. A wind-indicating device mounted on a building at the work site would not be an acceptable alternative, because a device so located might not accurately reflect wind conditions prevailing at the crane's location. Wind conditions may vary widely from one site to another and be affected by altitude, buildings and other factors. The ANSI MH9.1 provision (5.3.17) directed at the same hazard simply states "Rail-mounted, portal, gantry, semi-gantry, and all other bridge-type cranes located outside of structures shall be equipped with anemometers or wind indicators in good working condition." A requirement for a wind-indicating device also appears at § 1910.179(b)(4) of the general industry standards, but its application is restricted to "outdoor storage bridges" only, and would not cover container cranes and other types of cranes found in marine terminals.

Proposed paragraph (g)(3)(ii) sets performance requirements for wind-indicating devices. These devices are required to provide both a continuous readout of wind speed and a visible or audible alert when wind speed reaches a predetermined warning or partial shutdown velocity (the warning speed), which may not exceed the crane manufacturer's recommendations for warning or partial shutdown. Another warning is required when the wind velocity reaches that speed established by the manufacturer as requiring crane shutdown and securing (the shutdown speed). Again, this speed may not exceed the manufacturer's recommended wind-velocity limit for operation of the particular crane. Both warning and shutdown wind velocities vary, depending on the crane in question. For example, some cranes must shut down when the wind reaches 35 mph, while others can operate safely at 50 mph. The proposed requirements are essential if cranes are to be adequately controlled in working conditions involving high winds.

The readout and alarm required by paragraph (g)(3)(iii) must be located in the cab to be seen and heard by the crane operator.

Proposed paragraph (g)(3)(iv) concerns posting of instructions to be followed when wind indicators show warning or shutdown velocities. Instructions must be posted in the cabs of rail-mounted cranes, and employees must comply with these instructions. Any necessary directions for coordinating the activity of more than one crane in high-wind situations must be included in the posted instructions; an example of such a situation would be two cranes working on the same track.

Means of preventing rail-mounted crane movement must be used when the wind has reached the warning velocity, according to the proposed requirement in paragraph (g)(4)(i). The preliminary steps to be taken include stopping the crane from gantrying, removing any parts of the crane that are overhanging the vessel being worked and stationing the crane so that it can be secured quickly if the wind speed continues to increase. Are there situations (for example, when the wind prevents hoisting of the boom or when the crane's boom is not articulated) when the crane cannot be moved clear of the vessel? What additional precautions should be taken in such situations?

The proposed requirement in paragraph (g)(4)(ii) specifies that each crane be secured; using all available means, when the wind reaches the predetermined shutdown speed for the particular crane in question. The most common method of securing a rail-mounted crane is the use of uniformly spaced securing points positioned alongside the crane's tracks, but rail clamps, typhoon chains, and wires and cables are also sometimes used. All available means should be used to secure a crane, because even when all means are used, it is still sometimes impossible to hold a crane in high winds. The ANSI MH9.1 standard also contains provisions directed at runaway cranes (section 5.3.17).

In paragraph (g)(5), OSHA proposes that employers monitor local weather conditions so that they will have advance warning of high wind conditions. Subscribing to local weather reporting services or listening to NOAA weather broadcasts should greatly increase storm warning times and thus reduce the number of wind-related marine terminal injuries and fatalities.

Stops and bumpers are addressed in proposed paragraph (g)(6); the provisions proposed in the paragraph are similar to but less detailed than those in sections 5.3.17.1 and 5.3.17.2 of ANSI MH9.1 or in §§ 1910.179(e)(2) and (e)(3) of the general industry standards. As proposed, either stops or bumpers are required ((g)(6)(i)) on all rail-mounted cranes; stops are used on the truck's tracks and are designed to limit the movement of the bridge or trolley, and bumpers are used on the trolley's tracks to reduce the force of impact, thus decreasing the likelihood of employee injury and equipment damage. As proposed, any stop designed to operate by engaging the tread of a wheel must be at least equal in height to the radius of the wheel engaged, to ensure effectiveness of the device.

Proposed paragraph (g)(6)(ii) requires bumpers or other devices on the adjacent ends of all cranes or trolleys used on the same runway or bridge with other cranes or trolleys. Examples of means other than bumpers that would prevent crane collision are automatic electronic controls or sensing devices. OSHA's general industry crane standard (§ 1910.179(e)(2)(i)) has a similar requirement (Ex. 42).

Although crane and trolley stops and bumpers are effective in reducing the hazards associate with runaway cranes or with two cranes colliding, no stop or bumper can eliminate these hazards entirely. For example, the most effective bumper available is designed to eliminate impact damage only for a crane traveling without load at 20% of rated load speed (Ex. 35: 26), conditions which would clearly be exceeded in many emergency situations. Similarly, no stop device or system of stops will hold a rail-mounted crane that is already in motion or has not been secured before high winds occur. The

limitations of stops and bumpers underscore the importance of the crane wind-indicating devices required in this section of the proposal.

Paragraph (g)(7) proposes that when employees may be in the vicinity of the tracks, crane trucks must be equipped with means, such as sweeps, to deflect employees from the track when the crane approaches. A similar requirement appears in the general industry regulations, § 1910.179(e)(4), and in ANSI MH9.1 (section 5.3.17.3). This provision, in conjunction with the proposed requirement at (g)(9) should ensure that employees on the track will have adequate warning of and protection from the movement of a traveling crane.

To ensure safe employee passage between a crane and another structure, proposed paragraph (g)(8) requires a minimum clearance of 3 feet for the area to be used by employees for passage. No similar requirement appears in the general industry standards or the ANSI MH9.1 standards, but the often limited working spaces typical of marine terminals warrant is inclusion in this proposal

Each rail-mounted crane is required by proposed paragraph (g)(9) to have a warning device to alert employees in the crane's path that the crane is traveling toward them. This proposed requirement may be met by using either an audible or a visible warning device, such as a gong or light. The provision should not be interpreted to mean that a warning should be sounded continuously when a crane is traveling, because such a warning would soon cease to be effective. For maximum effect, the warning device is to be used only when employees are in danger of being hit by the crane. The equivalent general industry requirement, § 1910.179(i), applies only to overhead and gantry cranes and does not cover portal cranes, which are very common on the waterfront.

The proposed rule in paragraph (g)(10) deals with communication between the cab and the base of rail-mounted cranes, and is intended to ensure that effective communication is available between the operator, who is often far away from the ground, and employees at the base of the crane. Any effective means of achieving this communication, other than hand signals, may be used. Neither the general industry standards nor ANSI MH9.1 has a similar requirement.

The proposed requirement in paragraph (h) is directed to the stability of locomotive cranes; it stipulates that outriggers be used during hoisting operations unless the force of the load being hoisted is distributed so that it is not carried by the crane truck's springs, which might cause the crane to collapse. An equivalent provision appears at § 1910.180(h)(3)(xi) of the general industry standards.

The requirements proposed in paragraph (i) relate to general crane operations; most of these provisions are similar to coverage of the same topics in the longshoring regulations, the ANSI MH9.1, and the general industry standards.

The first proposed provision, (i)(1), is directed to the hazardous but sometimes necessary practice of using two cranes working in unison to hoist a large and heavy load. To be preformed safely, this type of operation requires close coordination and supervision, and the requirement that one person be designated to direct the operation and instruct all involved personnel is designed to ensure the necessary level of supervisory control and skill. This proposed requirement parallels the rule in § 1910.180(h)(3)(xii) of the general industry standards.

The proposed rule ((i)(2)) requiring guarding of areas accessible to employees within the swing radius of the body of a revolving crane is based on provisions in the longshoring regulations (§§ 1918.55 and 1918.74(c)). These provisions were originally promulgated in response to fatal accidents in which employees were caught between a part of the crane and another structure or between parts of the crane itself (Ex. 43). A SAC recommendation (Rec Vol 103i) supported inclusion of this provision; the OSHA proposed rule has gone beyond the committee's recommendation to include the language "or between parts of the crane" and to specify that the means of guarding be physical, which would prohibit the use of signs only. Examples of means of guarding that might be used are sawhorses and boards, roping off, or extending wires from the crane chassis. A similar provision appears in section 5.3.16 of ANSI MH9.1.

The hazards addressed in proposed paragraph (i)(3) are also covered by provisions in ANSI MH9.1 (section 5.3.11) and the general industry standards (§ 1910.180(h)(3)(xiii)). Since both the boom and the hook of a crane may swing during travel from one job site to another, the proposal requires that they be properly secured during transit, except in those situations specifically noted in the proposed requirement. When the boom is secured to a dolly, it cannot slew, and when the operator is turning the house, he has control of the crane's movement.

The appropriate precautions to be taken when a crane is left unattended between shifts are specified in proposed paragraph (i)(4). No similar requirements appear in the general industry standards (except for a requirement that operators remain at the controls while loads are suspended (§ 1910.180(h)(4)(i)) ANSI MH9.1 or the existing longshoring rules. However, the hazards of unattended cranes, such as crane runaway in high winds or falling of a load left suspended, are addressed at least minimally in the following industry developed and consensus standards: Mobile Hydraulic Crane Standards, Standard No. 2, Power Crane and Shovel Association (paragraph 8.3.3.8); Mobile Power Crane and Excavator standards, Standard No.1, Power Crane and Shovel Association (Paragraph 8.3.8.8); and the ANSI B30.5–1968, Crawler, Locomotive and Truck Cranes (section 5.3.1.3 f) (Ex. 91). As proposed, the standard provides that unattended cranes may not be left with suspended loads (except as noted) and must have clutches disengaged, power sources turned off, wheels blocked or otherwise secured against travel, and boom lowered and secured. These precautions are designed to designed employee injuries caused by uncontrolled crane travel, falling loads, and swinging booms. OSHA particularly welcomes comments on appropriate precautions to be taken when a crane is left unattended; for example, are there situations in which it is not feasible to take the proposed precautions? If these precautions are not taken, what alternative measures would be appropriate?

Although the next paragraph, (i)(5), addresses a hazard, crane operation near power lines, that is rarely encountered in the marine terminal setting, the seriousness of the hazard requires the proposed regulatory coverage. The general industry and construction standards contain nearly identical provisions (§ 1910.180(j)(1) and § 1926.550(a)(15)). The proposed requirements specify that, unless electric power lines are deenergized and grounded or an insulating barrier independent of the crane or derrick has been erected to prevent contact, cranes may only be operated near electric lines if they maintain the clearances specified in provisions (i)(5)(i) (A), (B), and (C). These minimum overhead clearances are essential if electrocutions caused by parts of the crane hitting power lines, which have been common throughout construction and general industry (Ex. 28:2), are to be prevented. The proposed clearances are identical to those in the general industry standard.

Proposed paragraphs (i)(5) (ii) and (iii) address boom guards and energized lines, respectively, and both provisions are nearly identical to rules in the general industry standards (§ 1910.181(j)(5) (ii) and (iv)). Although proposed paragraph (i)(5)(ii) permits the use of boom guards or proximity warning devices, these devices do not offer adequate employee protection against electric shock and may therefore not be used in lieu of maintaining the overhead clearances specified above. Proposed paragraph (i)(5)(iii), which also reflects industry practice, requires the employer to assume that electric lines are energized until he has contacted the agency responsible for the line (which is usually a utility company) and until that agency has indicated that the line has been deenergized, as required by proposed paragraph (i)(5)(iii). A similar requirement appears in the general industry regulations (§ 1910.180(j)(2)).

The requirements grouped under proposed paragraph (j) concern precautions to protect employees being hoisted by a crane, for example when employees are being placed on the top of intermodal containers. The same topic is covered in OSHA's ship repairing and shipbuilding regulations (§ 1915.41(a)(9) and § 1916.41(a)(9)).

The first two proposed provisions, (j)(1) (i) and (ii), stipulate that employees may only be hoisted by a crane or derrick load hoisting apparatus if a protected platform or boatswain's chain is used. Proposed paragraphs (j)(1)(ii) (A)–(F) list the requirements any platform used to hoist employees must meet; these include proposed specifications for platform and load weights, safety factors, anchoring, access doors, and overhead protection.

The proposed provision dealing with wedge and socket attachments, (j)(1)(ii)(F), prohibits the use of these attachments to hoist employees unless the line is doubled back and secured by a clamp, which will prevent slippage. The proposed requirements at (j) (2) and (3) are concerned with hoist mechanism control and immobilization of variable-radius booms during hoisting of personnel; these precautions ensure that the operator has positive control and that the boom does not rotate or extend accidentally. Without power-down capability, the action of the brake would be the only protection against the load slipping on the way down.

Proposed paragraphs (j) (4) and (5) both deal with devices used to hoist employees by crane or derrick. The first proposed requirement stipulates that unless a net approximately 5 feet in height surrounds the sides of the lifting platform, all employees being hoisted must be protected against falling by a safety belt or by a harness and lifeline, attached either to the hoist mechanism of the crane or to the lifting device itself. In addition, it is proposed that platforms or other employee hoisting devices be inspected before each day's use and be removed from service if defective.

The provisions proposed in (j) (6), (7), and (8), which also reflect current industry practice, are designed to ensure employee safety during personnel hoisting operations. The first of these proposed requirements would ensure effective communication, by means such as visual or voice contact or by means of hand signals, between the employees being hoisted and the crane operator (or signalman, if one is involved in the operation). The next provision requires crane operators to remain at the controls continuously during employee hoisting operations (a similar requirement applicable to any load being hoisted appears at § 1910.180(h)(4)(i) of the general industry standards).

The proposed rule at paragraph (j)(8) prohibits crane travel during the interval when employees are being hoisted, to reduce the amount of crane motion during this operation to a minimum; in situations in which crane travel is unavoidable, for example, when transferring employees into position, the crane may make minor movements while employees are elevated if all other proposed personnel hoisting requirements have been met.

The final proposed provision in paragraph (j) is addressed to the use of intermodal container spreaders to lift employees on and off containers. A personnel platform that could be used for this purpose was first devised by a U.S. steamship operator and stevedoring firm in the 1960's, and since then the use of this device has spread widely. The requirements proposed in (j)(9) offer protection against falls while personnel are being hoisted in this manner, and the final statement in this paragraph proposes that the provisions of paragraphs (j)(1)(i), (j)(1)(ii)(A), (j)(1)(ii)(B), (j)(1)(ii)(E), (j)(4) and (j)(8) not apply when intermodal container spreaders, rather than hoisting platforms, are used to hoist employees. These four proposed requirements are unnecessary when spreaders are used, because spreaders are stable, strong and secure, and are only used in situations where there are no overhead hazards; i.e., no suspended drafts.

Routine crane and derrick inspections are covered in proposed paragraphs (k)(1) through (k)(4); provisions that are similar in intent to proposed paragraphs (k)(3) and (k)(1) appear in the existing longshoring regulations (§§ 1918.74(a)(8) and 1918.61(a), respectively), and extensive crane and derrick inspection requirements are found in the general industry standards (§ 1910.179(j); § 1910.180(d); § 1910.181(d)). The proposal would allow only designated persons to perform inspections or repairs on cranes or derricks, and any defects in functional operating components found during inspection would be required to be reported to the employer. In turn, the employer must inform the operator of any defects, which would then have to be repaired before further use of the equipment.

The final provision in this paragraph, (k)(4), proposes that a record of required monthly inspections be maintained for at least six months, so that maintenance personnel will have access to the equipment's service and repair history. OSHA would appreciate receiving comments and information about the need for the monthly inspections called for in proposed paragraph (k)(2), particularly in view of the stringent existing crane certification requirements for annual and daily inspections (§ 1919.15(c)).

Section 1918a.46 Crane load devices. Proposed § 1918a.46 covers crane load devices and is an updating of § 1918.74(a)(9) of the existing longshoring rules. Regulations governing load-indicating devices were first incorporated in the maritime rules in 1971, because cranes used in the marine environment must often operate in more critical situations and under harsher conditions than generally prevail elsewhere. For example, in stevedoring, cargo is being hoisted into and out of vessel holds and the hoisting equipment is therefore subject to more shock loading, impact damage, and sideloading stress than equipment used in open spaces.

Since promulagation of the maritime rules in 1960, however, some load devices have been reported to be less sturdy and less reliable than originally thought; in addition, the serviceability and accuracy of these devices have been shown to be highly dependent on the quality of the maintenance performed on the device itself and on the crane to which it is attached. For example, a load-indicating device that relies on factors affected by sheave friction (such as tension on the wire) will not operate properly if the sheaves present more than the proper amount of friction. Lack of success in using these devices has led many people in the marine industry to recommend that load-indicating devices not be required in the proposal or in any future marine

terminal rule. However, OSHA believes that, given proper maintenance procedures, these devices provide significant protection for employees working with cranes. There are no available statistics attesting directly to the effectiveness of load-indicating devices, but other countries, such as Great Britain and Germany, and organizations such as the International Labour Organization (Code of Practice, Safety and Health in Dock Work, 1977) (Ex. 32: 63, 64) have required or recommended these devices for several years. It has been suggested (Ex. 28: 4, 5) that the required use of such devices is responsible for the smaller percentage of crane capsizing accidents in Great Britain (25% of all crane accidents) compared to the United States and Canada (35%). Neither the OSHA construction standards nor the general industry standards require these devices. OSHA would appreciate any information or statistics, including accident reports, that would be helpful in addressing this topic in the final standard for marine terminals.

The first proposed rule ((a)) of the crane load device section requires each crane to have means of determining or limiting the loads hoisted; the exceptioms to this proposed requirement are stated in paragraphs (a)(1) through (a)(4). Cranes using a clamshell or bucket to handle bulk cargo or those using a magnet or similar hoisting device (other than a hook, spreader or sling) are exempted from the load device requirement because the dimensions or physical characteristics of a bucket or magnet limit the size of the load so drastically that it is impossible to overload the crane. The proposed provision goes beyond the exemption in § 1918.74(a)(9)(viii)(*b*), which is allowed only "while handling bulk commodities or cargoes by means of clamshell bucket or magnet," because there are other commodities and other hoisting configurations which similiarly pose no threat of overload. Similarly, cranes used exclusively to handle hose-handled products, such as bulk liquids, are excluded because no loaded hose weighs enough to present on overload hazard. Determining accurately, the weight of a load to be hoisted is often essential if overloading accidents are to be prevented. An example of a load whose weight is otherwise impossible to determine is a lift consisting of water-soaked logs, a common type of cargo in West Coast ports. In addition, the weights painted on steel ingots and loaded intermodal containers are often incorrect.

Proposed paragraph (a)(3) would permit employers to dispense with a load device if they can demonstrate that a crane will not be used to handle loads beyond the crane's load ratings at any working radius; this provision represents a rewording of the requirement in § 1918.74(a)(9)(viii)(*d*) of the maritime regulations. As proposed, an employer could demonstrate that a particular crane never exceeds its rated loads by making the pertinent cargo manifest, stow plan, or bill of lading available. This proposed requirement would ensure that the crane's load rating is not exceeded.

The final exemption, stated at paragraph (a)(4), is substantively identical to the provision appearing at § 1918.74(a)(9)(viiii)(*a*) of the longshoring regulations, and proposes that trolley-equipped container-handling cranes need not have had load devices, if they are in compliance with the rules proposed in § 1918a.71(b), (c), (d), and (e) of this Part for determining container and load weight, or if lifts are made with a lifting beam supplied by the manufacturer. Proposed paragraph (a)(4) should not be interpreted as permitting a crane fitted with a weighing device to be used to weigh a load, a hazardous practice which may involve lifting loads of unknown and perhaps excessive weight. Some employers have installed weighing devices that provide an actual readout in the cab of the weight of every load, but OSHA does not propose that such a readout be required because the load should be weighed before it is hoisted. Compliance with this proposed provision is required in addition to the requirements proposed in § 1918a.71(a) through (e), which require a weighing scale to be used.

Proposed paragraph (b) specifies the requirements to be met by whatever load-indicating or load-limiting device is chosen by the employer to comply with proposed paragraph (a); the criteria are essentially the same as those in the maritime regulations (§ 1918.74(a)(9)(ii)). Proposed paragraph (b)(1) is appropriate in the case of cranes with elevatable variable radius booms, and permits employers to use any means of indicating load weight directly, except a hook scale or a dynamometer, which are not sufficiently accurate for this use; this option would require operators to use weight indications together with crane ratings, where this is appropriate, to ensure that the hoisting operation is within a safe range. The proposed alternative outlined in paragraph (b)(2) would permit the use of a load-moment device, computer, or other equipment or system that automatically indicates that the rated load is being approached or has been reached or exceeded, and the last proposed provision, (b)(3), would allow employers to equip their cranes with a limit switch or other device that shuts off power to prevent overloading.

Performance requirements for crane overload or load-indicating devices are addressed in proposed paragraph (c); these provisions loosely parallel those in § 1918.74(a)(9). The first proposed provision requires any device used to have a range compatible with the range of the crane. The accuracy ranges required for load-indicating devices are specified in proposed paragraph (c)(2), and are based on the standards used by manufacturers of these devices and set forth in Society of Automotive Engineers standard J376 (Ex. 39: 1, 2). Since the state of the art for these devices is such that the specified accuracy cannot be attained at the extremes of the crane's ratings, the proposal requires a means of warning the crane operator when the load falls within these extreme and inaccurate ranges.

Limit switches or equivalent devices must meet the accuracy requirements proposed in paragraph (c)(3), and the rule in proposed paragraph (c)(4) requires any load-indicating load-limiting device to meet the performance requirements at temperatures ranging from $-22°$ F to $+122°$ F, which would include those commonly encountered in the marine terminal environment.

Proposed paragraph (d) requires load-indicating devices to be checked before each day's use unless the device manufacturer has certified that the device will meet the performance requirements of paragraph (c) for a specified and unexpired period of time, and there is a record of this certification at the terminal.

In cases where the load-indicating device itself forms part of the weight-bearing structure, as is the case when a load cell is used, proposed paragraph (e) states that the device's strength factor may not be the limiting strength factor of the crane to which the device is fitted. A similar requirement appears at § 1918.74(a)(9)(iv) of the longshoring standards. Any load-indicating readout or device labeling is required by proposed paragraph (f) to be compatible with or convertible to the measures used on the crane rating chart, which is essential if indications and chart are to be used together safely and effectively. The provisions in this paragraph are similar in intent to those in § 1918.74(a)(9)(v) of the longshoring regulations.

In paragraph (g), OSHA proposes that manufacturer's installation, maintenance, and use instructions be

followed for cranes and load-indicating devices; the effectiveness of these devices is heavily dependent on proper maintenance of both crane and device.

Proposed paragraph (h) is directed to devices that use radius or boom angle as a factor in determining load capacity; the provisions specify the accuracy ranges required for these devices. As proposed, a chart would be required if conversion from angular to linear measure (or vice versa) is necessary. Similar requirements may be found in the maritime rules (§ 1918.74(a)(9)(vii)).

In paragraph (i), OSHA proposes performance tests for load devices and requires installations to be tested when initially fitted, at intervals recommended by the manufacturer, when an inaccuracy is noticed, and when surveys are required by certification procedures. The performance test must be in accordance with manufacturer's instructions (if these are available), and must include testing of all functions. Performance test for load-indicating devices are not addressed in the longshoring rules or in the general industry standards, but they are recommended in SAE J376 standard (Ex. 39: 3, 4).

Test records are covered in paragraph (j), which proposes that records of the most recently conducted performance test be maintained for each load device. Such a record would be required to note the accuracy of the device and any recalibration that was required to restore accuracy.

Section 1918o.47 Winches. Both fixed and portable winches are covered in proposed § 1918.47; the provisions in this section closely parallel the recommendations of the ad hoc Advisory Committee (Rec Vol 117i). The first proposed provision requires moving winch parts to be guarded to protect employees from being drawn into the winch; bars or another type of guard over the drum would meet this requirement. A similar provision appears at § 1918.53(a)(1) of the longshoring industry standards. All winches are required by proposed paragraph (b) to have stop controls that can be easily identified and reached by the operator in an emergency. Both the ANSI marine terminal standard (section 5.4) and the longshoring rules (§ 1918.70(b)) address the proper securing of portable winches to prevent shifting during use. However, proposed paragraph (c) permits greater flexibility than these rules by allowing a winch to be moved during use if necessary and by recognizing that it may not be possible to immobilize a portable winch entirely. For example, some portable winches, such as specialized winches on tracks, are designed to move within prescribed limits during use. Proposed provision (d) requires limit stop switches on portable winches, a safety feature that might have prevented a serious winch accident that occurred in a bulk-handling terminal (Ex. 21). The final provision, (e) proposes that the wire-rope-on-drum requirements from the crane and derrick section of the proposal (§ 1918a.45(f)(11)) also apply to winches, to ensure that a safe length of rope remains on the drum.

Section 1918o.48 Conveyors. The proposed requirements in § 1918a.48 cover conveyors used in marine terminals. Although OSHA has no conveyor accident data specifically related to marine terminal conveyor injuries and fatalities, conveyors are known to account for nearly 1% of all lost-workday injuries, on a national basis (Ex. 74: 1-3). The great majority of these injuries are caught-in-and-between injuries, a large number of which result in amputations (Ex. 46: 47). This degree of risk requires that every effort be made to provide protection to employees who work with and around conveyors; OSHA would be grateful for information related to the kinds of conveyors found in marine terminals, the types of material conveyed, the number of employees exposed, and any relevant accident and injury data.

The provisions in paragraph (a) propose that all danger zones associated with conveyors be guarded to ensure employee protection; there is at present no general coverage of conveyors in OSHA's general industry standards. Moving parts, such as nip and shear points and transfer mechanisms, would be required to be guarded, as would screw conveyors, areas beneath counterweights, walkways beneath overhead conveyors, and any other danger zone. The second provision, (a)(2), proposes that employers provide an elevated walkway with a guardrail for the use of employees who must cross over a moving conveyor. It also stipulates that spill guards, casings or other methods be used when necessary to protect employees walking under operating overhead conveyors.

Rollers or wheels on gravity conveyors are required by proposed paragraph (b) to be secured in position to keep them from jumping or falling out of the frame; this requirement is similar to a provision in the ANSI MH9.1 standard (section 5.5.2) and the longshoring rules (§ 1918.68(d)), and uses language recommended by the SAC (Rec Vol 117i).

Gravity roller conveyor sections are required by proposed paragraph (c) to be firmly placed and secured, to prevent material on the conveying medium itself from falling off and injuring employees. Both the ANSI MH9.1 standard (section 5.5.2) and the maritime regulations (§ 1918.68(c)) address the same hazard.

A means of braking or slowing objects arriving at the delivery end of a conveyor must be provided, according to proposed paragraph (d)(1), if employees at the transfer points might be injured by material piling up and spilling off the conveyor. An example of a method that might be used is applying an abrasive surface at the end of the conveyor. Section 1918.68(f) of the longshoring regulations and section 5.5.3 of the ANSI marine terminal document contain similar provisions. A further proposed requirement addressing conveyor brakes stipulates that electrically released brakes must engage automatically if the power supply to the conveyor fails or if the control returns to the stop position, to prevent the load from rolling or falling backward on the conveying medium; the parallel ANSI provision appears at section 5.5.3 of the marine terminal standard.

Portable conveyor stability is addressed in paragraph (e) and in the ANSI MH9.1 standard (section 5.5.3); portable conveyors that can be positioned and used at different elevations must also be held at the operating level by a locking device or other means such as wedging a block in the positioning mechanism. Portable conveyors that have toppled over have caused several accidents and injuries (Ex. 73: 3-49, 3-50, 3-51).

Proposed paragraph (f) deals with emergency stop devices at work stations of employees working along a conveyor or at fixed loading or discharge points; the equivalent ANSI MH9.1 provision (section 5.5.4) prohibits operators from leaving the conveyor's controls while the conveyor is in motion. OSHA has not included this latter requirement because the Agency believes that the remotely controlled and extensive conveyors for which such a rule would be appropriate are not generally found in marine terminals. OSHA invites comments on the use of these conveyors in marine terminals.

A requirement mandating a warning (which may be either visible or audible) unless employees are clear of the conveyor before start-up is proposed in paragraph (g), and reflects a recommendation of the Advisory Committee (Ex. 2:118i). A similar provision was included in the ANSI conveyor standard (B20.1–1976). This provision is intended to prevent accidents caused by the unexpected activation of the conveyor; for example, employees standing next to a vertical

conveyor might be struck by a bucket if the conveyor started without warning.

A general housekeeping requirement is proposed in paragraph (h), which states that areas around conveyor loading and discharge points must be kept free of obstructions while employees are working. Section 5.5.7 of ANSI MH9.1 deals with the same hazards, which include falling over boxes, overexertion caused by lifting objects improperly in a cramped space, and being struck by falling objects.

Conveyor maintenance, sevicing and repair are covered by the requirements in paragraph (i), which are essentially the same as those at section 5.5.8 of ANSI MH9.1. OSHA has recently studied reports of several conveyor accidents in general industry in great detail, and has determined that injuries and fatalities related to the failure to deactivate and lock out the power supply to the conveyor while repairs or maintenance is being performed or while employees are attempting to unjam a stopped conveyor may account for as many as 25% of all conveyor-related injuries (Ex. 75: 216). Although the data on which this estimate is based cannot be separated into marine terminal vs. general industry cases, OSHA believes that they are valid for conveyors used in terminals as well.

The first provision requires deactivation, followed by locking out, of the power source to any conveyor being repaired or serviced except that such a conveyor may be operated briefly for testing or "troubleshooting" purposes, for example to jog the belt. The second proposed rule in this paragraph, (i)(2), stipulates that the conveyor's starting device be locked before any employee attempts to remove any object overloading or jamming the conveyor. This provision would prevent employees attempting to unblock the conveyor from being injured by the accidental reactivation of the conveying medium. Unjamming injuries may occur in several ways: the probe used to unjam the conveyor may itself become a lethal projectile when the conveyor suddenly starts up, or the unexpected reactivation may catch the employee off guard, causing him to be pulled into the conveyor.

The miscellaneous conveyor safety practices proposed in paragraph (j) carry forward requirements found in ANSI MH9.1 (section 5.5.9) and in the ANSI conveyor standard (B20.1–1976). These provisions state that only persons designated by the employer may operate, repair, or maintain conveyors. They also prohibit riding, walking, or climbing on conveyors or their components, and require safety devices and overload switches to be in place and functional when the conveyor is used. The prohibition against employees riding the conveying medium has been included on the recommendation of the SAC (Ex. 2:120 i), and would deal with a source of conveyor accidents (Ex. 73: 250).

Section 1918a.49 Spouts, chutes, hoppers, bins, and associated equipment. Proposed § 1918a.49 deals with bulk-loading spouts, chutes, hoppers, bins and associated gear and equipment. Chutes and spouts are used to carry such material as grain, coal, scrap steel, and sugar; there have been several reported fatalities (Ex. 48) caused by the failure of chutes and spout rigging, which is often located so high above the ground that close inspection is difficult. OSHA proposes to require certification of this gear for marine terminals under Part 1919 because of the number of accidents and injuries associated with it. The inspection requirement in proposed paragraph (a) is essential because the equipment used to handle bulk commodities frequently escapes the kind of scrutiny directed to other cargo-handling gear, with disastrous results if the rigging or gear fails. The cross-reference calls attention to the certification requirement for this type of equipment.

The next proposed requirement, paragraph (b), states that instantaneous and direct communication must be available between the shipboard work station at the discharge end of a loading spout or chute and the position in the terminal from which the flow of cargo is controlled. The Advisory Committee recommended inclusion of this provision (Ex. 2:120 i) because of the many instances when it has been necessary to stop the flow immediately to prevent employees from being hit by the conveyed material, for example when the flow has been obstructed temporarily, causing cargo to overflow the chute. The Agency intends to propose a similar requirement in the longshoring regulations in the future.

Means of preventing employees from falling into chutes and hoppers are addressed in proposed paragraph (c). Openings to chutes and hoppers are required to be guarded, for example by hinged covers or other devices, such as a railing, to prevent fall injuries. Paragraph (d) requires employers to provide a safe walkway and means of reaching the hopper for employees working on a hopper. Guardrails are required if the conditions stipulated in § 1918a.112, the proposed section on guarding of edges, are present. The ANSI MH9.1 standard protects against the same hazard (section 5.7).

Chutes used to carry materials that could fall on employees are required by proposed paragraph (e) to have sideboards to contain the material carried, a provision based on § 1918.68(b) of the longshoring regulations and similar to a requirement in section 5.5.1 of ANSI MH9.1. The proposed provisions in paragraphs (f) and (g) are intended to prevent fast-moving bulk cargo from overflowing the chute and injuring employees, and to ensure that chutes are adequately anchored so that they will not themselves be a hazard to employees working near them. Similar coverage is provided in the longshoring rules (§ 1918.68) and in ANSI MH9.1 (sections 5.5.1, 5.5.2, and 5.5.3).

In paragraphs (h), (i), and (j), OSHA proposes requirements to protect employees working around bulk commodities, such as sugar, sand, cement, grain, and coal, that are stored in bins. The principal hazards of working around bulk cargo in bins are asphyxiation and exposure to hazardous atmospheres, which occur, for example, when an employee is buried in moving grain or is overcome by pesticide fumes while performing such tasks as reinstating the flow of the cargo or cleaning the bin.

Proposed paragraph (h)(1) requires the person controlling cargo flow into the bin to be made aware that another employee is entering an empty bin. Paragraph (h)(2) states that the power supply to the conveyor or spout carrying the cargo must be locked out after the power has been shut off. The provisions in proposed paragraphs (i) provide coverage for the hazards of working in a bin filled with a bulk commodity. In addition to requirements similar to those in paragraphs (h)(1) and (h)(2), employees entering a bin containing a commodity must be additionally protected both by a lifeline and harness and by an appropriately equipped standby stationed outside the bin. The severity of the hazards associated with fumigants, pesticides, and shifting bulk material makes these precautions essential to employee safety.

Guarding of bin top openings is required by the proposed provision in paragraph (j); railings, hinged covers, and gratings are examples of means of complying with this provision.

Paragraph (k) provides that chutes and hoppers be repaired only by designated persons.

The requirements proposed in paragraph (l) cover power shovels, which are often used with hoppers to discharge or distribute commodities

such as grain, coal, or sugar. The inspection called for in the first provision is designed to reduce the number of injuries caused by defective rigging and shovel components. Operational defects that might interfere with safe operation of the shovel or associated gear are reasons for withdrawing the equipment from service according to proposed paragraph (1)(2). The final provision pertaining to power shovels requires the power to be shut off and locked out, the belt to be stopped and the hopper to be closed before employees attempt to adjust the position or parts of the shovel or rigging.

Section 1918a.50 Certification of marine terminal material handling devices. Certification of material handling devices used in marine terminals is covered in § 1918a.50; this topic is presently regulated in §§ 1918.13 and 1918.14 of the longshoring standards. Certification of material handling equipment is based on the International Labour Organization (ILO) Convention no. 32 and the ILO's Associated Code of Practice, Safety and Health in Dock Work (1977), which requires signatory nations to have minimum certification requirements for cranes, ship's gear, loose gear and other equipment. Certification requirements call for inspection and testing of cranes and ship's gear used ashore as well as aboard, and one-time testing of wire rope (by sample lot) and loose gear such as shackles, swivels, and hooks. Although the U.S. is not a signatory nation, it adheres to the convention's certification provisions. Certificating agencies accredited or approved by OSHA perform the certification in the U.S. for equipment used ashore. OSHA also recognizes the certification authority of two states, California and Washington.

Certification is intended to ensure that material handling equipment is maintained properly so that it will be capable of handling loads safely. Since 1960, the Department of Labor has required certification of ship's gear for foreign and U.S. vessels not inspected by the Coast Guard, and the Coast Guard has required certification of Coast Guard inspected vessels since 1963. Certification requirements were extended to shoreside material handling equipment in 1970. The certification requirements in this section of the proposal are not expected to affect much marine terminal equipment because most cranes and other similar assembled units will already have been certificated under the existing certification regulations.

Proposed paragraph (a) sets forth the scope and conditions under which this section applies; as noted in paragraphs (c)(1) through (c)(6), certification requirements apply to cranes and derricks, bulk cargo spouts and suckers, vertical pocket and bucket conveyors, house fall cargo-handling gear, certain types of special gear, and wire rope and loose gear.

Certification must be performed in accordance with the standards of Part 1919 of 29 CFR or by a duly authorized state agency, as described in proposed paragraph (b).

Details of the tests and documentation required are provided in proposed paragraphs (c)(1) through (c)(6); many of these provisions parallel requirements in the longshoring regulations. The proposed rule for cranes and derricks is based on material in §§ 1918.13 and 1918.14. The proposed provision in § 1918a.51(c)(2) applies certification procedures to bulk cargo spouts and suckers; the collapse of these devices has caused several reported fatal accidents in the past (Ex. 48). A similar requirement appears in the longshoring rules (§ 1918.13(d)).

Vertical and bucket conveyors, other than those in grain elevator structures, must be inspected annually, according to proposed paragraph (c)(3). This is a newly developed provision recommended by the SAC (Ex. 2: 121 ia). Examples of terminal conveyors that would fall under the scope of this proposed rule are banana and sugar conveyors used to load and unload vessels. There may be other permanently installed vertical conveyors, such as bulk cement handling equipment, which should be exempted from coverage by the standard because their operation does not require the presence of employees. OSHA would particularly welcome information on the numbers and types of conveyors meeting this condition, and the Agency is also interested in comments relating to the scope of this provision.

House fall cargo-handling gear must be tested as a unit, as specified in paragraph (c)(4); there is no similar Part 1918 coverage, although both the ANSI MH9.1 and the longshoring rules require inspection and keeping of inspection records for this gear. Because this type of gear is falling into disuse, inspection and maintenance procedures have often been overlooked. The proposed rule would ensure that this equipment and its supporting structures meet certification requirements. The Advisory Committee recommended inclusion of this provision (Ex. 2: 121 ia).

Special stevedoring gear used ashore must be certificated in accordance with the proposed provisions in paragraphs (c)(5)(i) through (c)(5)(iii). Similar requirements for gear used aboard vessels are found in the longshoring rules (§1918.61(b)); however, extending this coverage to the shore side of the operation should reduce the number of accidents caused by improperly maintained specially rigged gear. Proposed paragraph (c)(5)(ii) requires spreaders that are not part of ship's gear to be certificated. In the past, spreaders consistently used with a particular crane have been certificated in connection with the crane's unit proof test, while spreaders not so used have been considered special stevedoring gear and have therefore been tested only in accordance with the pertinent longshoring requirement (§1918.61(b)). Spreaders are often exchanged among different cranes, and in the past only those used with container cranes have been tested. This proposed provision will not affect much equipment because many employers have had these spreaders certificated, although they were not required by law to do so.

Loose gear and wire rope purchased or obtained after the date specified in proposed paragraph (c)(6) and used in material handling must also be tested and certificated. A certificate obtained at purchase stating that the rope has been tested by sample lot would meet this requirement. The provision is intended to apply only to wire rope and loose gear used in material handling applications, where failure of the rope could be disastrous, and would not apply to rope used in less critical situations, such as for lashings or railings.

The proposed provision in paragraph (d), which is similar to rules in the longshoring regulations (§1918.13(e) and (f)), has been included to ensure that equipment that is partially disassembled and then reassembled in a new configuration, such as a mobile crane, is not considered a new piece of equipment requiring new certification procedures. Examples of equipment routinely used in difference configurations are cranes used alternately with a long and a short boom, or those used with various hoisting mechanisms, such as magnets, clam shells, and hooks. The requirement proposed at paragraph (e) seeks to avoid duplication of certification surveys by not requiring re-certification when certificated equipment is moved to another jurisdiction, for example, when a crane certificated in Washington moves to Oregon. A nearly identical

requirement is included in the longshoring rules (§1918.13(f)).

Proposed paragraph (e) draws attention to the fact that certification procedures are no substitute for routine maintenance and inspection; the language is identical to that of §1918.13(h) of the existing longshoring regulations.

The proposed provisions in paragraph (g)(1) and (2) state clearly the intervals allowed between required certification surveys; these requirements have been included because there has been some confusion in the past about these dates. For example, some employers have had equipment inspected twice in one year: once for the annual survey and once for the quadrennial survey. However, no annual survey is required in the year in which a quadrennial survey is performed. The requirement in proposed paragraph (g)(2) states that equipment which has not been in use for 6 months or more (and has therefore probably not been properly maintained) must have the more thorough certification survey required of equipment entering service.

Loose gear such as shackles and swivels is required by the rule in proposed paragraph (h) to be marked after it has been tested if it is to be used in a hoisting application. OHSA intends to add an equivalent provision to the shipboard (longshoring) regulations in the future, as has been done in the maritime regulations of other nations; a similar provision appears in section 6.7 of the ANSI MH9.1 standard.

Single sheave blocks used in hoisting are presently covered by the certification requirements of §1919.21(b); the proposal (paragraph (h)) would simpy extend these and other certification requirements to equipment used ashore. Unlike multiple sheave blocks, single sheave blocks have two safe working loads, depending on the method of use, and marking could therefore be critical to safety. The requirements proposed in this paragraph have been limited to newly obtained equipment because of the difficulties involved in marking and certificating all existing units of loose gear. These proposed provisions will ensure the use of tested equipment in cargo handling by requiring that identifying marks of the testing be traceable to related certification documents, which must be available at the terminal.

Cargo-handling equipment exempted from the certification requirements is listed in proposed paragraphs (i)(1) and (i)(2); the list of equipment exempted in the proposal includes equipment excluded from certification coverage in ANSI MH 9.1 (section 6.8). However, the ANSI standard also excludes vertical pocket conveyors, such as banana legs, which are used in terminals. Cranes used exclusively to hoist personnel, such as cherry pickers, are also excluded in MH9.1. The proposal requires certification of straddle trucks which are large enough to be considered cranes rather than industrial trucks. OSHA believes that any industrial truck sufficiently large to hoist two intermodal containers should be treated for regulatory purposes as a crane. The list of equipment excluded from Part 1918 certification requirements (§ 1918.3(r)) is almost identical to the ANSI MH9.1 list, except that the longshoring regulations do not mention bridge cranes, which are not used aboard ship. These cranes ar included in the proposal. Most cargo-handling equipment in marine terminals that is not required by the proposal to be certificated is used in activities that do not expose employees to hazardous situations, such as ore loading at facilities that are largely unattended, or in operations involving modified industrial trucks that cannot lift a large load to a height that would endanger employees below. Restricting the exemption of bulk coal-loading facilities to equipment not of the types illustrated in Figures II–I through II–22 of proposed Appendix II and to equipment that does not use the types of booms or spans shown in these illustrations makes the proposal's certification requirement more stringent than the parallel provision in the longshoring rules. Although specialized car dumpers and equipment used only at high-volume coal-loading facilities would not have to be certificated, other more versatile and less specialized equipment which is not used primarily in coal-loading operations would have to be certificated.

Section 1918a.51 Hand tools. Hand tools used in marine terminal operations are covered in proposed § 1918a.51, which is based on similar provisions in the longshoring regulations (§ 1918.72 (a) and (b)). Employers are required by the proposed rule in paragraphs (a) to provide employees with hand tools that are properly maintained and in safe condition. Examples of defects that would affect a tool's safety are loose handles and mushroomed heads.

Portable electric hand tools are addressed in proposed paragraph (b)(1), which is essentially identical to coverage of the same hazards in the longshoring regulations (§ 1918a.72(b), but is more stringent than that in the general industry standards (§ 1910.243(a)(2)(ii)). OSHA has received petitions (Ex. 92) from power tool manufacturers requesting that a requirement similar to the one in paragraph (b)(1) be deleted from the shipyard regulations. However, the Agency believes that an off switch and operates independent of hand pressure offers substantilly less protection to employees because the tool can continue to operate even after it has fallen or been dropped, and it can also easily be turned on accidentally.

The requirement proposed at paragraph (b)(2) is intended to protect employees from being cut while using a portable powered circular saw. It requires adequate guarding of the blade, and is similar to coverage in § 1910.243(a)(1).

The proposed rule in paragraph (c) applies to tools used to cut metal banding or strapping around cargo and requires that cutting tools be used for this purpose. Performing this operation with improper tools, such as a claw hammer, may cause accidents if employees performing the cutting or standing nearby are struck by a flying metal strap. No similar rule appears in the OSHA general industry or longshoring standards, nor is the topic addressed in ANSI MH9.1

Subpart D—Specialized Terminals

Subpart D of the proposal covers specialized marine terminals, such as those devoted to intermodal containers and roll-on roll-off operations, and terminals handling menhaden fishing vessels. The provisions in each section would apply, in addition to any other appropriate provisions in Part 1918a, to operations and equipment in the particular terminals addressed in each of those sections.

Section 1918a.71 Terminals handling intermodal containers or roll-on roll-off vehicles. Proposed 1918a.71 covers marine terminals handling intermodal containers or devoted to roll-on roll-off operations. A roll-on and roll-off operation is one in which a wheeled vehicle (such as a truck or container on chassis) is pushed, towed, or driven aboard a vessel, which then carries these vehicles in ocean trade. These terminals are addressed separately in the proposal because the proliferation of container-handling facilities and the rapid development of containerized cargo-handling techniques, which eliminate much of the manual and mechanical handling of cargo, have been reflected in a change in the types of accidents occurring at these terminals. Traffic accidents are now the most frequent kind of accident in specialized facilities of this type, in contrast to accidents such as struck-by and caught-in injuries that are associated with traditional break-bulk cargo handling.

This section is therefore addressed principally to traffic hazards and accidents specifically associated with container handling. The section of ANSI MH9.1. (section 3.22) dealing with container terminals is more extensive and more detailed in regard to traffic control provisions, but is not as comprehensive as the proposal's coverage of container handling.

The provisions proposed in paragraphs (a) through (f) have been written in simplified and performance-based language, but are based substantively on paragraphs (a) through (b)(6) of § 1918a.85 of the longshoring regulations. These requirements are directed at one of the principal operational difficulties and safety hazards associated with containerized cargo, that of accurately determining the weight of a container and its contents. Misjudging this weight can lead to cranes capsizing and dropping loads, and other types of accidents.

Container and load weights must be marked in pounds, to prevent mishandling in U.S. ports, but they may also bear metric equivalents. These proposed requirements specify a means that may be used to calculate the container's gross weight in cases where the terminal has no weighing scale.

Proposed paragraph (d) exempts open-top containers carrying only vehicles or gas cylinders from the gross weight requirement, because no container of this type can be loaded with enough cylinders or vehicles to present an overload hazard.

Weights of inbound containers from foreign ports may be established either by calculation, weighing, or using the bill of lading, cargo stow plan, or ship's manifest (proposed paragraph (e)).

The final container-weight provision, paragraph (f), prohibits lifting any container that weighs more than the hoisting equipment's rating will permit.

The proposed requirements in paragraphs (g) and (h) are directed at pedestrian hazards that occur in busy terminals, at which employees are engaged in many different tasks involving many types of powered equipment. Many terminals already have designated pedestrian areas, as required in proposed paragraph (g), but the number of traffic accidents in terminals of this type (Ex. 45) makes the establishment of pedestrian and vehicle routes essential in all such facilities.

A member of the Advisory Committee recommended (Rec Vol 62i) that employees be prohibited from walking beneath suspended containers, a requirement similar to provisions in the general industry standards (§§ 1910.179(h)(3)(vi) and 1910.180(h)(3)(b)(vi)), and in ANSI MH9.1 (section 3.22.2). The ANSI provision prohibits hoisting containers over pedestrian aisles "unless suitable precautionary measures are taken." Containers are occasionally dropped accidentally, for example when the locking mechanism releases in mid-air. Proposed paragraph (g)(2) requires employees to stand clear while containers are suspended or being hoisted overhead. OSHA would appreciate information about the operational difficulties, costs, and benefits that can be anticipated as a result of compliance with this requirement. For example, does this provision reflect current practice in intermodal container terminals? What kinds of warnings, if any, should be required?

Employees required to work around container-handling equipment or near a traffic lane must have high-visibility vests or other clothing offering equivalent protection, so that vehicle operators can see them easily (paragraph (h)). There is no similar ANSI or Part 1918 coverage.

Proposed requirements governing the handling of intermodal containers are included in paragraphs (i)(1) through (i)(3); these precautions are necessary because improper handling of containers may cause structural damage to the containers, leading to serious accidents. There are almost three million intermodal containers, which are owned by companies from different countries, moving in world trade; these units are of many types but are built to the requirements of ANSI NH5.4–1972/ISO TC–104 document (Ex. 64), which also establishes the means by which containers of particular designs are to be hoisted.

The proposed provisions at paragraph (i) outline the methods to be used to hoist containers in specific situations (except when the container has been damaged so that special means, such as appropriately used slings, are necessary). The instructions specified in detail-in paragraphs (i)(1) conform to those in the ANSI/ISO standard (Ex. 64), and are included because, when used with properly loaded and undamaged containers, these techniques reduce the hazards associated with container handling. Neither the longshoring regulations, which were published before the ISO standard, nor the ANSI marine terminal standard deals with container hoisting in detail. Procedures for hoisting containers from top and bottom fittings appear at proposed paragraphs (i)(1) (i) and (ii), respectively.

The provision proposed at paragraph (i)(1)(iii) prohibits hoisting containers from above or from one side only, unless either the container is designed to be handled in this manner. This proposed requirement would allow hoisting of 20-foot-long containers by fork lift trucks if the containers are fitted with suitably maintained fork lift pockets. The final requirement proposed in this paragraph, (i)(1)(iv), is intended to cover specialized containers and to allow flexibility for technological advances in container design, a rapidly developing field.

Container spreaders that have lanyards to activate the releasing device are covered in paragraph (i)(2)(i); this equipment is used principally in break-bulk terminals. The proposed provision prohibits the use of lanyard-triggered releasing devices unless the employer can ensure that the lanyard will not snag on an object, accidentally triggering release of a container; such an accident occurred in a marine terminal in Seattle (Ex. 69).

A similar hazard is addressed in proposed paragraph (i)(2)(ii), which deals with twistlock securing systems on container spreaders. If these systems are not properly maintained, they may release a suspended container in mid-air.

Proposed paragraph (i)(3) requires that containers be secured while they are being transported in the terminal. Failure to secure containers adequately has caused several accidents in the past. For example, unsecured containers have fallen from chassis when the vehicle turned the corner too sharply (Ex. 70).

The proposed requirements in paragraphs (j)(1) and (j)(2) are intended to avoid accidents that occur when employees handle seriously damaged intermodal containers. The first provision proposes that containers received in the terminal be inspected before they are handled further, to determine whether they have sustained damage during transit that would make them hazardous for employees to handle. A similar requirement, limited to outbound containers, appears in section 8.1.2.2 of ANSI MH9.1, and the same hazard is addressed by § 1918.85(d) of the longshoring rules. Any container found to have a defect, such as a damaged fitting, that might affect safe use is required by proposed paragraph (j)(2) to be removed from service, identified as unsafe, and kept from use until the defects have been repaired. The Part 1918 requirement (§ 1918.85(d)) is directed to the same hazard, and ANSI MH9.1 also contains a similar provision (section 3.22.9).

Section 1918a.72 Grain elevator terminals [Reserved]. Section 1918a.72

of the proposal has been reserved at this stage of the rulemaking because OSHA is currently developing a standard applying to both safety and health hazards associated with grain-handling facilities. Provisions developed for OSHA's general industry grain-handling facilities proposal that are also applicable to grain elevators at marine terminals will be proposed as additions to the marine terminal standard in the future. After public comment and evaluation of the evidence received in connection with the general industry rulemaking, OSHA intends to propose the incorporation of safety and health coverage specifically tailored to marine terminal grain elevators into this section. Until then, grain elevators at marine terminals would be covered by the applicable requirements in the other subparts of Part 1918a, and would not have additional requirements prescribed for them as "Specialized Terminals" (§ 1918a.71).

Section 1918a.73 Terminal facilities handling menhaden and similar species of fish. Proposed § 1918.73 contains rules applicable to terminal facilities that handle menhaden and similar fish. Menhaden is a term applied to several species of trash fish. The menhaden fishing industry operates on the Atlantic and Gulf coasts, and there is a smaller and similar operation on the West coast. In volume of catch, the menhaden industry forms the largest part of the U.S. fishing industry. Products made from menhaden and similar species of fish include fertilizer, pet food, and fish oil. The material in this section of the proposal was developed in conjunction with the National Fish Meal and Oil Association and in response to reports of several fatalities at menhaden facilities that were caused by exposure to hydrogen sulfide, which is produced by rotting fish (Ex. 44). Parallel coverage for shipboard application will be added to the existing Part 1918 regulations when these are revised in the future. There are approximately 25 facilities devoted exclusively to menhaden handling in this country; most of these already comply with the safety practices outlined in this section. The MH9.1 standard contains detailed coverage of menhaden-related hazards.

To protect employees from exposure to hazardous levels of hydrogen sulfide, the provisions proposed in paragraph (b)(1) require adequate ventilation of brailwater storage tanks. Brailwater is recirculated into the boat's hold to wash out the menhaden. Unless other effective methods of removing hazardous levels of hydrogen sulfide are used, storage tanks must be drained completely after daily use. The proposed requirements in paragraph (b)(2), which require draining, rinsing, and atmospheric testing of tanks, are designed to protect employees from hazardous exposure to hydrogen sulfide or to an oxygen-deficient atmosphere, hazards commonly associated with a confined space such as a closed brailwater tank, in which hydrogen sulfide or other noxious atmosphere has displaced the available oxygen.

Tests to establish that atmospheric levels are safe may only be conducted by designated persons using equipment appropriate for testing in these situations, according to proposed paragraph (b)(3). Hoses and pipelines conveying used brailwater must be drained and left open to the air at the end of each day's use (paragraph (c)), to allow any hydrogen sulfide fumes to dissipate.

Respiratory protective equipment must be appropriate for protection against hydrogen sulfide and oxygen deficiency, and must be immediately available at the terminal, according to the provisions proposed in paragraph (d). Provisions addressed to rescue attempts in dock tanks are also proposed in this paragraph. Employees entering a tank must wear lifelines and harnesses and be equipped with the appropriate respiratory protective equipment. Two similarly equipped standbys must also be stationed outside the tank. Confined space accidents often cause the death of the employee working in the tank and other employees trying to effect rescue (Ex. 24). The rescuers are usually overcome because they fail to don the proper respiratory equipment and instead spontaneously rush into the space to help, and are then themselves overcome.

The provisions in proposed paragraphs (e) and (f) require informed supervisory personnel, familiar with the dangers of hydrogen sulfide and oxygen-deficient atmospheres and the precautions and equipment for reducing or eliminating these hazards, to be present whenever brailwater is being discharged from a vessel. This provision is intended to provide the necessary level of supervisory control to deal effectively with this hazard. These personnel will perform any procedures, such as testing to make sure that used brailwater is safe to be recirculated into the hold (where employees will be working), that are necessary to protect employees from hazardous exposures. Brailwater can be treated to remove contaminants and then re-used. The ANSI marine terminal consensus standard (section 3.23) contains similar coverage but also includes provisions pertaining to conditions aboard vessels, coverage more appropriately located in the longshoring regulations.

Subpart E—Personal Protection

Subpart E of the proposal is concerned with personal protective equipment designed for eye, respiratory, head, and foot protection. In keeping with recent OSHA Policy (see the standard for occupational exposure to acrylonitrile, 43 FR 45762, October 3, 1978), the proposal requires any protective equipment mandated by the standard to be provided to employees without charge.

Section 1918a.91 Eye protection. The proposed provisions relating to eye protection are nearly identical to those of ANSI MH9.1 (section 7.1) and the existing longshoring rules (§ 1918.101), except that the proposal adds a cross-reference to the more extensive eye protection required against radiant energy by proposed § 1918a.152(h).

Section 1918a.92 Respiratory protection. The SAC recommended (Ex. 2:124aii) that respiratory protective equipment be used in accordance with the requirements set forth in 30 CFR Part 11, a suggestion with which OSHA concurs; the present longshoring regulations require respiratory equipment to be approved by the U.S. Bureau of Mines, but this function is now exercised by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health.

Many of the provisions in the proposed respiratory protection section are almost identical to coverage directed to the same hazards in the longshoring regulations (§ 1918.102); proposed paragraphs (a) through (j) derive from these rules, which are also compatible with similar requirements in § 1910.134 of the general industry standards. The proposed provisions in paragraph (j), are designed to ensure that proper aid is available whenever an employee is exposed to a hazardous atmosphere, whether or not the atmosphere is immediately hazardous to life and regardless of the type of respirator worn. The capability of the respirator and the degree of standby protection required vary with the level of hazard involved. For example, a canister-type gas mask might be used in an atmosphere containing a low concentration of ammonia, but self-contained breathing apparatus might be required for an oxygen-deficient atmosphere.

Section 1918a.93 Head protection. The head protection provisions proposed in § 1918a.93 differ somewhat

from present Part 1918 coverage (§ 1918.105) of this topic and from similar rules in the general industry standards (§ 1910.135). The present longshoring provision requires all employees on board vessels to be protected by hard hats. OSHA recognizes that some work situations in marine terminals do not expose employees to potential head injury; the proposal therefore only requires hard hats to be worn by employees exposed to potential head injury. This proposed provision follows the recommendation of the SAC (Ex. 2:127i).

Section 1918a.94 Foot protection. The foot protection section of the proposal (§ 1918a.94) differs from similar coverage in the existing maritime rules by requiring employers to ensure that their employees wear safety shoes in situations where they might be needed; the longshoring standard (§ 1918.104) only requires that employers make foot protection available to employees. The equivalent provision of the ANSI marine terminal standard (section 7.4) prohibits employees who are not wearing adequate footwear from working, but is otherwise similar to the proposal's treatment of the topic. The SAC also recommended (Ex. 2:128i) protection against foot injuries, which are common in cargo handling. At present, some ports, such as Philadelphia, provide employees with safety shoes but do not attempt to ensure that they are worn. OSHA would appreciate receiving information on current practice, foot injury incidence, and any related cost information.

Section 1918a.95 Other protective measures. Section 1918a.95 deals with other protective measures required in certain work situations. The proposed protective clothing provisions (paragraphs (a)(1) and (2)) are similar to rules in the maritime regulations (§ 1918.103) and the ANSI MH9.1 (section 7.6); these practices are already widely used throughout the industry. The proposed requirement that employers provide special protective clothing is not intended to apply to such standard items of clothing as work gloves; an example of a task requiring special protective clothing such as hoods or aprons would be handling leaking cargo packaging or cleaning a caustic tank.

Protective creams or ointments appropriate as barriers against the substance being handled are required whenever the substance involved demands this form of protection. The ANSI marine terminal standard contains a similar provision (section 7.5), but the existing longshoring regulations do not address this hazard. Examples of the types of exposure that might require protective ointment or cream are leaking containers of mildly corrosive or irritating substances. In general, however, barrier creams provide only minimal protection against cutaneous hazards, and gloves or indirect handling methods are more effective and are usually used in these situations.

Proposed paragraph (c)(1) requires employees such as line handlers, who may be pulled into the water in the course of their work, to be provided with personal flotation devices; no similar provision appears in the ANSI standard. The weight, pull, and cumbersome nature of the lines being handled all combine to make protection against drowning necessary; it is not unusual for a mooring line to pull an employee into the water. The remainder of the requirements in proposed paragraph (c) are standard practice in the industry; similar provisions appear in the longshoring rules (§ 1918.106).

Proper eye washing and any other appropriate emergency washing facilities are required by proposed paragraph (d) if employees are exposed to hazardous substances, such as any liquid acid that requires flushing if it contacts the eye. Parallel provisions appear in the general industry rules (§ 1910.151(c)) and in ANSI MH9.1 (section 7.7).

Subpart F—Terminal Facilities

Section 1918a.111 Maintenance and load limits. Hazards associated primarily with the structural features of marine terminals are addressed by the provisions of proposed Subpart F. Section 1918a.111 deals with maintenance of walking and working surfaces and their structural integrity, requiring load limits to be posted and observed to prevent excessive loads from damaging floor surfaces in cargo areas. This requirement is not meant to apply to areas in a terminal such as offices or storage lockers, which are not used for cargo-handling and would therefore not be subject to overloading. Both the general industry standards (§ 1910.22(d)) and the ANSI standard (section 3.1.1) contain provisions designed to protect employees and machinery from the hazards of unsafe floors; however, the proposal differs from the general industry standard in that it limits these requirements to active cargo areas.

Section 1918a.112 Guarding of edges. The various types of protection for employee hazards associated with open sides and edges covered in proposed § 1918a.112 include curbs, railings and toeboards. This section of the proposal is written primarily in performance language.

To protect vehicles and their operators from falling off an apron or bulkhead edge, curbs (bull rails) 10 inches in height must be provided ((a)(1)). Paragraph (a)(2) indicates that this protection is not required at loading docks, platforms and skids where cargo is moved by vehicles. The ANSI standard contains provisions directed at the same hazards (sections 3.1.4, 3.1.5, 3.1.6, and 3.1.7).

Protection against falls in situations where employees might fall more than 4 feet or into the water is addressed in proposed paragraph (b), which requires guardrails except in those circumstances specified in (b)(2)(i)–(iv). The SAC recommended guardrails at edges in cases where the fall distance was 4 feet or more (Ex. 2: 11i). The exceptions listed in paragraph (b) apply to work places, such as loading docks; to equipment, such as railroad rolling stock (covered by other Federal agencies); and to waterside edges used for cargo handling. Since falls from elevations account for as many as 340,000 work-related injuries annually (Ex. 59: 5), the importance of fall protection for employees cannot be overemphasized.

Guardrails used to protect marine terminal employees must meet the strength requirements and be positioned as specified in proposed paragraph (c), but the material used in guardrail construction is left to the employer's discretion. Flexible railings, a common feature in the marine industry, may be used if they are sturdy enough to offer adequate protection. The proposed provision also allows existing guardrails, which are often between 36 and 42 inches high, to continue to be used because they offer adequate employee protection, and replacing all such guardrails would be prohibitively costly. New guardrails are required to be between 40 and 44 inches high, a range permitting the use of guardrails in a variety of building situations. A recent ergonomic research report provides evidence for this range in guardrail height (Ex. 13: 49); this range provides the optimal protection for the greatest number of employees. ANSI coverage of the same topic (MH9.1, section 3.1.9) differs from that of the proposal because it does not take the height of existing guardrails into consideration, does not deal with flexible railings, and is restrictive in terms of construction materials.

Toeboards to protect employees from objects falling from overhead are covered in proposed paragraph (d); this provision also allows flexibility in design, material, and application by

requiring protection only in situations where objects such as tools might fall on employees below and by leaving the material and construction requirements of the toeboard unspecified. The ANSI marine terminal requirement stipulates a height of 4 inches for toeboards (section 3.1.9), but the proposal recognizes that the finished size of 4-inch lumber is closer to 3½ inches than to 4, and additionally that a drainage space may contribute to overall toeboard height.

Stairway railings and handrails are addressed in proposed paragraph (e); the provision in paragrpah (e)(1) allows a greater range in acceptable railing height (from 32 to 36 inches) than similar coverage in the general industry standards (§ 1910.23(e)(2)), to permit most existing railings to remain in place. Any railing used must be in good repair and free of splinters and sharp edges (paragraph (f)). The ANSI MH9.1 does not cover railings in terminals.

Section 1918a.113 Clearance heights. The clearance height provision in § 1918a.113 addresses an obvious hazard, that of employees hiting their heads or being injured when a vehicle hits an overhead obstruction, and uses language almost identical to that found in ANSI MH9.1 (section 3.4).

Section 1918a.114 Cargo doors. Cargo doors have been a source of accidents in marine terminals in the past. The requirements in proposed § 1918a.114 cover the three general types of cargo doors found in terminal facilities: those that are mechanically operated, sliding horizontal doors, and tackle-operated doors. The ANSI MH9.1 standard provides nearly identical coverage of these hazards (section 3.3).

Mechanically operated cargo doors operate by means of counterweights, which can themselves be hazards unless they are enclosed or otherwise guarded (paragraph (a)(1)). Proposed paragraph (a)(2) prohibits using cranes or lift trucks to open doors of this type. Using a lift truck to pry open a cargo door could easily cause the truck to topple, and using a crane for this purpose would impose an excessive sideloading stress. During cargo door repair, however, cranes and lift trucks may be used if precautions such as roping off or barricading the repair area are taken to protect employees. Doors opened only partially, for example for ventilation purposes, must be blocked or otherwise secured in this position so that they do not fall on employees working beneath or near them.

Lifting tackle used to move tackle-operated cargo doors must have shackles or other equally secure connections, such as a moused hook, to ensure that the door does not fall on employees. The lifting gear must have a safety factor of five, as recommended by the SAC (Ex. 2: 15i), to ensure that it is of adequate size and strength to hold the door. Means of holding these doors securely in both the open and closed positions are also required ((b)(3)). The ANSI standard contains two provisions (sections 3.3.2.3 and 3.3.2.4) dealing with inspection and maintenance that have been simplified and stated in performance terms in the proposal (paragraphs (b)(4)) and (b)(5)).

Horizontal sliding doors are hazardous if their rollers come out of their overhead tracks, or if they swing, as might happen in a strong wind. These dangers are addressed in proposed paragraph (c) of this section.

Section 1918a.115 Cargo-landing surfaces. Aprons (the open portions of a terminal facility immediately adjacent to a vessel berth and used to transfer cargo directly between the terminal and a vessel) must provide adequate space to allow necessary work to be performed without undue restriction of movement (proposed § 1918a.115). The hazards of working in too narrow or too restricted a space include falling into the water, overexertion, and being hit by cargo. In addition, cramped working conditions force cargo handlers to work beneath suspended loads, an extremely hazardous practice. No similar requirement appears in the ANSI consensus standard.

Section 1918a.116 Platforms and skids. The platform and skid secton of the proposal (§ 1918a.116) is intended to provide protection against falling both for employees working cargo from the platform or skid and for those working below. The provisions proposed in paragraphs (a) and (b) call for guardrails or other means of protection (such as nets) on the side edges of platforms, and require nets between second story platforms and the vessel being worked.

The requirements proposed in paragraph (c) stipulate that platforms and skids be properly maintained, have their working loads marked on or near them, and have a minimum safety factor of five. Coverage of this topic in the ANSI marine terminal standard (section 3.5) is essentially the same as the proposal. The SAC recommended (Ex. 2: 16i) adoption of similar language covering platform attachments. However, the proposal's performance requirement stipulating that platforms and skids be maintained properly and be capable of handling loads would require that platform attachments be adequate to support the loads being handled.

Section 1918a.117 Elevators and escalators. Elevators and escalators are addressed in proposed § 1918a.117; definitions of these terms appear in paragraphs (a) and (b). The general industry standards do not cover elevators or escalators, and there are elevators in use which are not covered by state or local inspection requirements, including some at waterfront facilities. The General Duty Clause (§ 5(a)(1)) of the OSH Act has often been used to cite employers for hazardous conditions associated with elevators (Ex. 71), although it is not possible to separate these citations into marine terminal, as opposed to general industry, categories. Escalators have been included in the proposal's coverage because there are some escalators in terminals that are used to move cargo, such as ship's stores, in addition to people, and these escalators may not be inspected as frequently as necessary to ensure employee safety.

The SAC recommended (Ex. 2: 17i) that escalators had elevators in marine terminals be certificated as an alternative to the thorough inspections required in proposed paragraph (e), but OSHA has not adopted this approach because most elevators are adequately inspected, and certification would require a new specially trained group of inspectors within the certificating agency. The language in proposed paragraph (e) recognizes that the designated person performing the annual inspection (and perhaps also the monthly inspection) may not be a marine terminal employee but a local government employee, insurance inspector, or employee of a service firm that provides inspection services. Evidence of the latest inspections must be posted, although earlier inspection records are not required to be retained; this provision is intended to reduce recordkeeping to the minimum level consonant with safety.

The requirements proposed in paragraphs (c), (f), and (g) cover load limits and other factors that might affect safe operation of manually operated elevators and those that do not have interlocking doors. The ANSI MH9.1 standard's coverage of elevators is similar in intent but uses language, such as "inspections shall be carried out by persons expert in the field," that OSHA has not proposed.

The proposed provision in paragraph (h) required adequate protection, such as doors, gates, or other barricades, to ensure that employees do not fall down the shaft of elevators that do not have full shaft door closings. The barrier must be in place at every landing except the one at which the elevator is positioned.

No similar provision appears in ANSI MH9.1.

Section 1918a.118 Manlifts. The section of the proposal devoted to manlifts, § 1918a.118, has been developed to apply specifically to manlifts used in marine terminals. The proposed provisions are compatible with but not identical to those on the same subject appearing in the ANSI marine terminal document (MH9.1) or the general industry standards (§ 1910.68). Several examples of manlift fatality case reports, received by OSHA in connection with another rulemaking but typical of manlift accidents anywhere, have been included in the marine terminal rulemaking record (Ex. 74); falls and crushing injuries are common in manlift accidents. The proposed section has been written to allow, to the extent possible, the continued use of existing installations, and to give the employer the widest possible latitude, consistent with employee safety, in implementing the various requirements.

Proposed paragraph (a) outlines a detailed inspection procedure for all manlift parts and related features essential to the safe operation of these devices. Inspection records, monthly and annual, must be kept for one year and be available in the terminal if they are not posted near the manlift (paragraph (b)). This provision is in keeping with the Agency's efforts to reduce recordkeeping requirements to the lowest level consistent with safe practice.

The emergency stop device proposed in paragraph (c), which would be accessible from any position on the lift, would permit an employee to stop the manlift at any point. Manlift instructions (proposed paragraph (d)) would acquaint employees with safe manlift procedures.

The proposed provisions in paragraphs (e), (f), and (g) deal with means of preventing employees on manlifts from being injured in the space above and below the manlift and the top and bottom floors of the facility housing the manlift; signs and lights are examples of such means. Accident reports of cases of employees being pinned either by a step off the manlift or between the lift and the ceiling are included in the record (Ex. 47). The automatic stop device proposed in paragraph (g) would prevent the same type of injury by stopping the manlift automatically any time an employee passed the top landing without getting off. Manlifts installed after the effective date of this standard would be required to have additional stop devices as backup.

Each step on a manlift is required (proposed paragraph (h)) to have a corresponding handhold, to provide the necessary security for employees mounting or riding the lift.

Accessible and secured emergency ladders running the entire length of the manlift must be positioned so that any employee riding the lift can leave it in an emergency (proposed paragraph (i)). This precaution, which is standard industry practice, is essential because a breakdown of the lift might, for example, leave an employee stranded 50 feet off the floor.

Landings, including emergency landings, are addressed in proposed paragraph (j), which requires that they be maintained free of obstructions and specifies that new manlifts (those built after the effective date of the standard) which have landings at intervals of 50 feet or more must have emergency landings every 25 feet or less. Landings must be guarded by an effective means of fall protection; the particular form of protection, which might be gates, railings, or mazes, is left to the employer's discretion. The final paragraph in the manlift section, proposed paragraph (k), stipulates that guards to guide (such as cone guides) and protect employees ascending on the lift be installed at each floor opening to prevent employees from hitting their heads or being knocked off the lift.

Manlifts are required by proposed provision (1) to be equipped, maintained, and used in accordance with the manufacturer's instructions. This requirement would, for example, require belts to be properly sized for the manlift configuration, handholds and steps to be uniformly spaced, and manlift components to have strength characteristics adequate for the application in which they are used.

The provisions proposed in paragraphs (m) and (n) are intended to ensure that no employee riding a manlift will be pulled into the bottom pulley or crushed between the top landing and the ceiling of the building containing the manlift. Brakes to hold the manlift when it is stopped are addressed in the final provision, paragraph (o), in this proposed section.

The proposal's coverage of manlifts is compatible with that of ANSI MH9.1 (section 3.7) but goes beyond it by requiring certain safety features such as warning signs and lights, emergency stop devices, and emergency ladders, and by enumerating safety features to be inspected. Section 1910.68 of the general industry standards contains an extensive series of detailed provisions relating to manlifts; those pertinent to employee safety in the marine terminal setting have been included, in performance language, in the proposed requirements.

Section 1918a.119 Fixed ladders. Proposed § 1918a.119 covers fixed ladders, a subject presently covered by §1910.27 of the general industry standards (Subpart D, Walking and Working Surfaces) but not addressed in ANSI MH9.1. In 1976, OSHA published a Request for Information asking for comments on the material in Subpart D of 1910 (41 FR 17102, April 23, 1976), which included questions about the requirements for fixed ladders, stairways, platforms, and other work surfaces. Many commenters responding to the notice recommended that OSHA adopt a performance-oriented approach to this subject matter whenever possible (Ex. 77). The proposed fixed ladder section uses the performance approach in many cases.

In addition, the proposal strives to make those specifications that are necessary for compliance as flexible and practical as is consistent with employee safety. For example, the proposal specifies an acceptable range, rather than a single size, for some ladder requirements (such as rung spacing), and in other cases (such as rail width or distance between ladder and structure), the proposal only stipulates the minimum dimension for particular ladder features. These minimum measurements offer adequate employee protection, even though they may not provide the extra degree of employee comfort and convenience offered by equipment built to more ample specifications. OSHA believes that requiring the minimum safe size, strength factor, or distance rather than the corresponding ideal measurements for these features will permit employers considerably more flexibility in compliance and will also allow sound and adequate equipment to continue to be used without the expense of replacement or retrofitting.

This proposed section does not apply to portable ladders, which are covered in another section of the proposal (§ 1918a.120); to ladders permanently affixed to vehicles of the types specified in (a)(1), which are covered by other Federal agencies; to climbing devices associated with tanks and towers, such as step bolts, which are not considered ladders; to ladders built into or attached to scaffold framing; or to certain special-purpose ladders.

Ladder defects are covered in proposed paragraph (c), which prohibits the use of ladders with defects affecting safe use, such as broken rungs or loose side rails. The second provision in this paragraph mandates that a ladder

repair, for example a rung replacement, provide a strength factor equivalent to that of the original ladder part.

The requirements in proposed paragraph (d) specify various ladder dimensions that are essential to the safety of employees using these devices. Paragraphs (d)(1)(i) and (d)(1)(ii) state the strength requirements for existing ladders (200 pounds applied over a 3½ inch width at the rung's center) and for newly built ladders (250 pounds similarly applied).

Rung spacing, from the center of one rung to the center of the next rung, is required by proposed paragraph (d)(2)(i) to fall within the 9 to 16½ inch range; however, after the effective date, newly installed ladders would be required to have spacing within the 10 to 14 inch range, which has been determined (Ex. 16) to provide maximum climbing ease and safety.

The proposal contains two requirements directed at the width of fixed ladder rungs: one for existing ladders, and one applicable to ladders installed after the effective date of the final standard. The first proposed provision, (d)(3)(i), permits ladders already installed to have a width of 10 inches between stiles (side rails), although newly installed ladders would be required by proposed paragraph (d)(3)(ii) to have a minimum rung width of 12 inches, in keeping with new research data on climbing safety (Ex. 17).

The distance between the center of the rung and the nearest physical object behind the ladder, such as a wall or building, is proposed in paragraph (d)(4) to be a minimum of 7 inches for all fixed ladders installed after the standard's effective date, but previously implaced ladders may continue to be used if this clearance is at least 4 inches. In future installations where physical limitations restrict the space available so drastically that a 7-inch clearance between the structure to which the ladder is attached and the rung cannot be achieved, the distance may be no less than 4 inches.

The proposed 7-inch clearance will allow enough distance so that the arch, rather than the ball, of the climber's foot will contact the rung, which reduces the amount of torque, and therefore effort, that must be exerted by the lower leg muscles (Ex. 17: 21). In addition, this clearance permits the climber's weight to be more evenly distributed over the arch of the climber's foot, further reducing strain and fatigue (Ex. 17: 21).

As proposed in provision (d)(5), the minimum clearance between an ascending ladder climber and any obstruction, such as a ceiling, light fixture, or wall is 24 inches, to permit passage of the climber. However, although a space of 24 inches allows enough room for the ladder user to avoid hitting hanging obstructions, the proposal requires a deflection device, such as a cone or bevel guard, to ensure that the climber is guided safely through a floor or landing opening without hitting the head.

To facilitate the climber's access to the surface above the top of the ladder, paragraph (d)(6) proposes that the ladder's stiles extend at least 3 feet above the landing surface, except where grab rails or bars provide a secure grip to aid in climbing off the ladder.

The proposed requirement addressed to ladder pitch ((d)(7)) prohibits the use of ladders positioned at a greater-than-90-degree backward slant to the horizontal, which would require a climber to climb with the back of his body, rather than the front, closer to the ground. This posture would require the climber to hang from the rungs of the ladder instead of being supported by the rungs.

Fall protection for climbers of fixed ladders is addressed in proposed paragraph (e). Although there are few ladders of great height in marine terminals, some do exist. Ladder fall protection devices may be grouped into three categories: cages, wells, and safety devices. Cages and wells provdie protection by enclosing the climber and limiting the distance of the potential fall by means of platforms. Safety devices generally involve the use of a pole and auxiliary equipment, such as a friction or hydraulic brake device and lifebelts and lanyards. The proposal considers each of these types of fall devices effective means of fall protection, although there is some evidence that fall arrest mechanisms, such as the safety devices mentioned above, may be more effective in an emergency than cage-type restraining devices, because the action of the safety devices is entirely independent of the climber's performance under stress (Ex. 72). OSHA would appreciate receiving any information about the relative merits of these respective protective devices, to aid the Agency in developing the final rule.

In paragraph (e)(1), OSHA proposes that all fixed ladders greater than 20 feet in height be provide with fall protection devices. This height agrees with the fall protection height requirement in the general industry standards (§1910.27(d)(1)(ii)).

Proposed paragraph (e)(2) states that when a fixed ladder more than 30 feet in height is equipped with a cage or well, unless the climber is additionally protected by a ladder safety device such as a lifebelt and lanyard, the ladder must be built of sections no more than 30 feet in height. Each ladder section must be offset horizontally from the section above and below it, and must also contain at least one landing platform fitted with guardrails. These features are designed to limit the distance a climber may fall, and the platform could also be used as a rest platform, if necessary.

The proposed requirement in paragraph (e)(2)(iv) is a grandfather provision which permits existing hinged platforms to be used in lieu of offset sections and landing platforms on ladders installed before the standard's effective date. Hinged platforms are not permitted in newly installed ladder cages or wells because they require the climber to bend down both to lift them from above during descent and to replace them after use during ascent. This bending maneuver is both "awkward and hazardous," according to a recent study of ladder safety factors (Ex. 17: 112). OSHA seeks information on the hazards of hinged platforms, and the extent of their use in marine terminals.

As proposed in paragraph (e)(3), rest platforms equipped with guardrails on all open sides must be supplied at intervals of 150 feet or less on all fixed ladders which use the safety device method of fall protection. The platform as proposed would provide sufficient room for a climber to stand. However, OSHA is aware that a platform with enough room for emergency sitting (minimum platform dimensions 18 inches in depth; by 26 inches in width) would offer even greater employee protection, by permitting an exhausted climber to rest his legs and feet more effectively (Ex 17: 52). OHSA is considering increasing the minimum platform dimensions to allow for emergency sitting, and would appreciate comments and suggestions pertaining to the effectiveness and feasibility of such rest platforms.

In paragraph (e)(4), OSHA proposes requirements designed to ensure that ladder safety devices are designed, installed, and maintained to ensure their effectiveness. Installation, maintenance, and repair should be performed in accordance with the recommendations of the manufacturer of the device; the distance between the point of attachment of the climber's safety belt and the carrier must fall in the range between 8 and 12 inches, a distance recommended in a recent research report on this topic (Ex. 16).

Ladder cages or wells installed after the standard's effective date are

required by proposed paragraph (e)(5) to be made of sufficiently rigid material to prevent a falling climber from either dislodging or breaking through the enclosure. In addition, cages and wells must have inner surfaces that are free of snags or other protrusions that might injure the ladder user, and both cages and wells are required to extend high enough above landings and close enough to the ground to protect employees during any portion of the ascent and descent that might be hazardous.

In paragraph (e)(6), OHSA proposes that all ladders on radio towers, other communication and utitlity towers, and on poles and other high structures such as stacks and chimneys meet the requirements of paragraph (e) after the effective date of the final standard. At present, many of these structures are not equipped with either ladders or step bolts, and employees are often required to use the tower's sturctural members as climbing devices. The proposal would offer employees climbing these high structures the same degree of fall protection afforded to climbers of fixed ladders, by mandating that employers provide safety devices, cages, or wells when the height of the structure exceeds 20 feet. Many of these facilities do not have fixed ladders, although some are equipped with step bolts or individual rung ladders, in which case safety devices would have to be used instead of cages or wells.

In proposed paragraph (f), OSHA addresses individual rung ladders, which are cast mortared, or otherwise secured directly to walls or other vertical or inclined surfaces, and which have no side rails. The load rating and rung spacing and width requirements parallel or exceed those proposed for existing fixed ladders. For example, proposed provision (f)(3) stipulates that the ends of the rungs of these ladders be offset, enclosed, or equipped with stops, to prevent the climber's foot from slipping from the rung. Since individual rung ladders have no stiles (side rails), these additional precautions against slipping are essential for safe ascent and descent. The final proposed requirement in this paragraph states that the rungs of ladders of this type must be free of sharp edges, which might injure or perhaps even trip a climber.

Section 1918a.120 Portable ladders. In § 1918a.120, OHSA proposes requirements for portable ladders, whether of wood, metal, or reinforced plastic construction, and including job-made ladders (ladders made on the site to the specific requirements of a job and not intended for use elsewhere). This section of the proposal also makes use of the phase-in concept, by specifying more stringent criteria for ladders obtained or built after the standard's effective date.

The load rating and rung spacing provisions are identical to those for existing fixed ladders, except that proprosed paragraph (b)(4) requires that rung width increase in proportion to the ladder's length of climb, a construction feature designed to impart greater strength and stability to long portable ladders.

Proposed paragraph (c) requires all manufactured portable ladders to bear lables indicating that they meet the construction requirements of the appropriate ANSI portable ladder consensus standard, which specifies load ratings, strength factors, spacing, and other requirements.

Job-made portable ladders used after the effective date of the final standard are required by proposed paragraph (d) to meet the ANSI A14.1–1975 spacing and loading specifications for manufactured portable ladders.

In paragraph (e), OSHA proposes maintenance and inspection requirements for all portable ladders, whether manufactured or job made. The defects outlined in paragraph(e)(1) are all sufficiently damaging to interfere with the structural integrity of the ladder, and the presence of any such defect would be cause to remove the ladder from the worksite or to lable is as unusable by tagging if stored on the premises. The inspection required by proposed paragraph (e)(2) would consist of a brief visual inspection to ensure that the ladder has no significant defect. The proposed provision would also require such an inspection after a ladder had been subjected to impact or other unusual stress.

Procedures for safe use of ladders are covered in proposed paragraph (f). The proposed requirements appearing at paragraphs (f)(1) through (f)(6) prohibit using ladders in unsafe ways; they may not be formed by securing a rung (cleat) across a single rail, which cannot provide adequate strength or support, nor may ladders be used in a horizontal position as a walking or working surface. Proposed paragraph (f)(3) is designed to protect climbers on ladders that are made of materials that would conduct electricity from being injured by electric shock, and proposed requirement (f)(4) prohibits tying, bolting, or otherwise securing separate sections from different multi-sectional ladders together or attaching single ladders to each other to achieve greater height. No temporary or improvised method of securing such separate climbing devices together can be guaranteed to provide adequate employee protection.

Proposed paragraph (f)(5) prohibits using self-supporting (free standing) portable ladders as straight ladders. Self-supporting ladders are not designed to be used at the pitch that would be necessary if they were leaned against a building.

The provision proposed in paragraph (f)(6) prohibits portable ladders that are not self supporting, i.e., those that depend on a structure for support, from being used as climbing devices at heights beyond the highest support point, even though the ladder may extend beyond that point. Climbing on and upsupported section of such a ladder could cause the ladder to slip or tip.

The requirement that ladders extend at least 3 feet above the upper level supporting the ladder (proposed paragraph (f)(7)) will ensure that employees climbing on or off the ladder have a secure rail to grasp, unless other handholds are available to offer equivalent gripping surfaces.

In paragraphs (f)(8) and (f)(9), OSHA is proposing that all ladders used be positioned on a level and secure surface and be equipped with slip-resistant bases, e.g., safety "shoes" or spikes. Further, ladders must be secured at top and bottom to prevent slipping. In addition, proposed paragraph (f)(10) requires ladders to be positioned out of the way of doors opening out toward the ladder, which could cause the ladder to slip and fall; in addition, ladders would have to be placed clear of projecting objects, such as window sills and protruding nails, which could injure an employee on the ladder.

Section 1918a.121 Fixed stairways. In proposed § 1918a.121, OSHA specifies requirements for fixed stairways. The term fixed stairway includes all stairs, indoors and out, except fire escape stairways, articulated stairways, or stairs built into a piece of machinery, such as a crane.

The dimensional characteristics specified in proposed paragraph (b) confrom to dimensions for stairways recommended in recent research on this topic (Ex. 17:150–176; Ex. 16). There is evidence that irregular spacing of stairway treads, risers and nosings "correlated highly with accident incidence" (Ex. 17:150). For this reason, the proposal requires uniform spacing of these features for fixed stairs installed after the standard's effective date.

Hand railings are required by proposed paragraph (b)(3) for all fixed stairs with length of climb greater that four steps. The absence of railings on

stairways also correlates highly with accident incidence, according to recent research (Ex. 17:150). Railings are required to have the strength characteristics and design features of permanently installed guardrails, since both types of railings perform essentially the same protective function.

Proposed paragraph (c) addresses stairways built in restricted spaces; these are required to have performance capabilties that will ensure adequate employee protection, but are permitted greater flexibility than that for fixed stairways in less restricted spaces. For example, tread depth may be as narrow as 4 inches because the stairs are without risers and therefore permit the climber's foot to extend into the open space behind the back of the tread. The final proposed requirement in the fixed stairway section states that employers must maintain such stairways in safe condition. For example, stairs must be kept free of tripping and slipping hazards, and railings must be kept free of sharp edges and be properly secured.

Section 1918a.122 Spiral stairways Spiral stairways, found frequently aboard ship and occasionally in marine terminals, are covered in proposed § 1918a.122. There is no coverage of this topic in either the general industry standards or the ANSI marine terminal consensus standard. The minimum requirements for spiral stairways are shown in Figure F–1; they conform to those for existing or restricted fixed stairways in proposed § 1918a.121(c), except for allowances made for the triangular form of spiral staircase treads. Since these stairways are open on at least one side, proposed paragraph (b)(4) stipulates that at least one baluster be provided for each step (if balusters are used), to protect against a user slipping through between the railing and the step.

Clearance above the uppermost step must be a minimum of 6 feet 6 inches, to allow a person to stand after ascending, according to proposed paragraph (b)(5); the requirement proposed in paragraph (c) requires employers to keep stairways of this type in sound condition and free of all hazards.

Section 1918a.123 Employee exits. In general, marine terminals are liberally equipped with exits, such as cargo doors, because they are used for vehicle and cargo traffic. However, to ensure that adequate and well-marked employee exits are available, particularly for emergency use, OSHA proposes the requirements in § 1918a.123. The proposed individual provisions address such matters as exit signs, market exit paths, and good housekeeping, all essential to protect employees in emergencies requiring escape. The minimum width specified in proposed paragraph (d) is sufficient to use of the exit by one person at a time. OSHA believes this minimum exit width is adequate because terminals have so many doors and windows that could be used for emergency egress; information demonstrating support or lack of support for this proposed requirement would be appreciated.

Section 1918a.124 Illumination. In § 1918a.124, OSHA proposes a minimum average light level of 10 foot-candles for active work areas in marine terminals. Although most terminals have light levels at or above this value, at least in cargo-handling areas, some do not. OSHA is considering increasing the required light level in the final rule to 20 foot-candles for active work areas, to conform to the level recommended both for active storage yards and for freight piers in the ANSI standard for illumination, ANSI A11.1–1973, Practice for Industrial Lighting.

OSHA believes this illumination level may be necessary to permit employees in cargo handling and other particularly hazardous work operations to see, and thus avoid, serious hazards. These hazards include tripping and falling over obstructions and being struck by falling objects. Since OSHA believes that areas where the work being performed is less hazardous, such as storage areas and transit sheds, require a lesser illumination level to protect employees, these areas are required in the proposal to have a minimum average light intensity of 5 foot-candles. This latter figure also accords with ANSIs recommendation for active shipping area surrounds (Ex. 61).

The proposed requirement states that illumination levels must be measured at the working or walking surface; as in other measurements of occupational exposure, for example, air samples, the place at which the measurement is taken is of the utmost importance to its validity. Since it is crucial to safety that employees be able to see the walking and working surface in use, the proposal requires that the assessment of light intensity be made at that level.The ANSI MH9.1 (section 3.15) also links amount of light required to degree of hazard involved. Its illumination requirement states:

> . . . all places where persons are employed, including regular passageways to or through a wharf, pier, or any other part of a marine terminal facility, or to and from a vessel, shall be lighted with such adequacy that employees are able to perform assigned duties safely; the amount of light being dependent on and suitable for the type and degree of activity in the specific area.

OSHA is interested in receiving comments about safe illumination levels in various terminal areas and operations. For example, are there work situations other than cargo-handling that require an average light intensity of 10 foot-candles to be performed safely? Do all walking areas, including parking lots, require an illumination level of 5 foot-candles? Are there specific jobs that require a lighting level greater than the proposed requirement for active work areas?

Section 1918a.125 Passage between levels and across openings. In § 1918a.125, OSHA proposes coverage for devices such as ramps, dockboards (car or bridge plates), or other temporary forms of surfacing, such as steel plates. These work surfaces are particularly hazardous because they are not a permanent part of any structure, and because they are subjected to heavy loads and rough use.

Proposed paragraph (a) provides that employees whose work requires them to drive or carry material across an opening or to move from one level to another have a safe means of crossing from one level or surface to another. Dockboards, also known as car or bridge plates, are used primarily to load or discharge cargo from the terminal's loading dock to a trailer or other vehicle by means of fork lift trucks, which go back and forth across the dockboard from the loading dock into the trailer. Ramps are used principally to provide vehicle access to vessels.

The provisions proposed in paragraph (b) address significant hazards associated with these temporary work surfaces. As with other equipment designed for material handling, these devices must be plainly marked with their rated capacities, to prevent collapse caused by overloading. If the rating is not marked directly on the device, which is sometimes the case with dockboards, the rating must be available at the terminal. The adequacy of the means by which these devices are secured to the loading dock, vessel, or other surface is critical to the safe transit of vehicles across them. Accidents involving slipping dockboards are common; a frequent accident sequence involves a fork lift being thrown into the open space between platform and trailer because the dockboard has slipped and fallen into the void. There are several kinds of anchoring and anti-slip devices for securing dockboards in place. In addition, sufficient overlap must be provided to ensure proper contact between the two edges; if the platform or loading surface slopes or is not level,

the edges cannot be lined up and the dockboard cannot be adequately secured.

The means of safe handling addressed in proposed paragraph (b)(5) would vary according to the surface in question and the equipment available. For example, ramps can be safely handled by fork lifts if the ramps are equipped with fork loops or lugs, and dockboards are often equipped with handles or handholds for carrying. The proposed requirements for ramps and dockboards are compatible with those in the general industry standards (§ 1910.30) and the longshoring regulations (§§ 1918.23 and 1918.24).

Guardrails to protect employees from falling are proposed in the requirement at (b)(7) for situations where the dockboard or ramp slopes or where employees might fall more than 4 feet. Fall protection for vehicles using these temporary surfaces is addressed in proposed paragraph (b)(8), which states that dockboards and ramps must have sideboards or, for example, be turned up at right angles on their open sides so that trucks cannot fall over the edge.

In proposed paragraph (c), steel plates or other temporary surfaces used to facilitate vehicle movement are required to be secured so that vehicles or other objects cannot dislodge the plate, which could cause the truck to overturn or the load to topple.

Section 1918a.126 Guarding temporary hazards. Areas in the terminal that may present tripping and falling hazards are addressed in proposed § 1918a.126. Examples of such areas are broken pavement, ditches, holes in the surface of the pier, and chuck holes in traffic areas. Employers may use any effective means of protecting employees from being injured by tripping or falling over or into these hazardous areas; ropes, barricades and temporary railings are examples of appropriate protection. In addition to providing a physical barrier, employers must ensure that such areas are adequately lighted so that employees can avoid the hazard. The ANSI MH9.1 (section 3.1.7) also addresses temporary surface conditions that may be hazardous to employees.

Section 1918a.127 River banks. The proposed provision in § 1918a.127 is intended to apply to conditions on the inland waterways rather than at ocean ports. Along rivers where the water level changes drastically, such as along the Ohio and Mississippi rivers, it is not uncommon for cargo-handling operations to be conducted directly from the bank of the river, without a pier or apron to use as a working surface.

Employees working at such sites need to be protected from falling or being pulled into the water, particularly since these rivers flow very swiftly. There have been several incidents of cargo handlers drowning in these circumstances (Ex. 76). The proposed requirement calls for two types of protection: personal flotation devices for each employee, and guarding of the perimeter of the working area, between the land and the water. Employers might use temporary railings, roping off, or other physical barricades to accomplish the goal of employee protection. The related ANSI provision (section 3.1.8) only requires temporary guarding of the work area perimeter. OSHA believes that requiring flotation devices in these situations is justified by the number of drownings that have occurred.

Section 1918a.128 Sanitation. The requirements proposed in § 1918a.128 address washing and toilet facilities, drinking water, safe eating areas, and garbage disposal, all matters which affect employee health and comfort. The proposal provides coverage for temporary sanitary facilities as well as permanent installations, because cargo is occasionally handled directly from a river bank, and temporary facilities would be used in such a situation.

The requirement proposed at paragraph (c) prohibits employees from eating or drinking in storage or handling areas used for hazardous materials. It is not uncommon for employees, for example, to sit on a pile of hazardous cargo while eating lunch, a practice that might lead to ingestion of some of the hazardous material. The general industry standard contains similar coverage to protect employees against ingestion of toxic materials (§ 1910.141(g)(4)).

The longshoring regulations have rules similar to those in this section (§ 1918.94(a) and (b)) covering drinking water and garbage disposal, and ANSI MH9.1 (section 8.11.2) also addresses requirements for drinking water.

Section 1918a.129 Signs and marking. Signs to alert employees of hazards and to provide essential information are addressed in § 1918a.129. To achieve their purpose, signs are required to be legible and easy to understand, containing either a key word or a more detailed description of the hazard, such as "Railroad Crossing" or "High Voltage."

All marine terminals would be required to have, as a minimum, signs identifying the location of first aid facilities, telephones, fire exits, firefighting and emergency equipment (such as respiratory protective equipment), and a sign listing telephone numbers of the nearest hospital and other sources of emergency aid.

In addition, employers would be required to post danger signs to warn employees of imminent danger, such as electric shock, and to provide caution signs to warn employees of the presence of a potentially hazardous situation. Other sections of the proposal also require employers to post safety instruction signs, such as those designating smoking areas, and traffic signs. The ANSI standard also contains provisions concerning signs (section 8.12).

Subpart G—Related Terminal Operations and Equipment

The material in this proposed subpart addresses certain equipment, such as saws, abrasive wheels, and other fixed machinery, and specialized operations, such as welding and spray painting, that are used or performed in marine terminals. The equipment and operations involve support functions conducted principally to maintain or repair equipment used in connection with the terminal's primary purpose, cargo handling. Many types of machines found in general industry are not used in terminals, and the proposal's guarding and protection requirements are therefore much less extensive than those of OSHA's general industry standards.

Section 1918a.151 Machine guarding. Guarding of fixed machinery is addressed in § 1918a.151. Guarding may involve physical barriers used at the point of operation, or guarding by location, which means positioning the hazardous area, for example a nip point, beyond the reach of employees. The could be done either by using equipment designed so that the nip point is completely enclosed, for example by casting, or located beyond the reach of any employee's work station.

Proposed requirements for all fixed machines are covered in paragraph (b). The first provision proposes that all danger zones (§ 1918a.2(g)) be guarded; this requirement is stated in performance terms, to allow employers flexibility in choosing a method of guarding that is appropriate for the machine in question and the conditions of use.

Proposed paragraph (b)(2) requires a local exhaust system to protect employees performing tasks that produce dangerous quantities of dust or flying chips, as would occur, for example, in fixed saw operations.

The requirement proposed at paragraph (b)(3) to secure fixed machinery is designed to protect employees both from being hurt by a blade or other part of the machine when

the machine shifts, and from being hit by the machine itself as it falls.

The power cut-off device required by proposed paragraph (b)(4) would permit the operator to turn off the machine in a potentially hazardous or emergency situation.

Machines designed to operate at different speeds could seriously injure the operator if they shift speeds without warning during machine operation; the belt-locking device required by proposed paragraph (b)(5) would prevent any unintentional change in speed.

In proposed paragraph (b)(6), motors are required to be constructed so that any loss of power will automatically turn the machine off, to prevent operator injury caused by unexpected restart when the power supply comes back on.

The lockout requirement in proposed paragraph (b)(7) is designed to prevent the severe and frequent injuries caused by the accidental reactivation of machines that have not been properly turned off and locked out before employees work on them. OSHA is presently developing a general lockout standard for machines and equipment used in general industry, and preliminary data indicate that injuries related to the failure to lock out machines may account for as many as one percent of all occupational injuries. Although these statistics pertain to general industry cases, there is no reasonable basis to conclude that marine terminal experience with the same types of machines would be significantly different.

The provisions proposed at paragraphs (b)(8) and (b)(9) would ensure that machines and equipment used in the terminal are maintained in accordance with the manufacturer's instructions, and that maintenance and repair are performed only by designated employees. Maintenance is perhaps even more important in the harsh weather conditions of the terminal environment than in less severe conditions, although it is essential to the safe operation of all industrial machinery.

The final requirement proposed in paragraph (b) prohibits use of any equipment with a defect that would interfere with safe operation; the intent of this provision is to protect operators of machinery and employees working near equipment from being injured by machine malfunction or failure.

In paragraphs (c), (d), (e), and (f), OSHA proposes coverage for the hazards associated with the operation of industrial saws. These hazards include being cut by the saw's blade, and being hit by flying pieces of the material being cut. Accordingly, most of the requirements in these paragraphs relate to machine guarding. For example, proposed requirements (c)(1), (d)(1), (d)(4), (e)(1), and (f)(1) all pertain to guarding of the blades of the type of saw involved.

The provision proposed in paragraph (c)(2) requires spreaders on handfed ripsaws and table saws; these devices hold the cut in the material open, and thus prevent the feedstock from squeezing and jamming the blade.

Non-kickback fingers or dogs are required by proposed paragraphs (c)(3) and (e)(2); these devices hold the material being cut so that it will not be picked up by the saw's action and thrown at the operator. The work practice proposed in paragraph (e)(5) is also intended to ensure that the saw is used in a manner that will offer resistance to the saw's action, to prevent the operator's hands from being caught in the blade.

The devices required in proposed paragraphs (d)(2) and (e)(4) would prevent the saw from rebounding abruptly after use, which might break the blade, and would also ensure that the blade returns to the rest position, away from the operator's hands. Steps to prevent the saw from swinging into the operator's range are proposed in paragraphs (d)(3) and (e)(3), and brakes which would stop the saw are covered in proposed requirement (f)(2). The final proposed provision for saws requires band saws to have a tension control device to maintain the proper tension on the blade, so that material will not catch and be thrown at the operator.

In paragraph (g), OSHA proposes requirements for abrasive wheels and equipment used to grind and sharpen tools and other objects.

The most common accident associated with abrasive wheels is one in which the operator is struck by a piece of the wheel when the wheel breaks. For this reason, most of the requirements proposed in this paragraph deal with guarding or are related to guarding. For example, proposed provision (g)(4) requires that work rests be used; these devices are designed to hold the tool being ground so that the operator's hand will not contact the wheel. Similarly, the requirements proposed in paragraphs (g)(5), (g)(6), and (g)(7) are intended to prevent conditions that might cause the wheel to shatter, thus injuring the operator or others in the vicinity.

Proposed paragraph (h) contains guarding provisions for moving machine parts, such as gears, sprockets, and belt chains; whether the guarding is point of operation guarding or guarding by location is left to the employer's discretion.

Section 1918a.152 Welding, cutting, and heating (hot work). The provisions in this section of the proposal are compatible both with the hot work requirements in OSHA's shipyard regulations (29 CFR Part 1915) and with the Agency's general industry hot work requirements (§ 1910.252). Fire and electric shock are the principal hazards associated with any type of hot work. Hot work is used in the marine terminal principally to perform routine maintenance and repair tasks, such as rebuilding a damaged intermodal container or repairing a chassis that is no longer properly aligned.

In paragraph (c), OSHA proposes requirements to protect employees from the hazards associated with unwanted fires in the workplace. Unless hot work is performed in designated areas without fire hazards, proposed requirement (c)(2) would require that additional precautions, such as using a fire-proof slag curtain, be taken.

Proposed paragraph (c)(3) ensures that fire extinguishing equipment is at hand wherever hot work is being performed. This equipment must be fully charged and ready for use at all times.

The fire watch proposed in paragraph (c)(4), which is standard industry practice, and is necessary to ensure that no sparks or other fire hazards are left unattended.

Drums and other containers presenting a fire or explosion hazard are required in proposed paragraph (c)(5) to be closed to prevent the escape of dangerous fumes, and empty containers must be removed from the hot work area. The proposed requirements in paragraph (c)(6) are intended to prevent flying slag from starting a fire on the floor below the hot work area or outside the structure in which hot work is being carried on.

Hot work is prohibited in the areas specified in proposed paragraph (c)(7); these areas present extreme fire hazards. For example, bulk sulphur may ignite spontaneously during handling. OSHA also has received many reports of fatal accidents caused by employers welding on tanks containing combustible liquids (ref).

Before heating, proposed paragraph (c)(8)(i) requires inerting or cleaning of tanks or drums that have contained a flammable or combustible substance. These structures must then be tested by the employer to ensure that the atmosphere is free of fire hazards. A relief valve to release the gas built up by heating the drum or tank is required in proposed paragraph (c)(8)(ii), to prevent explosion.

In paragraph (d), OSHA proposes requirements for gas welding and cutting operations, such as hell-arc or oxy-arc welding. The proposed requirements of paragraph (d)(1) specify work practices to be followed to prevent damage to the compressed gas cylinders used to supply the welder's torch. Compressed gas cylinders must be protected from impact, which may cause the pressurized cylinder to explode or to become a lethal projectile.

The requirements in paragraph (d)(2) are addressed to hazards associated with fuel gas use. For example, proposed paragraph (d)(2)(i) is intended to prohibit blocking of cylinder valves, which would interfere with the proper flow of gas.

Cylinder valve regulators, which are spring-loaded and therefore delicate, are addressed by the provisions proposed in paragraphs (d)(2)(ii) through (d)(2)(iv); these work practices are essential to maintaining regulators, which control the pressure level, in safe condition.

The proposed requirements in paragraphs (d)(2) (v) and (vi) are intended to prevent leaking cylinders from presenting a fire hazard to employees near the cylinder.

Hazards associated with fuel gas and oxygen are addressed in proposed paragraph (d)(3). Hoses used to convey these substances must be maintained in optimum condition, to ensure that they do not leak, which would present a fire and explosion hazard. It is essential that hoses supplying oxygen and those supplying fuel gas not be taped together more than is necessary for ease of handling, to reduce the likelihood of fire; however, as proposed provision (d)(3)(ii) notes, they may be taped together for a distance of no more than 4 inches for handling purposes.

Welding torches are addressed in proposed paragraph (d)(4); torches must be carefully maintained to ensure proper flow control. Proposed paragraphs (d)(5) and (d)(6) stipulate additional work practices to be followed to prevent explosions and fires.

Proposed paragraph (e) contains requirements for arc welding and cutting. As with other forms of welding, the primary hazards of arc welding and cutting are fire and explosion. However, arc welders and cutters are also subject to electric shock and to vision impairment caused by exposure to the blinding rays of the arc. The requirements in this paragraph are therefore directed at protecting workers from these dangers. For example, the proposed provisions appearing at paragraphs (e)(1)(ii), (e)(2)(i), and (e)(2)(iv) are designed to ensure that electrode holders, welding cables and connectors, and metal parts are properly insulated to protect against fire and electric shock.

The requirements proposed in paragraphs (e)(1)(i), (e)(2)(i), and (e)(3)(vi) are primarily concerned with the current-carrying capacity of electrode holders, welding cables, and ground connections. If such equipment is not electrically adequate to carry the current required in the welding or cutting operation, employees could be exposed to fire and electric shock.

In paragraphs (e)(2)(ii), (e)(2)(iii), (e)(9), and (e)(10), OSHA is proposing coverage directed largely to the hazard of electric shock. Proposed provision (e)(3)(ii) is intended to prevent explosions, which might occur if, for example, a pipeline carrying fuel gas was used as a ground return circuit. Grounding, which must be adequate to protect employees using electrical tools from being shocked or electrocuted, is addressed in the requirements proposed in paragraphs (e)(3)(iii), (e)(3)(iv), and (e)(3)(v).

The work practices and requirements in proposed provisions (e)(4), (e)(5), (e)(6), (e)(7), (e)(9), and (e)(11) are also directed at protecting the welder or cutter from electric shock and burns. The proposed requirements in paragraphs (e)(8)(i) and (ii) will provide employee protection against blinding by the arc and being burned by the sparks of the arc.

The final provision proposed in this paragraph, (e)(11), requires employers to provide additional protection against the increased risk of electric shock when arc welders and cutters must work in wet or humid conditions. This additional protection could take the form of rubber boots, rubber pads for employees to stand on, or rubber gloves.

The proposed requirements in paragraph (f) are directed to the atmospheric hazards associated with welding, cutting, and heating, processes which liberate fumes that may be harmful to the welder or cutter or to other employees in the vicinity of the hot work. The composition of the fumes liberated depends on the types of fluxes, filler materials, base materials and coatings involved in the process.

Proposed paragraph (f)(1) specifies the types of ventilation required to maintain breathing zone concentrations of atmospheric contaminants below hazardous levels. Either local exhaust ventilation, in the form of hoods that can be positioned near the point of operation, or general ventilation may be used to maintain non-hazardous levels of fumes, vapors, or smoke. The proposed requirement in paragraph (f)(1)(v) prohibits using pure oxygen to cool or ventilate the atmosphere, or to clean clothing to the work area. The provision is directed at the hazard of fire associated with oxygen levels above 23% of the atmosphere; since the oxygen used for welding is pure oxygen, it may cause a serious fire hazard. If it were used to clean a welder's clothing, for example, some of it might collect in the seams, where it could cause the clothing to catch on fire when the welding torch was lit.

In paragraph (f)(2), OSHA proposes requirements for performing hot work in a confined space, such as a tank or boiler. The severely limited natural ventilation, small size, and restricted access typical of confined spaces all contribute to the exacerbation of the respiratory hazards associated with hot work in general. The proposed requirements therefore mandate either mechanical ventilation or the use of appropriate respiratory protective equipment, in which case a standby prepared to perform a rescue must be stationed outside the confined space.

Proposed paragraph (f)(3) addresses the hazards of exposure to the fumes liberated when toxic metals are welded, cut, or heated, or used in the flux or filler. Examples of toxic mentals are lead, cadmium, chromium, zinc, and mercury. The level of employee protection required by the proposal varies with the toxicity of the metal being heated and the ventilation characteristics of the space in which the work is being performed. For example, proposed requirement (f)(3)(iii) requires that both local point-of-operation ventilation and supplied air or self-contained breathing apparatus be used when hot work is performed indoors with a beryllium base or filler metal. Workers exposed to beryllium fumes are subjected to the risk of developing either acute or chronic respiratory beryllium disease.

The provision proposed in paragraph (f)(3)(v) will ensure that employees working in the vicinity of the hot work are also adequately protected from hazardous exposures, by requiring them to wear the same type of personal protective equipment as is worn by the welder or burner.

In paragraph (f)(4), OSHA is proposing coverage for employees exposed to the fumes liberated during inert-gas metal-arc welding. An example of this type of hot work is the use of argon to weld aluminum. The proscription directed to the use of chlorinated solvents within 200 feet of the welder's arc is necessary to protect employees from chlorine gas, which would be liberated if the solvent contacted the sparks of the arc.

The rays produced by this type of hot work are particularly intense and therefore present the risk of impairing the vision of the exposed workers. Filter lenses and filter lens goggles are required by proposed paragraph (f)(4)(ii), to protect against this hazard.

Since inert-gas metal-arc welding produces 5 to 30 times the level of ultraviolet radiation produced in shielded metal-arc welding, proposed paragraph (f)(4)(iii) requires employees to wear protective clothing and equipment to protect them from ultraviolet burns and cutaneous or visual damage.

The final proposed requirement in the inert-gas welding section mandates that employees performing inert-gas metal-arc welding on stainless steel be protected by local ventilation or by supplied air respirators, to prevent exposure to hazardous levels of nitrogen dioxide.

Performing hot work on structures coated with preservatives requires that precautions against both fire and inhalation of toxic fumes be taken. For example, the requirements proposed in paragraph (g) would protect welders required to weld a chassis or container that had been painted with a preservative such as red lead paint or a chromate-containing coating.

Tests to establish the degree of flammability of the preservative coating are required by proposed paragraph (g)(1), and precautions against fire are required by the next provision. Examples of an appropriate precaution would be stripping the coating away from the area to be heated, or applying artificial cooling to the area to reduce the temperature of the surface. Since these perservatives produce toxic fumes when heated, the final proposed provision mandates that exposed employees wear appropriate respiratory protective equipment.

The final paragraph in the proposed hot work section addresses employee protection from the radiant energy produced by any type of welding or cutting. Visual impairments caused by the blinding flashes produced by the welder's torch and the metal being welded are common occurrences among welders. The proposed requirements in paragraphs (h)(1), (2), and (3) will ensure that eye protection, with the filter lenses appropriate to the task, is worn by affected employees.

Section 1918a.153 Spray painting. Spray painting is performed at many marine terminals, although such operations are usually conducted on an infrequent and small-scale basis. Spray painting is done to protect surfaces exposed to the environment from rusting or corroding. For example, chassis and fifth wheels might be spray painted after removal of rust spots or other damage. The principal hazards of spray painting are fire and inhalation of atmospheric contaminants.

The scope of this proposed section is specified in paragraph (a), which states that major spray painting jobs, such as painting the terminal building, and portable spray painting equipment, such as the hand-held equipment used for minor "touch-ups," are not included in the proposal's coverage of spray painting. Major painting jobs are considered construction operations, and would be covered by OSHA's construction regulations (29 CFR Part 1926).

The requirements proposed in this section are grouped according to the location in which the spray painting operation occurs. The requirements appearing in proposed paragraph (c) apply to any painting area, including spray booths, spraying areas, and outdoor spraying operations, while those in proposed paragraph (d) apply only to spraying booths and spraying areas. The provisions in proposed paragraph (e) apply to spray booths exclusively. This "tiering" of requirements corresponds to the degree of hazard associated with spray painting in the various locations. For example, electrical equipment used in an outdoor area would not have to be approved for use in a hazardous location because the natural ventilation outdoors is adequate to keep the atmosphere below flammable or explosive levels. However, electrical equipment in an indoor spraying area would be required by the proposal to be approved for use in a Class I, Division 2 hazardous location, while that used in the enclosed space of a spray booth would have to be approved for a Class I, Division 1 (explosive) atmosphere.

The proposed requirements in paragraph (c) are primarily directed to fire and explosion hazards in all spraying areas, whether indoor or out. For example, paragraph (c)(1) requires that the shut-off valves on spray painting containers or piping be closed when the equipment is not in use, to relieve the pressure on the hoses. Since equipment under pressure may burst, releasing flammable materials into the atmosphere, several proposed provisions are aimed at preventing this hazard (c)(1), (c)(2), and (c)(3). These preventive measures are necessary to ensure that materials used in spray painting operations which have low flash points, such as paints and thinners, do not create fire hazards.

Several paragraphs proposed in paragraph (c) are designed to prevent sparks or static electricity from igniting fumes from the operation; paragraphs (c)(4) and (c)(5) are examples of such provisions. Special precautions for the use of organic peroxides and other dual-component coatings, which are subject to spontaneous combustion, are addressed in proposed paragraph (c)(7).

The requirements in paragraph (d) would apply to indoor spraying areas and spray booths, but do not apply to outdoor spray areas because such areas do not have the equipment covered in this paragraph. For example, outdoor spray areas do not have exhaust ducts and ventilation fans.

Proposed paragraph (d)(1) requires distribution or baffle plates, which are used to ensure an even flow of air and to catch oversprays, to be of non-combustible material and to be so located and designed that accumulations of paint that might be hazardous can be removed frequently and easily.

Filters, used to filter out paint mist to keep atmospheric paint concentration below a hazardous level, are addressed by proposed paragraphs (d)(2), (d)(3), and (d)(4). These requirements are all directed at prevention of fire. Mechanical ventilation of spraying areas is covered in several proposed requirements (d)(5), (d)(6), (d)(7), and (d)(9)). Ventilation is used to maintain the concentration of flammable and combustible vapors and mist from spray painting below flammable levels.

The risk of an electrical spark igniting the atmosphere in a spraying area is substantial unless safeguards are used against sparking. In paragraphs (d)(8), (d)(10) and (d)(12), OSHA proposes requirements to prevent this hazard.

The final paragraph in the spray painting section contains provisions that apply to spray booths, enclosed spaces in which the concentration of fumes and therefore the danger of fire is greater than in a spraying area. Although spray booths are not common in marine terminals, several terminals do have them, and the requirements proposed in paragraph (e) are directed to employee protection in these situations. The proposed requirements mandate that the booths themselves be constructed largely of noncombustible material (e)(1), be separated from other marine terminal operations either by a partition or by a clearance space (e)(2) and (e)(3), and have conductive objects, such as ducts or piping, grounded, to prevent sparking or fire (e)(4)). Spontaneous ignition caused by successively applying materials that are flammable when combined would be prevented by

compliance with proposed paragraph (e)(8).

Section 1918a.154 Compressed air Many industrial processes use compressed air to clean the work area of debris, dust, and chips after work has been completed. Unless employees in the vicinity are properly protected, however, they may be hit by flying chips or debris that is thrown up by the cleaning process. In § 1918a.154, OSHA proposes that exposed employees be protected by chip guarding and by the appropriate personal protective equipment, such as goggles or face shields. This section also prohibits the use of compressed air to clean employees, a practice that can cause an air embolism if air under pressure is forced into the bloodstream through the skin.

Section 1918a.155 Air receivers. Air receivers, tanks used to store compressed air from a compressor, are addressed in proposed § 1918a.155. The hazard associated with this equipment is explosion caused by the excessive buildup of pressure in the receiver. The proposed provisions would guard against this hazard by requiring pressure guages and pressure-relief valves. The proposal would also prohibit the placement of any valves other than relief valves between the receiver and its safety valves, which would prevent the relief device from functioning properly.

Section 1918a.156 Fuel handling and storage. Although the Coast Guard exercises general statutory authority in matters related to fuel handling and storage in marine terminals, the working conditions covered by the provisions proposed in this section are not addressed in the Coast Guard regulations (33 CFR Part 126, 46 CFR Part 146).

The requirements in proposed paragraph (b) concern diesel and gasoline fuel handled at terminals which have their own dispensing pumps to supply industrial tructs and other vehicles used at the terminal. All of the proposed provisions are directed at preventing fires and explosions, the principal hazards associated with liquid fuel handling and storage.

In paragraph (c), OSHA proposes coverage for the safe handling and use of liquefied gas fuels, such as liquefied petroleum gases (LPG) (propane, butane, propylene, and butylene). These gases liquefy under moderate pressure, but convert to the gaseous state when the pressure is relieved. Adequate ventilation is an even greater problem with these fuels than with flammable natural gases, because LP-gas vapors are heavier than air and are therefore more difficult to disperse. Accordingly, two of the proposed provisions are directed at preventing these vapors from accumulating in low-lying areas such as tunnels and pits ((c)(1)(iii), (c)(5)(iii)).

The requirements proposed in paragraph (c)(2) are intended to ensure that LP cylinders and their valves are handled in a manner that will avoid damage to the containers and their fittings. The final provisions in this paragraph, (c)(3), (c)(4), and (c)(5), cover fueling operations, fuel storage, and storage and servicing of LP-powered vehicles, respectively.

Section 1918a.157 Battery charging and changing. The hazards associated with charging and changing electric storage batteries are dealt with in proposed § 1918a.157. Employees performing these tasks are exposed to acid burns from spilled electrolyte, slips and falls caused by spilled battery fluids, electric shock from the charging equipment, and fire and explosion caused by ignition of hydrogen released during the charging process. In addition, employees may overexert themselves if they attempt to lift the batteries or large quantities of electrolyte.

The proposed requirements are directed at the prevention of fire and explosion ((a), (b), (c), (f), (g), (h), (m), (n)); protecting employees from acid burns ((d), (e), (i), and (j)); avoiding electric shock ((k), (l), (n), and (o)); and preventing strains and overexertion injuries ((j)).

Section 1918a.158 Prohibited operations. The proposed standard's final section prohibits certain operations from being conducted during, or in the vicinity of, cargo-handling operations. Spray painting and abrasive blasting both produce exessive levels of noise, which would interfere with the communication of signals necessary to ensure close cooperation during the loading or discharging of cargo. Further, if a draft or part of a draft were to fall and hit the spray painting equipment, hazardous fumes might be released.

Proposed paragraph (b) is intended to protect cargo handlers from the fire hazards associated with welding and burning operations. Unless hot work is necessary to repair equipment being used in the hoisting operation, it should be performed in an area designated for that purpose and distant from the hoisting area, which would provide the requisite level of employee protection.

VI. Regulatory Assessment

The proposed standard covering the operation of marine terminals is not a "major" action as defined by Executive Order No. 12044 (43 FR 12661, March 24, 1978) and by the economic identification criteria contained in Department of Labor Guidelines for improving Government regulations (44 FR 5575, January 26, 1979).

The marine terminal facilities covered by the proposed standard include other industries in addition to those in Standard Industrial Classification (SIC) 4463, Marine Cargo Handling. For example, firms in such industries as petroleum refining, steel production, iron ore and coal mining, cement manufacturing, and others frequently have their own port facilities to serve their shipping needs; these firms would be classified under other SIC's. The economic analysis of the proposed standard therefore includes estimates of compliance costs that are not entirely attributable to SIC 4463.

Centaur Associates, Inc., has prepared an economic assessment for OSHA entitled "Economic Impact Statement/ Assessment for the Proposed Marine Terminals Standard" (Ex. 78). This study includes assessments of the technological feasibility of compliance, of the estimated costs of compliance, of the estimated effects upon the prices of goods shipped through marine terminals, of the estimated effects upon labor productivity and employment, and of the expected changes in market structure that can be anticipated upon implementation of the proposed standard.

According to the study, the costs of compliance for the marine cargo handling industry—based upon a "worst case" criterion—is estimated to be no greater than $40.3 million during the first year of compliance and no more than $18.5 million during any succeding year. This falls well short of the Department of Labor's Guidelines establishing criteria for major actions of $50 million in one year in any one industry and $80 million in any two years. With respect to the economy-wide costs of compliance, the total is estimated to be less than $63.8 million during the first year and no greater than $28 million during any succeeding year. These values also clearly fall short of the E.O. guidelines setting a "major" action level of $100 million in one year for the economy as a whole, and $180 million for any two years. The Centaur study concludes that compliance with the proposed standard is both technologically and economically feasible.

With respect to the other general economic assessments of the proposed standard, the study concludes that the effects on prices and the quantity of goods shipped through marine terminals is, in the worst case, only about $0.05 a ton—a negligible charge equal to approximately 0.06 percent of the

average water transportation shipping charges. It also concludes that there would be some minor negative effects upon labor productivity due to the required safety training and the probable changes in certain work practices. However, this productivity loss may be more than offset by the decline in lost work days attributable to the reduction of occupational injuries in marine terminals. The study also concludes that the proposed standard would not have any effect upon employment because of its limited impact on costs, prices, quantities shipped, and labor productivity.

In addition, pursuant to the Regulatory Flexibility Act of 1980 (Pub. L. 96–353, 94 Stat. 1164 (5 U.S.C. 601 et seq.)) the study assessed the impact of the proposed standard upon small businesses. The Centaur study concluded that this proposed standard would not create any new competitive disadvantages in small firms relative to larger firms because the bulk of the costs are directly dependent upon the firm's size and upon the number of its employees. For example, the amount and costs of new lighting required by the proposal would be determined by the size of the marine terminal. The cost of providing safety shoes, the cost of providing supervisory safety instruction, and the cost of per-worker productivity reductions are all determined by the number of employees. Since these items account for the major cost (accounting for about 75% of the total estimated cost of the proposal), the per-ton costs of the proposed standard are expected to be the same for both smaller and larger firms. Thus, the basic market structures of the marine cargo handling and other affected industries would not be changed, and smaller firms would not lose business as a result of promulgation of the standard.

Further, the proposed safety standard is not expected to have environmental effects because the standard is concerned only with working conditions at marine terminals. The proposed standard provides coverage only for matters such as the types of slings to be used, the positioning of safety ladders, and the type of headgear and protective shoes to be worn. These provisions would not have an impact on the quality of the environment, and consequently, there is no need to perform an environmental impact statement for this proposed safety standard.

The economic impact assessment has identified several benefits which will be realized as a result of promulgation of a proposed safety standard for marine terminals. As the Hazard section of the preamble points out, workers at marine terminals are exposed to serious risk of injury. The Bureau of Labor Statistics has found that the Water Transportation Services industry (SIC 446) has the highest hazard index rating of any 3-digit SIC industry. Further it reports the greatest number of workdays lost per 100 workers for any 3-digit SIC industry. The extent and severity of the injury problem in marine terminals are reflected in compensation and medical payments made under the Longshoremen's and Harbor Worker's Compensation Act, which totaled about $200 million in fiscal year 1980. This figure does not include workmen's compensation paid to workers injured at marine terminals owned, for example, by a steel company, an oil refinery firm, or other facility not principally devoted to cargo handling.

Clearly, there is a pervasive injury problem in the shoreside marine cargo handling industry, which the provisions of this standard are designed to ameliorate. The proposed illumination requirement should limit the number of injuries caused by lack of light. The requirement that workers wear safety shoes which meet the ANSI 41.1–1967 specification for a class 75 safety shoe which, according to a Canadian study on the effectiveness of safety shoes (Ex. 79) will prevent 55% of all toe injuries and also substantially lessen the severity of many other toe injuries. Another proposed provision requiring safety training of supervisors should also reduce the level and severity of injuries caused by careless work practices.

Based upon a review of the Centaur study and the proposed standard as a whole, OSHA has determined that this proposed standard is not a "major" action under E.O. 12044 and the Secretary's Guidelines (44 FR 5575, January 26, 1979), and it is not expected to have any adverse effects upon small businesses as set forth in the Regulatory Flexibility Act of 1980.

VII. Public Participation

Interested persons are invited to submit written data, views and arguments with respect to this proposal. These comments must be postmarked on or before May 15, 1981, and submitted in quadruplicate to the Docket Officer, Docket S–506, Room S–6212, Frances Perkins Building, 200 Constitution Avenue, N.W., U.S. Department of Labor, Washington, D.C. 20210 (202) 523–7894. Written submissions must clearly identify the specific provisions of the proposal which are addressed and the position taken with respect to each issue.

The regulatory assessment and the exhibits cited in this document will be available for public inspection and copying at the above address. OSHA invites comment concerning the conclusions reached in the economic impact assessment.

The data, views and arguments that are submitted will be available for public inspection and copying at the above address. All timely submissions received will be made a part of the record of this proceeding.

To assist interested persons in submitting their written comments and data OSHA is scheduling a public meeting during the comment period. The meeting will be held on April 28, 29, and 30, 1981, in the Auditorium, Frances Perkins Building, 200 Constitution Avenue, N.W., U.S. Department of Labor, Washington, D.C. 20210. It will begin at 9:00 A.M. will recess from 12 Noon to 1:00 P.M., and will continue until 5:00 P.M.

The public meeting is intended as an informal forum for interested persons to present their concern orally and to seek clarification of the proposal from representatives of OSHA who will conduct the public meeting.

OSHA requests that any person wishing to make an oral presentation at the meeting notify OSHA in advance. Please identify the person and/or organization intending to make a presentation, telephone number, the amount of time requested for that presentation, and the subject matter and a brief summary of the intended presentation, if possible. This written notice should be sent to Thomas Hall, Room N–3635, OSHA Division of Consumer Affairs, Frances Perkins Building, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210 postmarked no later than April 15, 1981. For further information concerning participation at the meeting, please contact Thomas Hall or Richard Terry at (202) 523–8024. All persons giving advance notice will have time reserved for their oral presentations. Persons wishing to speak who have not filed advance notices are requested to register from 8:30 A.M. to 9:00 A.M. on the morning of the public meeting.

As long as time permits, all persons who wish to be heard will be allowed to speak. However, in the interest of time, persons who have provided advance notice will be given priority.

Detailed minutes of the meeting will be prepared and will be made a part of the record of this rulemaking. Copies of the minutes will be available for inspection at the OSHA Docket Office, Room S–6212, U.S. Department of Labor,

200 Constitution Avenue, N.W., Washington, D.C. 20210.

Pursuant to 29 CFR 1911.11(b) and (c), interested persons may, in addition to filing written submissions and attending the public meeting as provided above, file objections to the proposal and request an informal public hearing with respect thereto in accordance with the following conditions:

(1) The objections must include the name and address of the objector;

(2) The objections must be postmarked on or before May 15, 1981 and submitted to the Docket Office at the above address;

(3) The objections must specify with particularity the provisions of the proposed rule to which objection is taken, and must state the ground therefor;

(4) Each objection must be separatelystated and numbered; and

(5) The objections must be accompanied by a detailed summary of the evidence proposed to be adduced at the requested hearing.

VIII. Authority

This document was prepared under the direction of Eula Bingham, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, Third Street and 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 Harbor Workers' 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, it is proposed to add Part 1918a to Title 29, Code of Federal Regulations, 29 CFR, and to amend 29 CFR Part 1910.16(a) and (b).

Signed at Washington, D.C. this 9th day of January 1981.

Eula Bingham,

Assistant Secretary of Labor.

1. By amending the title of § 1910.16 to read "Longshoring and Marine Terminals," and by revising paragraph (a) of § 1910.16 and by adding a new paragraph (b)(4) to § 1910.16 as follows:

§ 1910.16 Longshoring and marine terminals

(a) *Adoption and extension of safety and health standards for longshoring* (1) 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 under Section 6(a) of the Act and shall apply, according to the provisions thereof, 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.

(2) Part 1918a of this title shall apply exclusively according to the provisions thereof, to employment within a marine terminal, except as provided in paragraph (a)(4) of this section.

(3) The provisions of Part 1918a do not apply to the following:

(i) Facilities used for bulk storage, handling and transfer of flammable and combustible liquids, gases and hazardous cargo to the extent that specific working conditions are regulated by the United States Coast Guard; and

(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.

(4) 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 1918a, 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 Intergovernmental Maritime Consultative 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); and

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

(b) *Definition.* . . .

(4) "Marine terminal" means wharves, bulkheads, quays, piers, docks or other berthing locations and adjacent storage or contiguous areas and structures devoted to receiving, handling, holding, consolidating and loading or delivery of waterborne shipments. The term does not include production or manufacturing areas having their own docking facilities and located at a marine terminal.

2. By adding a new Part 1918a, Marine Terminal Code to 29 CFR as follows:

PART 1918a—MARINE TERMINALS

Subpart A—Scope and Definitions

Sec.

Subpart B—Marine Terminal Operations

Subpart C—Cargo Handling Gear and Equipment

Subpart D—Specialized Terminals

Subpart E—Personal Protection

Subpart F—Terminal Facilities

Subpart G—Related Terminal Operations and Equipment

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

§ 1918a.1 Scope and applicability.

(a) The regulations of this part apply to employment within a marine terminal as defined in § 1918a.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 Part 1918a do not apply to the following:

(i) Facilities used for bulk storage, handling and transfer of flammable and combustible liquids, gases and hazardous cargo to the extent that specific working conditions are regulated by the United States Coast Guard; and

(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.

(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 Part 1918a, 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 Intergovernmental Maritime Consultative Organization requirements;[A-1]

(iii) Noise. Subpart G, § 1910.95;

(iv) Commercial diving operations. Subpart T;

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

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

[A-1] The Intergovernmental Martime Consultative 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.

§ 1918a.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 a vessel.

(b) "Authorized," in reference to an employee's assignment, means authorized 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) Not designed 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. The term does not include such devices as industrial trucks, tractors, trailers, tiering machines, cranes, hoists, monorails, power and hand shovels, power scoops, bucket drag lines, platform elevators, moving stairways (escalators) and highway or rail vehicles.

(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 is recognized by the employer to possess 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 thorough visual inspection, supplemented by other tests and procedures appropriate to the type of gear or device. For example, crane examinations include testing of all normal operations, such as slewing, topping, and hoisting, followed by inspection of accessory gear such as sheaves and blocks, which are disassembled to ensure that they are in good operating condition.

(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 which is a gas or is rapidly or progressively transformed to the gaseous state, even though some nogaseous 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, remountable 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 which are devoted to receiving, handling, holding, consolidation, and loading or delivery of waterborne shipments, 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.

Subpart B—Marine Terminal Operations

§ 1918a.11 Housekeeping.

(a) The employer shall ensure that work areas are kept free of equipment and materials not in use, and clear of debris, projecting nails, strapping and other sharp objects not directly associated with the work in progress.

(b) Hatch beams and covers placed in terminal working areas shall either be stowed in stable piles with beams secured against tipping or falling, or be laid on their sides.

(c) Cargo and material shall not obstruct access to vessels, cranes, vehicles, or buildings.

§ 1918a.12 Slippery conditions.

The employer shall eliminate, to the extent possible, slippery working and walking surfaces in areas used by employees.

§ 1918a.13 Slinging.

(a) The employer shall ensure that drafts are safely slung before hoisting to prevent cargo from falling from the draft. Loose dunnage and debris hanging or protruding from drafts 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) When bundles of cargo such as ingots, steel and dunnage are hoisted by bands, strapping or ties, the bands, strapping, or ties shall be strong enough to support the load.

(d) Unitized loads bound by bands or straps may be hoisted by the banding or strapping only if the banding or strapping is designed for hoisting and is strong enough to support the weight of the load. The menans of handling shall not damage the bands or straps.

(e) The employer shall establish by testing in accordance with Part 1919 of this Chapter that the method of handling unitized loads by banding or strapping is suitable for hoisting.

(f) Unitized loads having damaged banding or strapping shall be handled by additional means that will ensure safe handling of the draft.

(g) Case hooks shall be used only with cases designed to be hoisted by these hooks.

(h) Loads requiring continuous manual guidance during handling shall be guided by guide ropes (tag lines) that are long enough to control the load.

(i) Intermodal containers shall be handled in accordance with § 1918a71(g).

§ 1918a.14 Stacking of cargo and pallets.

The employer shall ensure that cargo and pallets stored intiers are stacked to provide stability against sliding and collapse.

§ 1918a.15 Coopering.

The employer shall ensure that the repair or reconditioning of damaged or leaking cargo packaging (coopering) is so located and performed as not to endanger employees.

§ 1918a.16 Line handling. (See also § 1918a.95(c)).

(a) The employer shall ensure that areas used to handle mooring lines are kept free of obstructions.

(b) When stringpiece or apron width is insufficient for safe footing, grab lines or rails shall be installed on the sides of permanent structures. ("Stringpiece" means a narrow walkway between the water edge of a berth and a shed or other structure.)

§ 1918a.17 Railroad facilities.

(a) The employer shall ensure that work is performed in railcars only if floors of the railcars are in safe condition.

(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 ensure that no employees remain in railcars after work.

(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 railcars or near the tracks at the ends of the cars.

(e) When employees are working in, on, or under a railcar, the employer shall ensure that flags or signs warning that work is in progress are placed no less than 50 feet from any end of the railcar exposed 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) Railcars shall be moved only when attached to an engine or other powered vehicle. Free rolling movement of railcars is prohibited.

(h) Only freight car doors in safe condition shall be opened. Before being opened fully, doors shall be opened slightly to ensure that the load has not shifted during transit.

(i) If power trucks are used to open freight car doors, the trucks shall be equipped with door opening

attachments. The employer shall ensure that truck drivers stand clear of the railcar door while it is being opened or closed.

(j) Only railcar door openers or power trucks equipped with door opening attachments shall be used to open jammed doors.

(k) The employer shall ensure that employees do not remain in or on gondolas or flat cars when drafts are being hoisted over the car or landed in the car. 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 dump 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 a clearance of less than 24 inches (.61 m) exists between railcars and structures, cargo or waterside edges.

§ 1918a.18 Log handling.

(a) The employer shall ensure that structures (bunks) used to contain logs have rounded corners and 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 they are contained in bunks or are stacked or unitized to prevent spreading.

(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.

§ 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.

§ 1918a.20 Interference with communications.

The employer shall ensure that noise does not inferfere with the communication of warnings or instructions during cargo-handling operations.

§ 1918a.21 Open fires.

The employer shall ensure that open fires and fires in drums or similar containers are prohibited.

§ 1918a.22 Hazardous cargo.[B-1]

(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) Hazardous cargo shall be handled by means such as netting or restraining ropes to prevent damage to the cargo packaging during handling.

(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.

§ 1918a.23 Hazardous atmospheres and substances.

(a) *Purpose and scope.* This section covers areas in which a hazardous atmosphere or substance may exist, except where one or more of the following sections apply: § 1918a.22 *Hazardous cargo;* § 1918a.24 *Carbon monoxide;* § 1918a.25 *Fumigants, pesticides, insecticides, and hazardous preservatives;* § 1918a.73 *Menhaden terminals;* § 1918a.152 *Welding, cutting, and heating (hot work);* and § 1918a.153 *Spray painting.*.

(b) *Determination of hazard.* (1) When a room, building, vehicle, railcar, or other space contains or has contained a hazardous atmosphere, the employer shall ensure that a designated and appropriately equipped person tests 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 at the terminal for at least thirty (30) days.

(c) *Testing during ventilation.* When mechanical ventilation is used to maintain a safe atmosphere, tests shall be made to ensure that the atmosphere is not hazardous.

(d) *Entry into hazardous atmospheres.* The employer shall ensure that only designated persons 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 shall be similarly equipped and instructed and shall continuously monitor the activity of employees within such space;

(3) No ignition source shall be permitted in spaces containing flammable atmospheres; and

(4) Persons required to enter flammable atmospheres or those containing less than 19.5% oxygen shall use self-contained breathing apparatus or supplied air respirators drawing air from an uncontaminated source.

(e) *Cleaning of asbestos spills.* When the packaging of asbestos cargo leaks, the employer shall ensure that the spillage is cleaned up by designated employees protected from the harmful effects of asbestos as required by § 1910.1001 of this Chapter.

§ 1918a.24 Carbon monoxide.

(a) *Exposure limits.* The employer shall ensure that the carbon monoxide content of the atmosphere in a room, building, vehicle, railcar, or other enclosed space does not exceed 50 parts per million (0.005%) as an 8-hour time-weighted average (TWA) or 75 parts per million (0.0075%) at any time. Areas with concentrations above these levels shall be considered hazardous and employees entering these areas shall be protected as provided in § 1918a.23(d).

(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 or other measuring instruments certified by the National

[B-1] The 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).

Institute for Occupational Safety and Health under 30 CFR Part 11.

(d) *Records.* A record of the date, time, location and results of carbon monoxide tests shall be available at the terminal for at least thirty (30) days.

§ 1918a.25 Fumigants, pesticides, insecticides and hazardous preservatives.

(a) When cargo in a space is or has been stowed, handled, or treated with a fumigant, pesticide, insecticide, or hazardous preservative, the employer shall determine whether a hazardous atmosphere is present in the space, and shall ensure that only designated employees protected as required in paragraph (e) of this section 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 at the terminal for at least thirty (30) days.

(d) Chemicals shall be applied to cargoes only by designated persons.

(e) The employer shall ensure that only designated persons 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 shall be similarly equipped and instructed and 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.

§ 1918a.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 bandage, 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 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 within 200 feet (61 m) of each waterside work area. Employees working on any bridge or structure leading to a detached vessel berthing installation shall wear work vests provided by the employer at no cost to the employee. 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.

§ 1918a.27 Personnel.

(a) *Qualifications of machinery operators.* (1) The employer shall ensure that only trained and experienced employees who understand the signs, notices, operating instructions and signal codes in use operate crains, winches, other power-operated hoisting apparatus, power conveyors or similar devices, or any other power-operated vehicle, or give signals to operators 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) Operators assigned after (*effective date of final standard*) shall pass a practical operating examination and be instructed in established operating practices.

(3) Employees with medical conditions that may impair their ability to operate powered machinery shall not operate a crane, winch, or other power-operated hoisting apparatus or a power-operated vehicle.

(b) *Supervisory accident prevention proficiency.* (1) After (two years after promulgation), supervisors of more than five persons shall possess documentary evidence of satisfactory completion of 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 classroom instruction suited to the particular operations involved and shall include at least the following:

(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 investigation.

Subpart C—Cargo Handling Gear and Equipment

§ 1918a.41 House falls.

(a) The employer shall ensure that span beams are secured to prevent accidental dislodgement.

(b) A safe means of access shall be provided for employees working with house fall blocks.

(c) The employer shall ensure that designated employees 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.

§ 1918a.42 Miscellaneous auxiliary gear.

(a) *Routine inspection.* (1) At the completion of each use, the employer shall ensure that loose gear such as slings, chains, bridles, blocks and hooks is placed to avoid damage to the gear. Loose gear shall be inspected and any defects corrected before reuse.

(2) Loose stevedoring gear shall be inspected for defects during use.

(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 used for hoisting and shall have such ratings available at the terminal. 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 (other than U-bolt 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.

Table C–1

[Number and spacing of u-bolt wire rope clips]

Improved plow steel, rope diameter		Minimum number of clips		Minimum spacing	
Inches	Centimeters	Drop forged	Other material	Inches	Centimeters
½ or less	(1.3)	3	4	3	(7.6)
⅝	(1.6)	3	4	3¾	(9.5)
¾	(1.9)	4	5	4½	(11.4)
⅞	(2.2)	4	5	5¼	(13.3)
1	(2.5)	5	7	6	(15.2)
1⅛	(2.7)	6	7	6¾	(17.1)
1¼	(3.2)	6	8	7½	(18.1)
1⅜	(3.5)	7	8	8¼	(21.0)
1½	(3.8)	7	9	9	(22.9)

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

(6) Eyes in wire rope bridles, slings, bull wires, or in single parts used for hoisting shall not be formed by wire rope clips or knots.

(7) Eye splices in wire ropes shall have at least three tucks with a whole strand of the rope and two tucks with one-half of the wire cut from each strand. Other forms of splices or connections which can be shown to be equivalently safe may be used.

(8) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in bulling cargo, shall consist of one continuous piece without knot or splice.

(c) *Natural fiber rope.* (1) The employer shall ascertain the 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 use 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.

(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) Borken or worn stitches; or

(v) Distortion or damage to fittings.

(3) Defective synthetic web slings removed from service shall not be repaired and returned to service.

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

(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 at the terminal.

(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) The employer shall ensure that only designated persons inspect chains used for slinging or hoisting.

(ii) 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.

(iii) 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.

(iv) Chains shall be removed from service when maximum allowable wear, as indicated in Table C–2, is reached at any point of link.

Table C–2.—*Maximum Allowable Wear at any Point of Link*

Chain size		Maximum allowable wear	
Inches	(cm)	Inches	(cm)
¼ (5/32)	(0.6)	3/64	(0.1)
3/8	(1.0)	5/64	(0.2)
½	(1.3)	7/64	(0.3)
5/8	(1.6)	9/64	(0.4)
¾	(1.9)	5/32	(0.4)
7/8	(2.2)	1 1/64	(0.4)
1	(2.5)	3/16	(0.5)
1⅛	(2.9)	7/32	(0.6)
1¼	(3.2)	¼	(0.6)
1⅜	(3.5)	9/32	(0.7)
1½	(3.8)	5/16	(0.8)
1¾	(4.4)	1 1/32	(0.9)

(v) 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.

(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.

Table C–3.—*Safe Working Loads for Shackles*

Material size		Pin diameter		Safe working load in 2,000 lb. tons
Inches	(cm)	Inches	(cm)	
½	(1.3)	5/8	(1.6)	1.4
5/8	(1.6)	¾	(1.9)	2.2
¾	(1.9)	7/8	(2.2)	3.2
7/8	(2.2)	1	(2.5)	4.3
1	(2.5)	1⅛	(2.9)	5.6
1⅛	(2.9)	1¼	(3.2)	6.7
1¼	(3.2)	1⅜	(3.5)	8.2
1⅜	(3.5)	1½	(3.8)	10.0
1½	(3.8)	1⅝	(4.1)	11.9
1¾	(4.4)	2	(5.0)	16.2
2	(5.0)	2¼	(5.7)	21.2

(2) Screw pin shackles used aloft in house fall or other gear, except in cargo hook assemblies, shall have their pins moused or be otherwise effectively secured.

(j) *Hooks other than hand books.* (1) The manufacturer's recommended safe working loads for hooks shall not be exceeded. After (*effective date of final standard*) hooks other than hand books shall be tested in accordance with § 1918a.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 shall be bolts and nuts, drive screws (helically threaded nails), annular threaded nails or fastenings of equivalent holding strength.

(2) Damaged pallets shall be removed from active work areas, identified as damaged and stored away from the work area.

(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 on visual examination do not meet the requirements of this section 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.

§ 1918a.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) The employer shall ensure that modifications, such as adding counterweights, that might affect the vehicle's capacity or safety are not performed without either the manufacturer's prior written approval or the written approval of a professional engineer experienced with the equipment and who has consulted the manufacturer. 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 safely arranged loads within the rated capacity of the truck shall be handled.

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

(8) The employer shall ensure that drivers slow down and sound the horn at cross aisles and other locations where visibility is obstructed.

(9) If the load obstructs the forward view, the employer shall ensure that the driver travels with the load trailing.

(10) Steering knobs shall not be used.

(11) When powered industrial trucks use cargo lifting devices that have a means of engagement hidden from the operator, mirrors or other means shall be provided to enable the driver to see that the cargo has been engaged.

(c) *Maintenance.* (1) The employer shall ensure that only designated persons perform maintenance and repair.

(2) Batteries shall be disconnected during repairs to the primary electrical system unless power is necessary for testing or repair.

(3) Replacement parts whose performance may affect the vehicle's safety shall be at least equivalent in performance capability to the original parts.

(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 and shall be inspected by an authorized person on each day of use. 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 operational defect shall not be operated.

(6) Records of the daily inspections required in (c)(5) shall be maintained at the terminal for at least thirty (30) days.

(7) Repairs to the fuel or ignition systems of powered industrial trucks shall only be conducted in designated areas equipped to protect employees from fire hazards.

(d) *Approved trucks.* (1) "Approved power-operated industrial truck" means one listed or approved for the intended use by a nationally recognized testing laboratory, e.g., Underwriters Laboratories, Inc.; Factory Mutual Engineering Corporation.

(2) Approved trucks 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 being injured by 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. (i) Forks, fork extensions and other attachments shall be secured so that they cannot be accidentally dislodged, and they shall be used only in accordance with the manufacturer's recommendations.

(ii) The employer shall ensure that employees do not ride on lift truck forks.

(4) Counterweights. Counterweights shall be affixed so that they cannot be 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. (i) The employer shall ensure that employees do not stand on the forks of a lift truck or on a pallet or load being lifted on the forks.

(ii) Employees may only be elevated by fork lift trucks when a platform is secured to the lifting carriage or forks. The platform shall meet the following requirements:

(A) The platform shall have a railing complying with § 1918a.112(c).

(B) The platform shall have toeboards complying with § 1918a.112(d) if tools or other objects could fall on employees below.

(C) 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.

(D) The employer shall ensure that employees on the platform are protected from exposure to moving truck parts.

(E) The employer shall provide overhead protection for employees on the platform when there is danger of falling objects.

(F) The platform floor shall be skid resistant.

(G) The employer shall ensure that the truck operator is at the truck's controls when employees are elevated unless the truck's controls are elevated with the lifting carriage.

(H) 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 designed to withstand a load equal to the load that will bend the machine's draw bar.

(g) *Straddle trucks.* (1) Accessibility. Straddle trucks shall have a permanent means of access, including any handholds necessary to ensure safe access to the operator's platform.

(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 by mirrors or equivalent means.

(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 protected by safety glass or by equivalent means.

§ 1918a.44 General rules applicable to vehicles.[C-1]

(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.[C-2]

(b) The employer shall ensure that private vehicle parking in marine terminals is allowed only in designated areas, which shall not be used concurrently for storage.

(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 ensure that motor vehicle operators 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 equivalent are provided.

(f) Vehicular routes, traffic rules, and parking areas shall be established, identified, and used.

(g) The employer shall ensure that vehicle drivers warn employees in traffic lanes of the vehicle's approach.

(h) Where pedestrians use or cross traffic lanes, pedestrian crossing signs shall be posted to warn vehicle drivers.

(i) Signs indicating pedestrian traffic shall be clearly posted at vehicular check-in and check-out lines and similar locations where employees may be working.

(j) The employer shall ensure that a distance of at least 20 feet (4.6 m) is maintained between any two vehicles in a check-in, check-out, roadability, or vessel loading/discharging line.

(k) The employer shall ensure that no unattended vehicle is left with its engine running.

(l)(1) When the rear of a vehicle is elevated to facilitate loading or discharging, a ramp shall be provided and secured. The employer shall ensure that the vehicle is secured against accidental movement during loading or discharging.

(2) The ramp shall have a safety factor of four for the load being carried.

(m) Only highway vehicle floors in safe condition shall be use.

(n) 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.

(o) 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.

(p) 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) 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/cm^2)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 proper 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 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.[C-3]

(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

[C-1] The United States Coast Guard at 33 CFR 126.15(d) and (e) has additional regulations applicable to vehicles in terminals.

[C-2] 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 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....

[C-3] NHTSA charts are available free from General Services Division, National Highway Traffic Safety Administration, Attention: N48-51, 400 Seventh Street, S.W., Washington, D.C. 20590. Industry charts are available upon request from the manufacturer.

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 area. 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.

§ 1918a.45 Cranes and derricks (See also § 1918a.51).

(a) *Coverage.* (1) This section applies to every kind of crane and derrick such as but not limited to:

(i) Crawler, locomotive and truck cranes;

(ii) Overhead and bridge cranes of all types, including steeple-towers, container bridge cranes, ore and coal bridges and other specialized versions;

(iv) Hammerhead tower cranes;

(v) Any crane or derrick used to handle intermodal containers in containerized operations;

(vi) Any mobile straddle-type crane capable of straddling two or more intermodal containers (sixteen feet (4.88 m) in width);

(vii) Any other type of equipment not listed here but 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 and chain hoists.

(b) *Ratings.* (1) Except for bridge cranes covered by paragraph (g) of this section, the employer shall ensure that cranes and derricks having ratings that vary with boom length, radius (outreach) or other variables are equipped with a durable rating chart visible to the operator, covering the complete range of the manufacturer's (or design) capacity ratings. The rating chart shall include all operating radii (outreach) for all permissible boom lengths and jib lengths as applicable, with and without outriggers, and alternate ratings for optional equipment affecting such ratings. Precautions or warnings specified by the owner or manufacturer shall be included along with the chart.

(2) The manufacturer's (or design) rated loads for the conditions of use shall not be exceeded.

(3) Designated working loads shall not be increased beyond the manufacturer's ratings or original design limitations unless such increase meets with the manufacture's approval. When the manufacturer's services are not available or where the equipment is of foreign manufacture, engineering design analysis performed or approved by the agency certificating the equipment under Part 1919 of this Chapter is required. 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) The employer shall ensure that equipment is not used in a manner that exerts sideloading stresses upon the crane or derrick boom.

(2) No crane or derrick having an operational defect shall be used.

(e) *Protective devices.* (1) The employer shall ensure that guards protect employees from exposed moving parts such as gears, chains and chain sprockets during crane and derrick operations. These guards shall be securely fastened.

(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 *(one year after effective date),* crane and derrick controls shall be self-centering so that they will automatically move to the "off" position when the operator releases the control.

(2) Booms. (i) 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.

(ii) The main purchase block of cranes with extendable booms shall be secured when a whip line is in use.

(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 § 1918a.119 (d), (e)(1), (e)(2)(iii), and (e)(2)(iv).

(iii) Stairways on cranes shall be equipped with rigid handrails meeting the requirements of § 1918a.112(c)(1).

(iv) If the top of a ladder or stairway or any portion 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 hazardous location on the ladder or stairway.

(5) Operator's station. The cab, controls and mechanisms of the equipment shall be so arranged that the operator has a clear view of the load or signal man, 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 counterweight. Ballast or counterweight shall be located and secured only as provided in the manufacturer's or design specifications, which shall be available at the terminal.

(7) Outriggers. Outriggers shall be used according to the manufacturer's specifications or design data, which shall be available at the terminal. 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 areas in which employees are working.

(9) The employer shall ensure that electrical equipment is guarded or maintained to prevent employees from contacting live parts. Designated persons may work on energized equipment 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 or derrick shall be equipped with two means of braking, one of which shall work directly on the drive shaft or other part of the reducing gear.

(ii) Each brake shall be capable of sustaining 1½ times the crane's rated load.

(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 employer shall ensure that the rated loads of bridge cranes are 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 *(effective date of final standard)* each rail-mounted crane shall be fitted with an operable wind-indicating device.

(ii) Indications. Wind-indicating devices shall provide a visible indication of wind velocity at all time. They shall also provide distinctive visible and audible alerts:

(A) When wind velocity reaches that speed (the warning speed), not exceeding the crane manufacturer's recommendations, at which a warning is to be provided or partial shutdown (such as stopping of crane movement on the rails) is to be accomplished; and

(B) When wind velocity reaches that speed (the shutdown speed), not exceeding the crane manufacturer's recommendations, at which work is to be stopped and the crane secured.

(iii) Location of indications. The indications required by paragraph (g)(3)(ii) of this section shall read out directly in the operator's cab.

(iv) Instructions. The employer shall post operating instructions for wind-indicating devices, including warning and shutdown velocities and the actions to be taken on their indications, in the operator's cab of each crane. The employer shall ensure that operators comply with these instructions. The instructions shall include directions for any coordination necessary when two or more affected cranes are located at the same terminal.

(4) Securing of cranes in high winds. (i) When the wind reaches the crane's warning speed, the employer shall ensure that:

(A) Gantry travel is stopped;

(B) Any portion of the crane spanning or partially spanning a vessel is moved clear of the vessel; and

(C) The crane is positioned for shutdown.

(ii) When the wind reaches the crane's shutdown speed, the employer shall ensure that the crane is 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.

(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 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 when employees are in the way 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 method, but not by a hand-signalling system.

(h) *Stabilizing of locomotive cranes.* Loads shall 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, the employer shall designate a person to 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 attachment to the crane have been erected to prevent physical contact with lines, cranes shall be operated near power lines only in accordance with the following:

(A) For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet (3 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) Except as provided in paragraph (j)(9) of this section, the employer shall ensure that no employee is hoisted by the load hoisting apparatus of a crane or derrick except:

(i) In a boatswain's chair rigged to prevent it from accidental disengagement from the hook or supporting member; or

(ii) On a platform meeting the following requirements:

(A) Enclosed by a railing or other means providing protection equivalent to that described in § 1918a.112(c). If equipped with open railings, the platform shall be fitted with toe boards;

(B) Having a safety factor of four based on ultimate strength;

(C) Bearing a plate or permanent marking indicating maximum load rating, which shall not be exceeded, and the weight of the platform itself;

(D) Equipped with a device to prevent access doors, when used, from opening accidentally;

(E) Equipped with an overhead guard to protect employees from falling objects or other overhead hazards; and

(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 a crane or derrick 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) Unless the platform used to hoist employees is completely surrounded by a net approximately five feet (1.52 m) in height, each employee hoisted shall be secured by safety belt or harness and lifeline or equivalent device attached to the source of suspension or to the platform used.

(5) 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.

(6) The employer shall ensure that employees being hoisted remain in continuous sight of and communication with the operator or signalman, if a signalman is used.

(7) The employer shall ensure that the operator remains at the controls when employees are hoisted.

(8) Cranes shall not travel while employees are hoisted, except in an emergency.

(9) 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 (*effective date of final standard*) shall be 42 inches (1.07 m), plus or minus 3 inches (7.6 cm), in height. The provisions of paragraphs (j)(1)(i), (j)(1)(ii)(A), (j)(1)(ii)(B), (j)(1)(ii)(E), (j)(4), and (j)(8) of this section do not apply when such container spreaders are used.

(k) *Routine inspection.* (1) The employer shall ensure that only designated persons inspect each crane and derrick on each day of use for defects in functional operating components and that any defect found is reported to the employer. The employer shall inform the operator of these 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 shall be corrected before further equipment use. Repairs shall be done 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.

§ 1918a.46 Crane load and limit devices.

(a) After (*one year after effective date*), the employer shall ensure that every crane has a load-indicating device or a limiting device, except in the following situations:

(1) When handling bulk commodities by means of clamshell or bucket, or in other service not using a hook, spreader or sling to engage the load to be hoisted;

(2) When handling or holding hoses for hose-handled products;

(3) When it can be documented that the crane never handles loads which exceed the crane's load ratings at all actual working radii; or

(4) When trolley-equipped bridge cranes handle:

(i) Containers identified on the manifest as empty or loaded and the lift is in compliance with the provisions of § 1918a.71 (b), (c), (d), and (e); or

(ii) Other lifts by means of a lifting beam supplied by the crane manufacturer.

(b) Crane load or limiting devices shall:

(1) Provide direct indications, by means other than a hook scale or dynamometer, of actual loads hoisted, to be used in conjunction with posted crane ratings;

(2) Automatically indicate in the cab the approach to, reaching, and exceeding or rated loads; or

(3) Prevent an overload by means of a device such as a limit switch or equivalent installation.

(c) *Performance requirements.* (1) Crane load or limiting devices shall have a range compatible with the range of the crane to which they are attached.

(2) For devices other than limit switches or equivalent devices, load indications shall fall in the range between 97% and 110% of actual loads, the 97% value establishing a 3% limit over rated loads. If accuracy requirements cannot be met over a narrow range at the extremes of the rating of the crane, labeling or other visible or audible means shall indicate to the operator the ranges in which accuracy requirements cannot be met.

(3) Accuracy of limit switches or equivalent devices shall be within plus or minus 10% of activating loads.

(4) Load-indicating or limiting devices shall meet required accuracies over ambient temperatures from −22° to +122°F (−30° to +50°C) without external adjustment.

(d) For devices other than limit switches or equivalent devices, it shall be determined before each day's use that the device is operable, unless the device has been certified by the manufacturer to remain operable within the limits specified in paragraph (c) of this section for a specified time, which has not expired.

(e) When elements of the load-indicating or limiting device are located so that their failure could cuase a load to be dropped, the strength of the elements shall not be the limiting strength factor of the crane.

(f)(1) Readout and labeling shall be provided, and shall be compatible or convertible for use with the crane rating

chart. Readout and labeling shall provide:

(i) Units and form of measure;

(ii) Indicating device capacity;

(iii) Operating range within which accuracy requirements are met; and

(iv) Basic operating instructions and precautions.

(2) If the load or limiting device does not measure the load hoisted but affords warning when the load rating is approached or reached, or if it automatically stops the crane when the limit is reached, the crane shall be clearly marked with an identification and description of the device, its operating instructions, and any necessary precautions.

(g) For cranes with load indicating or limiting devices, maintenance, use and installation of the device and maintenance of the crane shall be performed in accordance with manufacturers' recommendations, which shall be available at the terminal.

(h) In installations using radius (in feet or meters) as a factor in operation, the indicated radius or boom angle (in degrees) shall satisfy the following:

(1) If displaying radius, the indications shall be in the range from 97% to 110% of actual radius, establishing allowable "under" indications of 3% of actual radius (overload condition) and allowable "over" indications of 10% of actual radius (underload condition).

(2) If displaying or using boom angle, indications shall be as follows:

(i) For boom angles, measured as the angle between the boom base section's longitudinal axis and the horizontal plane, of 65° or more, indicated angles shall be between ½° more and 1½° less than actual angles.

(ii) For boom angles under 65°, indicated angles shall be from 1° more to 2° less than actual angles.

(iii) When radius is presented in degrees, and feet or meters are required, conversion charts shall be provided.

(i) *Performance tests.* (1). The employer shall ensure that load-indicating devices and limit switches are performance tested, using known weight or fixed anchor procedures, at installation, at manufacturer's recommended intervals, when there are indications of inaccuracy, and at certification surveys.

(2) Tests shall be in accordance with manufacturer's instructions, which shall be available at the terminal, and shall include all functions.

(3) Tests shall use an appropriately configured crane and load rating chart. Tests of limit switches or equivalent devices shall include activation of the limit switch or device.

(j) *Test records.* Signed and dated records of the most recently conducted performance tests shall be available at the terminal and shall include the following:

(1) Crane owner;

(2) Crane manufacturer, model, serial number;

(3) Device manufacturer, model, serial number;

(4) Crane configuration, method of test and test load data; and

(5) Accuracy calculations and whether recalibration was necessary to achieve accuracy.

§ 1918a.47 Winches.

(a) The employer shall ensure that moving winch parts which present caught-in hazardous to employees are 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 § 1918a.45(f)(11) shall apply to winches.

§ 1918a.48 Conveyors.

(a) *Guards.* (1) The employer shall ensure that danger zones at or adjacent to conveyors are 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) Brakes or equivalent means of stopping objects at the delivery end of the conveyor shall be provided.

(2) Conveyors using electrically released brakes shall be constructed so that the brakes cannot be released until power is applied and 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.* Emergency stop devices shall be readily accessible to employees at fixed loading, unloading and other conveyor work stations.

(g) *Starting powered conveyors.* The employer shall ensure that powered conveyors are not 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.* (1) The employer shall ensure that conveyors are stopped and their power sources locked out during maintenance, repair, and servicing, unless power is necessary for testing.

(2) The starting device shall be locked in the stop position before an attempt is made to remove the cause of a jam or overload that has stopped the conveying medium.

(j) *Safe practices.* (1) Only designated persons shall operate, repair or service powered conveyors.

(2) Employers shall ensure that employees stay off operating conveyors.

(3) Conveyors shall be operated only with all overload devices, guards and safety devices in place and operable.

§ 1918a.49 Spouts, chutes, hoppers, bins, and associated equipment.

(a) The employer shall ensure that standing and running rigging and associated gear used as a permanent part of spouts, chutes or similar devices is inspected before each use and is not used if it has any functional defects. (See also § 1918a.51(c)(2) for certification requirements.)

(b) Instantaneous and 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 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, and guardrails if required by § 1918a.112.

(e) Chutes shall be equipped with sideboards to protect employees from falling objects.

(f) Chutes shall be firmly placed and secured to prevent them from falling.

(g) Brakes or equivalent means of stopping objects at the delivery end of chutes shall be provided.

(h) Before an employee enters an empty bin, the employer shall ensure that:

(1) Personnel controlling the flow of cargo into the bin have been notified of the entry; and

(2) The power supply to the equipment carrying the cargo to the bin has been turned off and locked out.

(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 has been turned off and locked out;

(3) The employee entering the bin is wearing 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 shall be covered with gratings or other means of preventing employees from falling into the bin when the cover is removed.

(k) Chutes and hoppers shall be repaired only by designated persons.

(l)(1) Before power shoveling operations begin, the employer shall ensure that a designated person inspects the equipment to be used. The inspection shall include at least the eye bolts, wires, and sheaves.

(2) Power shovels and associated equipment with operational defects 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 and locked out, the belt stopped, and the hopper closed.

§ 1918a.50 Certification of marine terminal material handling devices.

(a) Employers shall not use any material handling device listed in paragraph (c) of this section until they have 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.

(b) The certifications required by paragraph (a) of this section, and further described in paragraph (c) of this section, shall be performed:

(1) In accordance with the standards of 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 the standards of 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 annually and quadrennially, and shall be inspected annually and examined quadrennially. Certificates of tests, inspections, and examinations shall be available for inspection on the equipment or at the terminal.

(2) Bulk cargo spouts and suckers, together with any portable extensions and rigging or outriggers supporting them vertically, shall be inspected annually. Certificates attesting to the required examination shall be available at the terminal.

(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 inspected annually and examined quadrennially. The quadrennial examination shall include all supporting structures, rigging and mechanical components and observation of all steps of operation. Certificates attesting to the required inspections and examinations shall be available at the terminal.

(4) (i) House fall cargo-handling gear in use shall be tested as a unit and subjected to an examination upon initial certification and every fourth year, and shall be subjected to annual inspections in other years. The unit test shall consist of a proof load to 25% in excess of the rated safe working load. Inspections and examinations shall include all supporting structures and components. Certificates attesting to the required tests, inspections and examinations shall be available at the terminal.

(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% 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 at the terminal.

(6) Wire rope and loose gear obtained after *(effective date of final standard)* 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 at the terminal.

(d) Disassembly and reassembly of equipment necessary for movement from job to job or which does not affect the equipment's ratings will not nullify the validity of the equipment's existing 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) In addition to certification procedures, all certified equipment shall be maintained in accordance with the manufacturer's maintenance procedures.

(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 surveys, inspections or 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) The employer shall ensure that loose gear obtained after *(effective date of final standard)* bears a legible mark indicating that it has been tested (see paragraph (c)(6) of this section). Signal 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 at the terminal.

(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 (4.88m)) in width.

§ 1918a.51 Hand tools.

(a) The employer shall ensure that hand tools used by employees are 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 required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(c) Only cutting tools shall be used to cut metal strapping or banding used to secure cargo.

Subpart D—Specialized Terminals

§ 1918a.71 Terminals handling intermodal containers or roll-on roll-off vehicles.

(a) This section shall apply in addition to any applicable requirements of this Part.

(b) The employer shall ensure that every intermodal container is 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.

(c) Containers loaded aboard or discharged from any vessel by a shore crane or derrick shall:

(1) If empty, be identified by shipping documents as empty and be so marked; and

(2) If loaded, be marked with their actual gross weight to be legible to the crane or other hoist operator.

(d) Each outbound loaded container, except open vehicle-carrying containers and those designed and used exclusively to carry compressed gases, shall be weighed to determine its actual gross weight. 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.

(e) The weight of loaded inbound containers from foreign ports shall be determined by weighing, by the method of calculation described in paragraph (d), or by shipping documents.

(f) 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.

(g) (1) Marked and designated areas shall be set aside within a container or roll-on roll-off terminal for passage of employees to and from work areas.

(2) The employer shall ensure that employees stay clear of the area beneath a suspended container.

(h) The employer shall ensure that employees working with container-handling equipment or in the terminal's traffic lanes wear high-visibility vests or equivalent protection.

(i) Except when damage to an intermodal container makes special means of handling necessary, 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):

(1) Intermodal containers of 20 feet (6.1 m) or more in length shall be hoisted as follows:

(i) If hoisted by the top lifting fittings, the lifting forces shall be applied vertically from at least four such fittings,

(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 grappling arms from above or from one side shall 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) Intermodal container spreaders using lanyards for activation of releasing devices shall not be used except when there is no possibility of the lanyards accidentally releasing a suspended intermodal container.

(ii) Intermodal container spreader twistlock systems shall be designed and used so that a suspended load cannot accidentally be released.

(3) Intermodal containers moved by flat bed trucks or container chassis shall be secured to prevent dislodgement in transit.

(j) (1) Intermodal containers received shall be inspected for defects in structural members or fittings before further 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.

§ 1918a.72 Grain elevator terminals. [Reserved]

§ 1918a.73 Terminal facilities handling menhaden and similar species of fish.

(a) This section shall apply in addition to any applicable requirements of this Part.

(b) (1) The employer shall ensure that tanks in terminal areas used for receiving or storing brailwater for recirculating into vessel holds in discharging operations are open 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.

(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 that 19.5%.

(3) Tests shall be conducted by designated personnel with suitable test equipment and respiratory protective equipment complying with the provisions of § 1918a.92 of this Part.

(c) 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.

(d) At least four units of respiratory protective equipment consisting of supplied-air respirators or self-contained breathing apparatus complying with the requirements of § 1918a.92 of this Part 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 repiratory 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.

(e) 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.

(f) Supervisory personnel shall be on hand at dockside to supervise discharging of brailwater from vessels.

Subpart E—Personal Protection

§ 1918a.91 Eye protection.

(a) (1) When employees perform work hazardous to the eyes, the employer shall provide, at no cost to the employee, 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 ensure its use.

(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 § 1918a.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.

§ 1918a.92 Respiratory protection.

(a) The employer shall provide, at no cost to the employee, approved respiratory protective equipment meeting the requirements of 30 CFR Part 11 and shall ensure its use in hazardous atmospheres as defined in § 1918a.2(p).

(b) Respirators are approved for use in hazardous atmospheres only when they are maintained and used in accordance with the requirements for performance and respiratory protection set forth in 30 CFR Part 11.

(c) For protection against nuisance dusts, the employer shall provide, at no cost to the employee, respirators with particulate filters or dust masks meeting the requirements of 30 CFR Part 11, and shall ensure their use.

(d) For protection against pneumoconiosis-producing or toxic dusts, the employer shall provide, at no cost to the employee, respirators meeting the requirements of 30 CFR Part 11, and shall ensure their use.

(e) Respiratory protective equipment shall not be modified.

(f) Respiratory protective equipment shall be inspected before each use. Gas mask canisters and chemical cartidges shall be replaced before the end of their service life. Mechanical filters shall be cleaned and replaced as often as necessary to prevent excessive breathing resistance.

(g) Previously used respiratory protective equipment shall be cleaned and disinfected before reissuance.

(h) Respiratory protective equipment shall be stored in a convenient and clean location.

(i) Employers shall instruct employees using respiratory protective equipment in its uses and limitations.

(j) When an employee enters a hazardous atmosphere, at least one attendant shall stand by with rescue equipment and with respiratory protection approved for the hazard involved.

§ 1918a.93 Head protection.

(a) The employer shall ensure that employees exposed to impact, falling or flying objects, or electric shocks or burns shall wear protective hats, which shall be provided at no cost to the employee.

(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.

§ 1918a.94 Foot protection.

(a) The employer shall ensure that employees exposed to impact, falling objects, or puncture hazards wear safety shoes, which shall be provided by the employer at no cost to the employee.

(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.

§ 1918a.95 Other protective measures.

(a) *Protective clothing.* (1) The employer shall provide, at no cost to the employee, protective clothing when ordinary clothing is unsuitable and circumstances necessitate special protective clothing, and shall ensure its use.

(2) Protective clothing previously worn shall be cleaned and disinfected before issuance by the employer to another employee.

(b) *Protective creams or ointments.* The employer shall ensure that employees use protective creams or ointments when skin exposure to a particular substance requires their use.

(c) *Protection against drowning.* (1) the employer shall provide, at no cost to the employee, and shall ensure that employees wear, personal flotation devices for those employees, such as line handlers, who are engaged in work in which they may be pulled into the water.

(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 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.

(d) *Emergency facilties.* 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

§ 1918a.111 Maintenance and load limits.

(a) The employer shall ensure that the structural integrity of docks, piers, wharves, terminals and working surfaces is maintained.

(b) Maximum safe load limits, in pounds per square foot (kilograms per square meter), of floors within buildings and structures 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.

§ 1918a.112 Guarding of edges.

(a) *Vehicle protection.* (1) The employer shall ensure that vehicle curbs and bull rails at least 10 inches (22.9 cm) in height are provided at the water side of aprons and bulkheads, except where vehicles are prohibited.

(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) Except as specified in paragraph (b)(2) of this section, 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.

(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, other equivalently safe 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, slattered or similar construction, guardrails shall consist of top rails and midrails. When used, midrails shall be positioned at approximately half the height of the top rail.

(3) The top surface of guardrails installed before *(effective date of final standard)* shall be at least 36 inches (0.91 m) high. Those installed after *(effective date of final standard)* 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.* (1) Stair railings shall be capable of withstanding a force of at least 200 pounds (890 N) applied in any direction, and shall be not 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 shall be provided at any stairway having four or more risers, as follows:

(i) For stairways less thanb 44 inches (1.12 m) wide at least one railing; and

(ii) 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.

§ 1918a.113 Clearance heights.

The employer shall ensure that the clearance height is prominently posted where the height is insufficient for vehicles and equipment.

§ 1918a.114 Cargo doors.

(a) *Mechanically operated.* (1) The employer shall ensure that cargo door counterweights are guarded.

(2) Lift trucks and cranes shall not be used to move mechanically operated doors except 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) *Horizantal sliding.* (1) Horizontal sliding door rollers shall be constructed to prevent the door from jumping from overhead tracks.

(2) The employer shall ensure that sliding doors are secured to prevent them from swinging.

§ 1918a.115 Cargo-landing surfaces.

The employer shall ensure that the working area of an apron used to load or discharge vessels is large enough to permit unobstructed cargo handling.

§ 1918a.116 Platforms and skids.

(a) The employer shall ensure that platforms and skids extending from piers, transit sheds or lofts and used for landing or hooking on drafts shall be provided at the side edges with guardrails meeting the requirements of § 1918a.112(c) or equivalent means, such as nets, to protect employees against falls.

(b) The employer shall ensure that any employee working below a second story platform or skid is protected from falling objects by a net stretched from the platform or skid to the vessel.

(c) The employer shall ensure that platforms and skids are strong enough to bear the loads handled and are maintained in safe condition. Safe working loads, which shall be posted or marked on or adjecent to platforms and skids, shall have a miminum 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.

§ 1918a.117 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) The employer shall ensure that no elevator or escalator with any operational defect is used.

(d) Elevator safey devices shall not be overridden or made inoperable.

(e) The employer shall ensure that elavators and escalators are thoroughly inspected at intervals not exceeding one year, and that additional monthly inspections for satisfactory operation are carried out by designated persons. Records of the results of the latest annual and monthly elevator inspections shall be posted in elevators. Records of 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. The door, gate, or equivalent device shall 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.

§ 1918a.118 Manlifts.

(a) *Inspection.* The employer shall ensure that manlifts are 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:

Step fastenings;
Rails;
Rail supports and fastenings;
Roller and slides;
Belt and belt tension;
Handholds and fastenings;
Floor landings;
Guardrails;
Lubrication;
Safety switches;
Warning signs and lights;
Illumination;
Drive pulley;
Bottom (boot) pulley and clearance;
Pulley supports;
Motor;
Drive mechanism;
Brake;
Electrical switches;
Vibration and misalignment;
"Skip" on up or down run when mounting the step (indicating worn gears); and
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 *(Effective date of the final standard)* 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 § 1918a.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 *(effective date of the standard)* 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.

§ 1918a.119 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) Special-purpose ladders, such as fruit-pickers' ladders, shelf ladders, combination step and extension ladders, and library ladders.

(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) The employer shall ensure that 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 are removed from service.

(2) Ladder repairs shall provide strength at least equivalent to that of the original ladder.

(d) *Ladder specifications.* (1) Strength and spacing requirements. (i) Existing ladders shall be capable of withstanding without damage a minimum concentrated load, applied uniformly over a 3-½ inch (8.8 cm) width at the rung center, of 200 pounds (890 N).

(ii) Ladders installed after *(effective date of final standard)* 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 is a unit shall be capable of simultaneous additional loading in 250 pounds (1120 N) increments for each additional employee, applied to a corresponding number of rungs. The unit shall have a safety factor of four, based on ultimate strength, in the designed service.

(2) (i) Existing ladders shall have rungs evenly spaced from 9 to 16-½ inches (22.9 to 41.9 cm) apart, center to center.

(ii) Ladders installed after *(effective date of final standard)* shall have rungs evenly spaced from 12±2 inches (30±5 cm) apart, center to center.

(3) (i) Existing ladders shall have a width between side rails of at least 10 inches (25.4 cm).

(ii) Ladders installed after *(effective date of final standard)* 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 *(effective date of final standard),* the minimum distance shall be 7 inches (17.8 cm) unless physical limitations make a lesser distance, not less than 4-½ inches (11.5 cm), necessary.

(5) When a ladder passes through an opening or past overhead obstructions, a minimum 24 inch (.61 cm) 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) The employer shall ensure that ladders whose pitch exceeds 90° to the horizontal (slanting backward on the climbing side) are not 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 cm) shall comply with the following provisions:

(i) The ladder shall consist of multiple sections not exceeding 30 feet (9.14 m) each;

(ii) Except as specified in paragraph (e)(2)(iv) of this section, each section shall be horizontally offset from adjacent sections;

(iii) Except as specified in paragraph (e)(2)(iv) of this section, a landing platform capable of supporting a load of 100 pounds per square foot (4.79 kPa) and fitted with guardrails complying with § 1918a.112(c) shall be provided at least every 30 feet; and

(iv) For ladders installed before *(effective date of standard),* 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 § 1918a.112(c) on 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 at the terminal;

(ii) Be repaired 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 installed after *(effective date of final standard)* shall:

(i) Be of rigid construction that allows unobstructed ladder 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.

(6) After *(effective date of final standard),* ladders on radio, microwave communication, electrical power and similar towers, poles and structures, including stacks and chimneys, shall meet the requirements of this paragraph (e). Ladders used only for firefighting or emergency purposes are exempted from the requirements of this paragraph.

(f) *Individual rung ladders.* Ladders consisting of individual rungs that are attached to walls or conical manhole sections 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 4½ 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.

§ 1918a.120 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) The employer shall ensure that rungs of manufactured portable ladders obtained before *(effective date of final standard)* are capable of supporting a 200 pound (896 N) load without deformation.

(2) Rungs shall be evenly spaced from 9 to 16½ 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 15 inches (38 cm) for ladders 10 feet (3.05 m) or less in overall length, and shall increase at least ¼ inch (0.6 cm) for each additional 2 feet (0.61 m) of ladder length.

(c) *Standards for manufactured portable ladders.* The employer shall ensure that portable manufactured ladders obtained after *(effective date of final standard)* bear identifying labels indicating that they meet the appropriate ladder construction requirements of the following standards.

ANSI A14.1–1975 Safety Requirements for Portable Wood Ladders
ANSI A14.2–1972 Safety Requirements for Portable Metal Ladders
ANSI A14.5–1974 Safety Requirements for Portable Reinforced Plastic Ladders

(d) *Standards for job-made portable ladders.* The employer shall ensure that job-made ladders used after *(effective date of final standard):*

(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 15 inches (38 cm) for ladders 10 feet (3.05 m) in height. Width between rails shall increase at least ¼ 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 occurance, 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 electrical conductors.
(4) Individual sections from different multi-sectional ladders or two or more single straight ladders shall not be tied or fastened together to achieve additional length.
(5) Except for combination ladders, self-supporting ladders shall not be used as single straight ladders.
(6) Unless intended for cantilever operation, non-self-supporting ladders shall not be used to climb above the top support point.
(7) Ladders shall extend at least 36 inches (0.91 m) above the upper support level if employees are to leave or mount the ladder at that level, except that where such extension is impractical other equivalent means such as grab bars may be used to provided a hand grip.
(8) The employer shall ensure that ladders are securely positioned on a level and firm base.
(9) Ladders shall be fitted with slip-resistant bases and lashed, blocked or otherwise secured at top or bottom to prevent the ladder from slipping.
(10) Ladders shall be placed so that employees climbing are not exposed to injury from projecting objects or doors that open toward the ladder.

§ 1918a.121. 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 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) The employer shall ensure that fixed stairs installed after *(effective date of final standard)* are 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 § 1918a.112(c)(1).
(4) Railing height from tread surface at the riser face shall be 33 ±3 inches (83.8 ±7.6 cm).
(c) *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:
(1) Are capable of a single concentrated load of 200 pounds (890 N) at the tread center;
(2) 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
(3) Have handrails that meet the requirements of § 1918a.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.
(d) *Maintenance.* The employer shall ensure that fixed stairways are maintained in safe condition and are not obstructed.

§ 1918a.122 Spiral stairways.

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

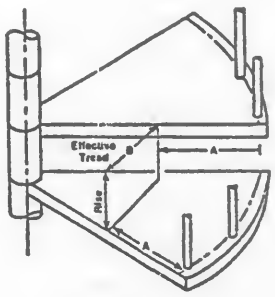

Figure F-1

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 6-½ to 10-½ 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 § 1918a.112(c)(1). A minimum of one baluster, if used, shall be provided 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 stem.
(c) *Maintenance.* Spiral stairways shall be maintained in safe condition.

§ 1918a.123 Employee exits.

(a) The employer shall ensure that employee exits are marked. Marking consisting of the word "Exit" or other appropriate description shall be clear and easily distinguishable.
(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).

§ 1918a.124 Illumination

Except where the regulations of the United States Coast Guard (33 CFR 126.15(l) and (n), and 33 CFR 154.570) apply, the employer shall ensure that active work areas (for example cargo transfer points) are illuminated at an average minimum light intensity of 10 foot-candles. Other work areas (for example open storage areas) shall be illuminated at an average minimum light intensity of 5 foot-candles. Light intensity shall be measured on a horizontal plane at the work or walking surface.

§ 1918a.125 Passage between levels and across openings.

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

(b) *Dockboards (car and bridge plates) and ramps.* Dockboards and ramps shall:

(1) Not be subjected to loads exceeding the manufacture's recommended load rating, which shall be marked on the dockboard or ramp or available at the terminal;

(2) have sufficient edge contact with pier, dock and loading platforms and carriers or vessels to prevent rocking or sliding;

(3) Not be used when loading dock or platform surfaces slope so that substantial contact cannot be maintained;

(4) Be so secured, constructed and used as to prevent the dockboard or ramp from slipping;

(5) Have effective means for safe handling;

(6) Have a safety factor of at least four;

(7) Be equipped with a guardrail meeting the requirements of § 1918a.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);

(8) Be equipped with sideboards or be designed so that trucks are prevented from running over the edge; and

(9) Have slip-resistant surfaces.

(c) *Other temporary surfacing.* When steel plates or similar means are used temporarily to bridge or cover uneven surfaces or tracks, such temporary surfacing shall be secured or built to prevent displacement by vehicle wheels.

§ 1918a.126 Guarding temporary hazards.

The employer shall ensure that ditches, pits, excavations, other subsidence areas, and surface areas in poor repair are guarded by barricades, railings, roping off or by other equally effective means. The employer shall provide sufficient illumination so that employees can see and avoid the hazardous area.

§ 1918a.127 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 § 1918a.95(c).

§ 1918a.128 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) Portable 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.* The employer shall ensure that employees do not consume food or beverages in areas where hazardous materials are or have been stored or handled.

(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.

§ 1918a.129 Signs and marking.

(a) *General.* (1) The employer shall provide signs that are clearly worded and legible.

(2) Signs shall contain a key word or legend indicating the reason for the sign.

(i) Key words are such words as Danger, Warning, Caution.

(ii) Legends are more specific explanations such as High Voltage, Close Clearance, Pedestrian Crossing.

(b) *Specific.* (1) Every marine terminal shall have conspicuously posted signs as follows:

(i) Locations of first aid facilities;

(ii) Locations of telephones;

(iii) Telephone numbers of the closest ambulance service, hospital or other source of medical attention, police, fire department, and emergency squad (if any); and

(iv) Locations of firefighting and emergency equipment and fire exits.

(2) The employer shall ensure that any imminent danger is designated by a danger sign to warn employees of the immediate hazard.

(3) The employer shall ensure that any area in which any potential hazard is present is designated by a caution sign to warn employees of the hazard.

Subpart G—Related Terminal Operations and Equipment

§ 1918a.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 triping devices, electronic safety devices, or other such devices).

(b) *General.* (1) The employer shall ensure that danger zones on machines and equipment used by employees are guarded.

(2) During operations that produce chips or dust, the employer shall provide an effective exhaust system at the point of origin of chips and dust.

(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 device if the belt can be shifted.

(6) Motors shall be wired to prevent automatic restart after loss of power.

(7) The employer shall ensure that the power supply to machines and equipment is turned off and locked out during repair, adjustment, or servicing.

(8) The employer shall maintain machines and equipment in accordance with the manufacturer's instructions, which shall be available at the terminal.

(9) The employer shall ensure that only designated employees maintain or repair machinery and equipment.

(10) Machines and equipment with operational defects shall not be used.

(c) *Hand-fed circular ripsaws and hand-fed circular crosscut table saws.* Unless fixed or manually adjustable enclosures or guarding provides equivalent protection, the employer

shall ensure that hand-fed circular ripsaws and hand-fed circular crosscut table saws are 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, but 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) The employer shall ensure that swing cutoff saws 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 materials or throw material toward the operator;

(3) Adjustable stops 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 ensure 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) The employer shall provide 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) Except as provided in paragraphs (g)(2) and (g)(3) of this section, the employer shall ensure that abrasive wheels are used only on machines having enclosure guards to restrain pieces of grinding wheels and to protect employees if the wheels break. 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 ⅛-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) The employer shall ensure that the grinding machine turns the wheel 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) The employer shall ensure that rotating parts, such as gears and pulleys, that are located 8 feet (2.4 m) or less above working surfaces are 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.

§ 1918a.152 Welding, cutting and heating (hot work).

(a) *Definition.* "Hot work" means riveting, welding, burning or other fire or spark-producing operation.

(b) *General.* (1) The employer shall ensure that welding, cutting and heating are performed only as permitted by this section and by other applicable regulations.

(2) 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, the employer shall ensure that hot work is performed only in designated locations that are free of fire hazards.

Footnote G–1: 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.

(2) When hot work must be performed in a location that is not free of fire hazards, the employer shall ensure that all necessary precautions are 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) Additional employees shall be assigned to guard against fire during hot work and for a sufficient time after completion of 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 so 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 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.

(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. The employer shall ensure that compressed gas cylinders:

(i) 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) Are hoisted only while secured, as on a cradle or pallet, and shall not be hoisted by magnet, choker sling or cylinder caps;

(iii) Are moved only by tilting or rolling on their bottom edges;

(iv) Are secured when moved by vehicle;

(v) Are secured while in use;

(vi) Have valves closed when cylinders are empty, being moved or stored;

(vii) Are secured upright except when hoisted or carried;

(viii) Are not freed when frozen by prying the valves or caps with bars or by hitting the valve with a tool;

(ix) Are not thawed by boiling water;

(x) Are not exposed to sparks, hot slag or flame;

(xi) Are not permitted to become part of electrical circuits or have electrodes struck against them to strike arcs;

(xii) Are not used as rollers or supports;

(xiii) Do not have contents used for purposes not authorized by the supplier;

(xiv) Are not used if damaged or defective;

(xv) Do not have gases mixed within, except by gas suppliers;

(xvi) Are stored so that oxygen cylinders are separated from fuel gas cylinders and combustible materials by a minimum distance of 20 feet (6 m) or a barrier having a fire-resistance rating of 30 minutes; and

(xvii) Do 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 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 1½ 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 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 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 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 are 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 operation, 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 may not

be used until it is protected by insulation equivalent in performance capability 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 electical 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 pipe lines, 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 that required by paragraph (e)(3)(i) of this section.

(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 hazards exists.

(v) Arc welding and cutting machine frames shall be grounded, either through a third wire in the cable containing the circuit coductor or through a separate wire at the source of the current. Ground 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 is kept in the open 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 § 1918a.91. When welders are exposed to their own arc or to each other's arc, they shall wear filter lenses complying with the requirements of § 1918a.91.

(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 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 cofined space the employer shall ensure that:

(i) General mechanical or local exhaust ventilation meeting the requirements of paragraph (f)(1) of this section is provided; or

(ii) Employees in the space wear supplied air respirators in accordance with § 1918a.92 and a standby on the outside maintains communication with employees inside the space and is 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 § 1918a.92;

(A) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials;

(B) Metals cotaining 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) The employer shall ensure that employees performing hot work in confined or enclosed spaces involving beryllium-containing base or filler metals are protected by local exhaust ventilation and wear supplied air respirators or self-contained breathing apparatus, in accordance with the requirements of § 1918a.92.

(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 are protected by respirators in accordance with the requirements of § 1918a.92, and those working on beryllium-containing base or filler metals are protected by supplied air respirators, in accordance with the requirements of § 1918a.92.

(v) The employer shall ensure that any employee exposed to the same atmosphere as the welder or burner is protected by the same type of respiratory and other protective equipment as that worn by the welder or burner.

(4) Insert-gas metal-arc welding. The employer shall ensure that employees do not engage in and are not 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 § 1918a.91. When welders are exposed to their own arc or to each other's arc, filter lenses complying with the requirements of § 1918a.91 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, the employer shall ensure that a test is 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 precautions 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 § 1918a.92.

(h) *Protection against radiant energy.* (1) The employer shall ensure that employees are protected from radiant energy eye hazards by spectacles, cup goggles, helmets, hand shields or face shields with filter lenses complying with the requirements of § 1918a.91 and 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 number of the lens in the helmet may be reduced if the sum of 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 ⅛ inch	4 or 5.
Medium gas welding ⅛–½ inch	5 or 6.
Heavy gas welding, over ½ inch	6 or 8.
Shielded Metal-Arc Welding 1/16- to 5/32- inch electrodes	10.
Inert-gas Metal-Arc Welding (Nonferrous) 1/16- to 5/32- inch electrodes.	11.
Inert-gas Metal Arc Welding (Ferrous) 1/16- to 5/32- inch electrodes	12.
Shielded Metal-Arc Welding:	
3/16- to 1/4- inch eletrodes	12.
5/16- and 3/8- inch electrodes	14.
Atomic Hydrogen Welding	10 to 14.
Carbon Arc Welding	14.

Table G–1.—*Filter Lenses for Protection Against Radiant Energy*—Continued

Operation	Shade No.
Medium gas welding ⅛–½ inch	5 or 6.
Heavy gas welding, over ½ inch	6 or 8.
Shielded Metal-Arc Welding 1/16- to 5/32- inch electrodes..	10.
Inert-gas Metal-Arc Welding (Nonferrous) 1/16- to 5/32- inch electrodes.	11.
Inert-gas Metal Arc Welding (Ferrous) 1/16- to 5/32- inch electrodes..	12.
Shielded Metal-Arc Welding:	
3/16- to 1/4- inch eletrodes	12.
5/16- and 3/8- inch electrodes	14.
Atomic Hydrogen Welding	10 to 14.
Carbon Arc Welding	14.

§ 1918a.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 the terminal structures under construction, major repair or rebuilding of terminal structures,or portable spraying appartus not used regularly in the same location.

(b) *Definition.* "Spraying area" means any area where flammable vapors, mists or combustible residures, dusts or deposits may be present due to paint spraying operations.

"Spray booth" means a power-ventilated enclosure containing a flammable or combustible paint spraying operation and confining and limiting the escape of paint, vapor and residue by means of an exhaust system.

"Approved" means, for the purpose of this section, that the equipment has been approved for the specified use by an organization such as Factory Mutual Research Corporation or Underwriters Laboratories, Inc.

(c) *Spray painting requirements for indoor and outdoor spraying areas and booths.* (1) Shut-off valves. The employer shall ensure that containers or piping with attached hoses or flexible connections have shut-off valves closed at the connection when not in use.

(2) Pressure-relieving devices. Pumps used to transfer paint supplies shall have automatic pressure-relieving devices.

(3) Inspection before use. 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) Electrical and other sources of ignition. (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) When 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) Containers and piping systems. When transferring flammable or combustible liquids between containers, both containers shall be bonded and grounded.

(6) Operations and maintenance. (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) Organic peroxides and other dual-component coatings. Spraying with organic peroxides and other dual-component coatings shall only be conducted in sprinkler-equipped spray booths.

(8) Storage of flammable and combustible liquids. The employer shall ensure that only the quantity of flammable or combusitble 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 precautions. 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) The employer shall ensure that distribution or baffle plates are of noncombustible material and are 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 or 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 suction 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 I, Hazardous Locations. Wiring, motors and equipment within 20 feet (6 m) of any interior spraying area and not separated by vapor-tight partitions shall not produce sparks during operation and shall otherwise conform to the requirements of Subpart S of Part 1910 of this Chapter for Class I, Division 2, Hazardous Locations.

(13) Outside electrical lights within 10 feet (3 m) 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) The employer shall ensure that spray booths are 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 (0.91 m) or by fire-retardant partitions or walls.

(3) A space of at least 3 feet (0.91 m) 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 (0.46 m) 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.

§ 1918a.154 Compressed air.

The employer shall ensure that employees are 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.

§ 1918a.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) The employer shall ensure that air receivers are 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.

§ 1918a.156 Fuel handling and storage.

(a) *Applicability.* This section applies to those matters not covered by the Coast Guard requirements in 33 CFR Part 126 and 46 CFR Part 146.

(b) *Liquid fuel.* (1) The employer shall ensure that only designated persons conduct fueling operations. In case of spillage, filler caps shall be replaced and spillage disposed of before engines are started.

(2) Engines shall be stopped and operators shall not be on the equipment during refueling operations.

(3) Smoking and open flames are prohibited in areas used for fueling, fuel storage or enclosed storage of equipment containing fuel.

(4) Equipment shall be refueled only at designated locations.

(5) 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.

(6) Flammable liquids may be dispensed in the open from a tank or from other vehicles equipped for delivering fuel to another vehicle 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 without latch-open devices.

(7) 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.

(8) Liquid fuel dispensing devices, such as pumps, shall be mounted either on a concrete island or be otherwise protected against collision damage.

(c) *Liquefied gas fuels.* (1) Fueling locations. (i) The employer shall ensure that liquefied gas powered equipment is 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 (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 comply with paragraph (b) of this section.

(ii) Using matches or flames to check for leaks is prohibited.

(iii) Containers shall be examined before recharging and again before reuse for the following:

(A) Dents, scrapes and gouges of pressure vessels;

(B) Damage to valves and liquid level gauges;

(C) Debris in relief valves;

(D) Leakage at valves or connections; and

(E) Deterioration or loss of flexible seals in filling or servicing connections.

(4) Fuel storage. (i) Stored fuel containers shall be located to minimize exposure to excessive temperatures and physical damage.

(ii) Containers shall not be stored near inside 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 shutoff 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.

§ 1918a.157 Battery charging and changing.

(a) The employer shall ensure that only designated persons 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) Ventilation shall be provided during charging.

(i) Facilites for flushing the eyes, body and work area with water shall be provided where 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 charging batteries, the vent caps shall be in place.

(n) Chargers shall be turned off when leads are being connected or disconnected.

(o) Installed batteries shall be secured to avoid physical or electrical contact with compartment walls or components.

§ 1918a.158 Prohibited operations.

(a) The employer shall ensure that spray painting and abrasive blasting operations are not 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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