

STATUS: Open to the public.

MATTERS TO BE CONSIDERED: (1) Report on general conditions of the Mississippi River and Tributaries Project and major accomplishments since the last meeting; (2) Views and suggestions from members of the public of any matters pertaining to the Flood Control, Mississippi River and Tributaries Project; and (3) District Commander's report on the Mississippi River and Tributaries Project in Memphis District.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Rodger D. Harris, telephone 601-634-5766.

Rodger D. Harris,

Executive Assistant, Mississippi River Commission.

[FR Doc. 90-8362 Filed 4-6-90; 10:47 am]

BILLING CODE 3710-GX-M

MISSISSIPPI RIVER COMMISSION

TIME AND DATE: 9:00 a.m., May 1, 1990.

PLACE: On board MV MISSISSIPPI at City Front, vicinity of Beale Street, Memphis, TN.

STATUS: Open to the public.

MATTERS TO BE CONSIDERED: (1) Report on general conditions of the Mississippi River and Tributaries Project and major accomplishments since the last meeting; (2) Views and suggestions from members of the public of any matters pertaining to the Flood Control, Mississippi River and Tributaries Project.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Rodger D. Harris, telephone 601-634-5766.

Rodger D. Harris,

Executive Assistant, Mississippi River Commission.

[FR Doc. 90-8363 Filed 4-6-90; 10:47 am]

BILLING CODE 3710-GX-M

MISSISSIPPI RIVER COMMISSION

TIME AND DATE: 9:00 a.m., May 2, 1990.

PLACE: On board MV MISSISSIPPI at Port of Rosedale, MS.

STATUS: Open to the public.

MATTERS TO BE CONSIDERED: (1) Report on general conditions of the Mississippi River and Tributaries Project and major accomplishments since the last meeting; (2) Views and suggestions from members of the public on any matters pertaining to the Flood Control, Mississippi River and Tributaries Project; and (3) District Commander's report on the Mississippi River and Tributaries Project in Vicksburg District.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Rodger D. Harris, telephone 601-634-5766.

Rodger D. Harris,

Executive Assistant, Mississippi River Commission.

[FR Doc. 90-8364 Filed 4-6-90; 10:47 am]

BILLING CODE 3710-GX-M

MISSISSIPPI RIVER COMMISSION

TIME AND DATE: 3:00 p.m., May 3, 1990.

PLACE: On board MV MISSISSIPPI at Foot of North Street, Baton Rouge, LA.

STATUS: Open to the public.

MATTERS TO BE CONSIDERED: (1) Report on general conditions of the Mississippi River and Tributaries Project and major accomplishments since the last meeting; (2) Views and suggestions from members of the public on any matters pertaining to the Flood Control, Mississippi River and Tributaries Project; and (3) District Commander's report on the Mississippi River and Tributaries Project in New Orleans District.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Rodger D. Harris, telephone 601-634-5766.

Rodger D. Harris,

Executive Assistant, Mississippi River Commission.

[FR Doc. 90-8365 Filed 4-6-90; 10:47 am]

BILLING CODE 3710-GX-M

NUCLEAR REGULATORY COMMISSION

DATE: Weeks of April 9, 16, 23, and 30, 1990.

PLACE: Commissioner's Conference Room, 11555 Rockville Pike, Rockville, Maryland.

STATUS: Open and Closed.

MATTERS TO BE CONSIDERED:

Week of April 9

Friday, April 13

10:00 a.m.

Briefing on Risk Based Technical Specifications Program (Public Meeting)

11:00 a.m.

Affirmation/Discussion and Vote (Public Meeting)

a. ALAB-925 (Rockwell International Special Nuclear Material License Renewal)

Week of April 16—Tentative

Monday, April 16

2:00 p.m.

Discussion/Possible Vote on Full Power Operating License for Comanche Peak (Unit 1) (Public Meeting)

Thursday, April 19

11:30 a.m.

Affirmation/Discussion and Vote (Public Meeting) (if needed)

Week of April 23—Tentative

Thursday, April 26

2:00 p.m.

Briefing on Containment Performance Improvement Program (Other Than Mark I) (Public Meeting)

3:30 p.m.

Affirmation/Discussion and Vote (Public Meeting) (if needed)

Friday, April 27

9:00 a.m.

Briefing on Evolutionary Light Water Reactor Certification Issues and Related Regulatory Requirements (Public Meeting)

Week of April 30—Tentative

Monday, April 30

10:00 a.m.

Briefing on Status of Nine Mile Point 1 Restart (Public Meeting)

Thursday, May 5

10:00 a.m.

Briefing on Incident Investigation Team (IIT) Report on Amersham Materials Event (Public Meeting)

2:00 p.m.

Briefing on EEO Program (Public Meeting)

3:30 p.m.

Affirmation/Discussion and Vote (Public Meeting) (if needed)

ADDITIONAL INFORMATION: Affirmation of "Public Comments Received Concerning the Enforcement Policy Revision Involving Maintenance-Related Root Cause" scheduled for April 5, was cancelled.

Note: Affirmation sessions are initially scheduled and announced to the public on a time-reserve basis. Supplementary notice is provided in accordance with the Sunshine Act as specific items are identified and added to the meeting agenda. If there is no specific subject listed for affirmation, this means that no item has as yet been identified as requiring any Commission vote on this date.

TO VERIFY THE STATUS OF MEETINGS CALL (RECORDING)—(301) 492-0292

CONTACT PERSON FOR MORE

INFORMATION: William Hill (301) 492-1661.

Dated: April 5, 1990.

William M. Hill, Jr.,

Office of the Secretary.

[FR Doc. 90-8420 Filed 4-6-90; 2:37 pm]

BILLING CODE 7590-01-M

RESOLUTION TRUST CORPORATION

Notice of Change in Subject Matter of Agency Meeting

Pursuant to the provisions of the "Government in the Sunshine Act" (5 U.S.C. 552b), notice is hereby given that Corporation business requires the addition to the "New Business" for the

open session of the Tuesday, April 3, 1990, meeting of the Resolution Trust Corporation the following:

Briefing re:

Policy on Post-Insolvency Interest for Direct Collateralized Borrowings.

The changes were required with less than seven days notice to the public and no earlier notice was practicable.

The meeting will be held in the Board Room on the sixth floor of the FDIC Building located at 550-17th Street, N.W., Washington, D.C.

Requests for further information concerning the meeting may be directed to Mr. John M. Buckley, Jr., Executive Secretary of the Corporation, at (202) 898-7102.

Dated: April 3, 1990.

Resolution Trust Corporation.

John M. Buckley, Jr.,

Executive Secretary.

[FR Doc. 90-8333 Filed 4-5-90; 4:57 pm]

BILLING CODE 6714-01-M

RESOLUTION TRUST CORPORATION

Notice of Agency Meeting

Pursuant to the provisions of the "Government in the Sunshine Act" (5 U.S.C. 552b), notice is hereby given that on Tuesday, April 3, 1990, at 3:06 p.m., the Board of Directors of the Resolution Trust Corporation met in closed session

to consider matters relating to the resolution of four thrift institutions and internal corporate activities.

In calling the meeting, the Board determined, on motion of Director C.C. Hope, Jr. (Appointive), seconded by Director Robert L. Clarke (Comptroller of the Currency), concurred in by Director Salvatore R. Martoche, (Acting Director of the Office of Thrift Supervision), and Chairman L. William Seidman, that Corporation business required its consideration of the matters on less than seven days notice to the public; that no earlier notice of the meeting was practicable; that the public interest did not require consideration of the matters in a meeting open to public observation; and that the matters could be considered in a closed meeting by authority of subsections (c)(2), (c)(8), (c)(9)(A)(ii) and (c)(9)(B) of the "Government in the Sunshine Act" (5 U.S.C. 552b).

The meeting was held in the Board Room of the FDIC Building located at 550-17th Street NW., Washington, DC.

Dated: April 4, 1990.

Resolution Trust Corporation.

John M. Buckley, Jr.,

Executive Secretary.

[FR Doc. 90-8334 Filed 4-5-90; 4:57 pm]

BILLING CODE 6714-01-M

RESOLUTION TRUST CORPORATION

Notice of Agency Meeting

Pursuant to the provisions of the "Government in the Sunshine Act" (5 U.S.C. 552b), notice is hereby given that the Board of Directors of the Resolution Trust Corporation will meet in open session at 2:15 p.m. on Tuesday, April 10, 1990, to consider the following matter:

Summary Agenda:

No Cases.

Discussion Agenda:

A. Memorandum re:

Policy on Post-Insolvency Interest for Direct Collateralized Borrowings

The meeting will be held in the Board Room of the FDIC Building located at 550-17th Street NW., Washington, DC.

Requests for further information concerning the meeting may be directed to Mr. John M. Buckley, Jr., Executive Secretary of the Resolution Trust Corporation at (202) 898-3604.

Dated: April 3, 1990.

Resolution Trust Corporation.

John M. Buckley, Jr.,

Executive Secretary.

[FR Doc. 90-8335 Filed 4-5-90; 4:57 pm]

BILLING CODE 6714-01-M

Corrections

Federal Register

Vol. 55, No. 69

Tuesday, April 10, 1990

This section of the FEDERAL REGISTER contains editorial corrections of previously published Presidential, Rule, Proposed Rule, and Notice documents. These corrections are prepared by the Office of the Federal Register. Agency prepared corrections are issued as signed documents and appear in the appropriate document categories elsewhere in the issue.

DEPARTMENT OF AGRICULTURE

Office of the Secretary

Privacy Act of 1974; Amendment of an Existing System of Records

Correction

In notice document 90-7227 beginning on page 11628 in the issue of Thursday, March 29, 1990, make the following correction:

On page 11628, in the third column, under **EFFECTIVE DATE**, in the second line, "March 14, 1990" should read "May 14, 1990".

BILLING CODE 1505-01-D

DEPARTMENT OF COMMERCE

International Trade Administration

Short Supply Determinations; High-Manganese Non-Magnetic Steel Plate

Correction

In notice document 90-7759 beginning on page 12398 in the issue of Tuesday, April 3, 1990, make the following correction:

On page 12399, in the second column, in the paragraph headed *Comments*, in the third and fourth lines, "April 7, 1990" should read "April 10, 1990".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

[Docket No. 90M-0053]

IntraOptics, Inc.; Premarket Approval of Models SK15 and SK16 Posterior Chamber Intraocular Lenses

Correction

In notice document 90-4511 beginning on page 7033 in the issue of Wednesday,

February 28, 1990, make the following correction:

On page 7033, in the third column, under **DATES**, "February 28, 1990" should read "March 30, 1990".

BILLING CODE 1505-01-D

OFFICE OF MANAGEMENT AND BUDGET

Revised Standards for Defining Metropolitan Areas in the 1990's

Correction

In notice document 90-7425 beginning on page 12154 in the issue of Friday, March 30, 1990, make the following correction:

On page 12155, in the third column, in paragraph C, the second line, "250,000" should read "25,000".

BILLING CODE 1505-01-D

Conclusions

The results of the present study indicate that the use of a computerized system for the management of patient information can significantly improve the efficiency and accuracy of data collection and analysis. The system was found to be user-friendly and capable of handling large volumes of data. The use of a computerized system can also help to reduce the risk of data loss and ensure that data is stored in a secure and accessible format. The results of the study suggest that the use of a computerized system for the management of patient information is a viable and effective option for healthcare providers.

The results of the study also indicate that the use of a computerized system for the management of patient information can help to improve the quality of patient care. By providing healthcare providers with easy access to patient information, the system can help to ensure that patients receive the best possible care. The system can also help to reduce the risk of medical errors and improve the overall efficiency of the healthcare system. The results of the study suggest that the use of a computerized system for the management of patient information is a viable and effective option for healthcare providers.

The results of the study also indicate that the use of a computerized system for the management of patient information can help to reduce the cost of healthcare. By improving the efficiency and accuracy of data collection and analysis, the system can help to reduce the risk of medical errors and improve the overall efficiency of the healthcare system. The results of the study suggest that the use of a computerized system for the management of patient information is a viable and effective option for healthcare providers.

The results of the study also indicate that the use of a computerized system for the management of patient information can help to improve the overall quality of the healthcare system. By providing healthcare providers with easy access to patient information, the system can help to ensure that patients receive the best possible care. The system can also help to reduce the risk of medical errors and improve the overall efficiency of the healthcare system. The results of the study suggest that the use of a computerized system for the management of patient information is a viable and effective option for healthcare providers.

Registered Federal Patent

**Tuesday
April 10, 1990**

Part II

Department of Labor

**Occupational Safety and Health
Administration**

29 CFR Part 1910

**Walking and Working Surfaces and
Personal Protective Equipment (Fall
Protection Systems); Notices of
Proposed Rulemaking**

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910

[Docket S-041]

RIN 1218-AB04

Walking and Working Surfaces

AGENCY: Occupational Safety and Health Administration (OSHA), Labor.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Occupational Safety and Health Administration (OSHA) proposes to revise its general industry standards for workplace walking and working surfaces (29 CFR part 1910, subpart D) in order to focus on the hazards that can result in trips, slips, and falls causing serious and fatal injuries.

This proposed standard will also eliminate ambiguities and redundancies contained in the existing subpart D standards; address areas not covered in the existing standards; and consolidate and simplify many of the provisions contained in the existing standards.

In a related notice of proposed rulemaking, OSHA proposes to amend the existing standards in 29 CFR part 1910, subpart I—Personal Protective Equipment, to add criteria pertaining to personal fall protection systems, including fall arrest systems (lifelines and lanyards, body belts and harnesses, deceleration devices, etc.), work positioning systems (lineman's body belts and pole straps, window cleaner's belts, etc.), travel restricting systems (tether lines, etc.), and fall protection systems for climbing (ladder safety devices, etc.). The proposed revisions to subparts D and I, because of their interdependency with regard to the use of personal fall protection systems, are being published concurrently.

OSHA believes that the proper use of fall protection systems can protect employees from injury and death due to falls to different elevations. The existing subpart D standards for walking and working surfaces refer to or require the use of such systems, but provide little or no information to identify what criteria these systems must meet in order to provide employee safety. The subpart I proposal will clearly state those criteria.

DATES: *Comments.* Comments must be postmarked by July 9, 1990.

Requests for public hearing on objections to the proposed standard. Requests for a public hearing on objections to the proposal must be postmarked by July 9, 1990.

Notices of intention to appear, testimony and documentary evidence. If OSHA receives requests for a hearing on objections to the proposal, OSHA will hold a hearing. Any interested persons may participate in the hearing. Notices of intention to appear, testimony and documentary evidence for the hearing must be postmarked by August 8, 1990.

Public hearing. If OSHA receives requests for a hearing from the public, OSHA will commence a hearing on September 11, 1990.

ADDRESSES: *Comments and requests for a hearing.* Comments on the proposal and requests for a hearing on objections to the proposed standard should be submitted in quadruplicate to the Docket Officer, Docket S-041, U.S. Department of Labor, Occupational Safety and Health Administration, Room N2625, 200 Constitution Avenue, NW., Washington, DC 20210.

Notices of intention to appear, and testimony and documentary evidence. Notices of intention to appear at the hearing, and testimony and documentary evidence which will be introduced into the hearing record, must be submitted in quadruplicate to Mr. Tom Hall, Division of Consumer Affairs, Room N3649, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, DC 20210.

Public hearing. If requested by the public, a hearing will be held in Washington, DC, beginning September 11, 1990, at 10:00 a.m. in the Auditorium of the Frances Perkins Building, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: *Proposal.* Mr. James A. Foster, U.S. Department of Labor, Occupational Safety and Health Administration, Room N3637, 200 Constitution Avenue, NW., Washington, DC 20210, (202) 523-8151.

Public hearing. Mr. Tom Hall, Division of Consumer Affairs, U.S. Department of Labor, Occupational Safety and Health Administration, Room N3649, 200 Constitution Avenue, NW., Washington, DC 20210, (202) 523-8615.

SUPPLEMENTARY INFORMATION: The author of this proposed rule is Terence P. Smith, Directorate of Safety Standards Programs, Occupational Safety and Health Administration.

I. Background

The vast majority of workers in general industry employment spend their work hours walking on level working surfaces such as office floors, hallways, or the floors of shops and

factories. While slips, trips and falls are still common occurrences to such workers, the likelihood of a major injury from such a fall is not great.

However, many employees in general industry work on scaffolds; climb up and down ladders; walk on narrow stairs; work in areas where there may be holes in the floor; or work on elevated floors which have unprotected edges. Slips, trips, and falls from ladders, scaffolds, stairs, elevated floors and similar work surfaces are major causes of employee injury (Refs. 14, 16, 17, 22, 26, 32, 34, 38).

The existing standards in subpart D, which deal with the hazards of walking and working surfaces, are part of the initial package of standards promulgated by OSHA in 1971, under section 6(a) of the Occupational Safety and Health Act of 1970 (the Act) (29 U.S.C. 655(a)). During the period since OSHA promulgated subpart D, interested parties have suggested changes in these regulations. As discussed below, efforts to revise subpart D have been going on over a number of years. In September 1973, OSHA published a proposed revision of subpart D in the *Federal Register* (38 FR 24300). In April 1976, OSHA published a notice in the *Federal Register* (41 FR 17227) which withdrew the 1973 proposal because, in the Agency's view, it had become outdated and did not reflect then current information. Concurrently, in a separate notice, OSHA requested further information (41 FR 17102) on revisions needed in subpart D. In addition, OSHA conducted several informal public meetings to provide interested parties with the opportunity to present their views on issues related to subpart D.

After reviewing the responses to the April 1976 notice, OSHA determined that a more thorough scientific and technical research effort was needed to develop objective information upon which an effective subpart D standard could be developed.

OSHA had contracted with the National Bureau of Standards (NBS) to conduct research in the area of fall protection. The NBS research resulted in four reports. Three reports, published in 1976, addressed guardrails (Refs. 9, 10, 11). In the guardrail reports, NBS described a variety of existing guardrail systems that complied, at the time of installation, with various building codes. However, NBS tested these systems, and found that they did not meet the pertinent OSHA standards. The testing program used an anthropomorphic model and other ergonomic data to generate information which, along with

the results of other research efforts that reviewed human and environmental factors interaction, enabled the NBS to develop its final guardrail report, "A Model Performance Standard for Guardrails" (Ref. 11).

The fourth NBS report addressed personal fall protection systems, specifically body harnesses, body belts and lanyards (Ref. 8). That report also described various situations in which fall protection systems have failed, as well as the lack of test criteria for evaluating the shock absorbing qualities of the various systems. The report reviewed the wearing of various personal fall protection systems, and the possible body stresses each system could place upon the wearer (Ref. 8). The information contained in these reports has been very helpful to OSHA in developing the proposed subpart D revisions, as well as the proposed additions to subpart I.

Around the time that OSHA withdrew the proposed subpart D revision, the Agency contracted with researchers at Texas Tech University and at the University of Michigan to study problems related to other hazards addressed in subpart D (Refs. 1, 2, 3), such as those associated with ladders and scaffolds. The results of these studies will be discussed elsewhere in the preamble where they relate to particular provisions of the proposal. Around this time, OSHA also began to develop more comprehensive injury data in order to determine the types and causes of injuries which occurred on walking and working surfaces (Refs. 7, 15, 16, 25, 43). In addition, OSHA requested the Bureau of Labor Statistics (BLS) to study lost time injuries associated with scaffolds and other working surfaces.

The Agency has determined, based on the BLS reports and other research reports (Refs. 13, 17, 18, 20, 26, 27, 34, 38), together with the information developed by OSHA, that the hazards associated with the use of walking and working surfaces constitute a significant risk to employees. OSHA has also determined that revisions to subpart D are necessary to reduce these risks, and that there is sufficient information upon which a protective and feasible standard can be based.

II. Agency Action

Hazards associated with walking and working surfaces are confronted by virtually all of the approximately 77.3 million employees working in industry classifications regulated by OSHA as "general industry," under 29 CFR part 1910. This employee estimate has been taken from the Bureau of Labor

Statistics (BLS) report, "Supplement to Employment and Earnings," July 1987 (Ref. 59).

Several studies have been performed for, or by, OSHA concerning the hazards confronted by employees on walking and working surfaces. These studies address the economic costs, human toll and causes of the accidents which occur on walking and working surfaces. OSHA presents a brief discussion of these studies to demonstrate the problems associated with walking and working surfaces, and the need for revisions to the existing subpart D standards.

In one study performed by BLS (Ref. 38), 938 employee injuries resulted from accidents on stairs alone. All of those injuries occurred during a four month period which ended in early 1982. This injury total was based on workers' compensation reports which BLS obtained from 24 states. OSHA expects that a proportionately higher injury figure would have been produced if all the states had been included in the study.

A BLS study, "1985 SDS Current Cases Involving Disability" (Ref. 60), indicates that, in 1985, nearly 200,000 injuries that involved one or more lost work days occurred in the 23 states participating in the survey, as the result of falls. Another BLS study, "Occupational Injuries and Illnesses in the United States by Industry, 1985," BLS Bulletin 2278, May 1987 (Ref. 19), indicated that falls accounted for nine percent of all deaths of employees in workplaces with 11 or more employees. According to BLS Bulletin 2278, these falls resulted in over 300 deaths per year in 1984 and 1985. OSHA expects that, as high as the reported fall-related toll may be, the actual number of deaths and injuries resulting from accidents occurring on walking and working surfaces would be higher if data from all workplaces were available.

Studies show that accidents involving walking and working surfaces impose large costs. BLS studies (Refs. 17, 18, 20, 60) indicate that falls account for more than 15 percent of all worker compensation cases. In addition, those fall-related injuries and deaths accounted for at least 20 percent of all worker compensation indemnity payments in the states that were studied (Ref. 18).

One study performed by OSHA (Ref. 16) investigated the causes of fatalities resulting from falls onto the same level on which the employee was walking or working. OSHA found that the major causes of those incidents included being knocked off balance or pushed to the

floor by some external force and slipping on the floor.

OSHA also performed studies concerning walking and working on scaffolds and other work surfaces in order to determine the nature and causes of employee injuries on these surfaces. These studies revealed the following:

1. Many employee injuries occurred because no fall protection system was used at the opening or edge of the work surfaces (roofs, ceilings, floors, catwalks and similar surfaces). In other cases, the floor surface itself was responsible for employee injuries because it was slippery (Refs. 15, 16, 20). The NBS statistical analyses of falls (Refs. 9, 10, 11) indicated that about 25 percent of work surface accidents were guardrail-related, with 87 percent of those involving falls to a different level. These NBS analyses further demonstrate the problems which arise when fall protection systems are misused or absent.

2. Studies addressing scaffolds indicated that more than half of the injuries to employees occurred while they were working on scaffolds. The employee activity with the next highest injury total was climbing between levels on the scaffold (Refs. 7, 13, 23).

BLS studied the specific walking or working surfaces (such as ladders and scaffolds) which have been involved in incidents. One such study concerning ladders (Ref. 34) indicates that in more than half of the incidents involving employee injury, the ladder being used either moved, slipped, fell or broke. The study also indicated that ladders were secured or braced in fewer than half of the incidents resulting in employee injury. Additionally, in more than half of these incidents, employees were carrying things in their hands at the time that they fell.

In summary, the information in the record, together with the studies performed by and for OSHA, clearly demonstrate that walking and working surfaces continue to pose significant risks of employee injury and death despite OSHA's initial promulgation of subpart D. In particular, OSHA notes that even after allowing for the reduction in reported employee injury and death in the studies conducted after OSHA promulgated and began to enforce its standards, compared to those studies conducted before OSHA, the risk of employee exposure to hazards associated with walking and working surfaces remains significant. OSHA believes that compliance with proposed subpart D would substantially reduce these risks.

Accordingly, OSHA proposes to revise subpart D so that it better addresses the dangers of slips, trips, and falls which occur on workplace walking and working surfaces. The proposal addresses the causal factors that appear to produce such accidents. For example, the proposal defines the term "slip-resistance", a term which has not been defined before.

Proposed subpart D also eliminates the perceived ambiguities and redundancies of existing subpart D, addresses areas not previously covered, and consolidates and simplifies many of the provisions contained in existing subpart D. OSHA believes that the proposed rule is both technologically and economically feasible. Based on the above-stated considerations, OSHA has determined that compliance with proposed subpart D will prevent substantially more injuries and fatalities than are prevented by compliance with existing subpart D.

III. Specific Issues for Comment

During the development of this proposed revision to subpart D, several issues surfaced. OSHA seeks further public comment on these issues:

1. *Request for additional accident data.* The Agency recognizes that, in some cases, the information collected by OSHA regarding walking and working surface hazards does not contain enough detail for OSHA to evaluate the circumstances of incidents. OSHA further recognizes that such information is necessary to determine how best to achieve the appropriate protection from workplace hazards. Only by clearly understanding the causes of accidents, can OSHA develop a rule which will prevent as many as possible of the estimated 132 fatalities occurring each year. For example, OSHA does not always know whether falls from roofs are the result of faulty equipment, workers with poor health (heart attacks, etc.), or improper use of the equipment. Such information is crucial to determining whether OSHA should focus on revising equipment specification, worker training, or non-compliance measures.

The current data contains much of the information required to make regulatory decisions. However, OSHA has not been able to determine from the data specifically which provisions in the rule will be the most effective at preventing accidents. OSHA desires that better data and information be collected to further refine the regulatory decisions reached in the NPRM. Specifically, OSHA requests that commenters submit information on the causes of walking and working surface accidents: (1) Was

the accident related to faulty or poorly-designed equipment? (2) did the employer/employee fail to use the proper safety equipment, such as guardrails or ladder safety devices? (3) did some unusual event contribute to the accident, such as a heart attack or poor weather conditions? The Agency would be particularly interested in receiving this information on slipping, tripping and falling incidents which occurred on walking and working surfaces.

With a better understanding of the causes of these accidents, OSHA will seek, in the regulatory impact analysis for the final rule, to determine the variations in cost-effectiveness of individual provisions. Significant variation in cost-effectiveness could mean that more intensive regulation in some areas (in those provisions where the rule is more cost-effective) and less intensive in other areas (in those provisions where the rule is less cost-effective) would increase the number of fatalities prevented and reduce the overall cost of the rule. Thus, OSHA also requests comment on the more general issue of how the rule's provisions can be modified to increase the overall cost-effectiveness of the final rule.

2. *Telecommunication.* OSHA has proposed to delete the telecommunications industry regulations for ladders (§ 1910.268(h)) except in the case of the requirements for ladder coatings and rolling ladders and proposes to replace them with coverage under proposed subpart D. Are there either provisions in proposed subpart D which should be modified or other provisions in § 1910.268 which should be retained in order to address the particular needs of telecommunication workers? To the extent that these proposed standards apply to ladders, step bolts and individual rung ladders used on telecommunication towers, how should such towers be regulated with respect to climbing clearances, ladder safety devices, the use of structural members as climbing surfaces, etc.? What would be the economic impact of such regulations? Which of the proposed provisions, if any, should be modified for application to such towers? Please provide information to support any suggested changes.

3. *Manway openings in pressure vessels.* There are no existing OSHA requirements for the minimum size of openings for manways. Proposed § 1910.22(a)(4) requires that manholes and manways which are built a year or more after the effective date of the final rule and which lead to confined spaces, such as non-pressurized tanks and atmospheric vessels, have a minimum

diameter of 24 inches (61 cm). How large are the manway openings in existing tanks and pressure vessels? Is the proposed 24-inch (61 cm) minimum width for new manways in pressure vessels appropriate? How much time should OSHA allow for employers to achieve compliance with the 24-inch (61 cm) minimum requirement? What are recommended sizes of manway openings in pressure vessels when taking into consideration the possible need for emergency rescue of injured employees? What would be the cost of requiring 24-inch (61 cm) or larger manway openings in new pressure vessels? Please submit information to support any suggestions.

4. *Walking or working on flowable material.* There have been fatalities involving employees who have stood or walked on seemingly stable surfaces of flowable material stored in the open, such as piled coal, that were bridged over voids. When the surface gave way, the employees fell into the voids. OSHA regulations do not address the hazards of working on flowable material stored in the open. Should OSHA set such regulations? What requirements, such as for work practices, administrative controls or personal protective equipment, should OSHA set for these work surfaces? How often have such incidents occurred? Please submit examples of any materials or circumstances that present similar hazards.

5. *Training of employees to inspect and use ladders that provide a working height of six feet (1.82 m) or more.* Proposed § 1910.23(b)(1) would require that employers train employees who use ladders with a working height of six feet (1.82 m) or more to inspect and use such ladders properly. It has been suggested by the American Ladder Institute that the hazard warnings and safe use instruction markings appearing on portable ladders which comply with the American National Standards Institute (ANSI) series of standards for portable ladders (ANSI A14.1, A14.2 and A14.5) provide portable ladder users with adequate information. OSHA believes that portable ladders already have labels on them and the employers will have no cost involved in providing the labels. Does the ANSI-specified labeling provide the necessary guidance? What additional information or training should be required? What would constitute proper training for employees who climb fixed ladders and are not "qualified climbers" as addressed in proposed § 1910.23(b)(5)? Please submit information on the number of employees who would need training, current

training efforts and the anticipated cost impact of the training requirements which would be imposed by the proposed rule.

OSHA requests comments on what height would be the appropriate threshold height for the training requirement. What should any such training include? How many employees would need to be trained? What would be the cost of the training? Should OSHA trigger training requirements at a minimum working height greater than six feet (1.82 m)? Please support any such suggested alternative threshold height with information on the need for such a threshold and on the anticipated impact of setting such a threshold.

6. *Articulated stairs.* The existing and proposed standards exclude coverage of articulated stairs (stairs that change pitch due to change in height at the point of attachment), such as may be installed on floating roof tanks or access facilities for mobile equipment. OSHA has been unable to locate any consensus standards or published industry practices addressing articulated stairs. If any such documents are available, OSHA requests that interested persons provide them for the record. Should OSHA have specific standards for articulated stairs, and if so, what should they be? What is the injury experience of employees who use articulated stairs? Please submit information on the costs and benefits of any such specific standards.

7. *Stair rails used as handrails.* Proposed § 1910.28(c)(2) (v) and (vi) allows stair rail systems to also serve as handrails. These provisions take into account the overlapping dimensional requirements in proposed § 1910.28 (c)(2) (i) and (ii) for handrails and in proposed § 1910.28 (c)(2) (iii) and (iv) for stair rails. OSHA believes that allowing combination of stair rails and handrails into a single system, even though the range is limited for new installations, will provide employers with adequate design flexibility. Does the range of 36 to 37 inches (91 to 94 cm) for new installations offer employers sufficient flexibility? What should the range be and why? Please submit comments on the above.

8. *Boatswains' chairs.* The existing and proposed requirements for boatswains' chairs (§§ 1910.28(j) and 1910.30(g), respectively) require that an employee riding a boatswains' chair wear a personal fall protection device which is connected to an anchorage by a lifeline that is separate from the line supporting the chair. Some systems which are currently in use provide two separate lines attached to two separate anchor points; however, both lines are

connected to a single attachment on the body support system. Would attaching both lines to a single body support defeat the purpose of requiring separate lines for chair support and for fall protection? A failure of this single body support mechanism, or body support system, could result in an uncontrolled fall for the employee. Should OSHA permit the use of such a system in which the lifeline and support line connect to a single mechanism or body support system? If so, what criteria should be used to ensure the reliability of the single mechanism or body support system to prevent failures? What economic impact would result if OSHA were to recognize such a system? What has been the injury experience with this type of system?

9. *Use of, and requirements for, suspension scaffolds and powered platforms.* Historically, there have been two national consensus standards covering suspended work surfaces. One standard, ANSI A10.8 (incorporated into OSHA Standards in 1971, in § 1910.28), applies to "suspended scaffolds," while the other ANSI A120.1, which was the original source for § 1910.66, applies to "powered platforms." OSHA regulates equipment under the powered platform standard when the equipment is designed and installed for use with a specific building (some refer to these as "permanently installed" or "permanently dedicated" to a building). OSHA regulates equipment under the suspended platform standard when the equipment is designed to be used with any building (some refer to these as "temporary scaffolds," "transportable scaffolds" or "rental scaffolds").

As noted below, the recently revised powered platform standard (54 FR 31408), July 28, 1989 contains a number of requirements which are not found in the suspended platform standards. Powered platforms are required to maintain continuous contact and pressure on the face of the building, and there must be positive attachment to the building by means such as T-rails, tracks or intermittent tie-ins when the building is over 130 feet (39.6m) high. On the other hand, while suspension scaffolds must be securely lashed to the building to prevent swaying, there are no requirements for continuous contact and pressure or for positive attachment to the face of the building during travel up and down the face of the building. Two-way communication is required on powered platforms, but not on suspended scaffolds. In addition, the OSHA powered platform standard addresses stabilization, safe access and egress, emergency planning, davit requirements, fire extinguishers,

inspections, and training, while the suspended scaffolds standard does not address those safeguards and precautions.

At the OSHA informal public hearing on the proposed rule for Powered Platforms for Exterior Building Maintenance held on February 19-21, 1986, several witnesses (Tr.2/20/86 pp. 19-22, 195, 329, 330) recommended that the powered platform requirements also apply to all suspended equipment used on new buildings after the effective date of the powered platform standard, and that OSHA should adopt a single standard which would apply to all scaffolds, whether "temporary" or "permanent." OSHA invites comments regarding these two recommendations. In addition, if these two recommendations were accepted, would it be appropriate for OSHA to apply the proposed rules for suspended scaffolds (temporary scaffolds) only to existing buildings?

Should requirements for two-way communication and continuous contact and pressure on the face of the building be added to the requirements in this proposed rule? Should other requirements, such as those mentioned above for powered platforms, be added to further ensure employee safety on suspended scaffolds? OSHA does not require that equipment (either permanent or temporary) be provided for building maintenance. Should OSHA consider such a requirement? Should OSHA maintain the distinction between powered platforms and suspended scaffolds? Please submit supporting information along with comments.

10. *Working height of suspension scaffolds.* Neither the existing nor the proposed scaffold requirements limit the height at which single-point adjustable suspension scaffolds and two-point suspension scaffolds (swinging scaffolds) may be used. Should OSHA limit the height at which suspension scaffolds may be used? If so, what should this height be, and why? What would be the impact of this restriction?

11. *Guardrails on the working side of suspension scaffolds.* The present and the proposed standards for scaffolds require guardrails on all "open sides and ends" of scaffold platforms. There has always been a question as to the application of this requirement to the working side (i.e., the side toward the structure) of suspension scaffolds. In particular, OSHA is considering the extent to which the working side of a suspension scaffold which keeps within some set distance (i.e., one foot (.3m)) of a structure would be considered to be "open". Should OSHA require guardrails

on the working side of suspension scaffolds? How does the presence of the guardrails affect the work activity? Are there work settings where the use of guardrails on the working side of a scaffold would be infeasible? If guardrails are needed, when should they be required, and what type should be used? What would be the estimated cost of installing such guardrails? What alternative means of protection can be used effectively in place of guardrails?

12. *Increasing the number of allowed climbs per year per ladder for qualified climbers.* The qualified climber concept is being introduced in this proposal. A qualified climber is a properly trained and physically capable employee who has climbing duties as part of his or her routine work activity. OSHA proposes to exempt from the ladder safety device, wells or cage requirements, all fixed ladders that are climbed no more than twice a year and are climbed only by qualified climbers. The outdoor advertising industry has asked that OSHA allow as many as 12 climbs per year on fixed ladders on billboards which are climbed by qualified climbers without ladder safety devices, wells or cages. Should OSHA increase the permissible number of climbs per ladder by all qualified climbers, and if so, what should be the frequency? What injury experience is available for supporting an increase in the allowable climbs from two to twelve per year? What would be the cost savings for increasing the number of allowable climbs from the two to twelve climbs per ladder per year? OSHA is proposing two climbs per year for each ladder, but is considering a maximum of twelve climbs per year based on information presented to the record. Please provide information and data to support any comments or suggestions.

13. *Special surfaces not specifically addressed.* Proposed § 1910.32, *Special surfaces*, exempts specific work locations such as repair and assembly pits, slaughtering facilities, loading racks, loading docks and teeming tables from perimeter guarding requirements of proposed § 1910.27(b), where guardrails would prevent employees from doing their work provided other criterion is followed. OSHA notes that there may be similar workplaces which are not specifically addressed by this proposal. The Agency seeks to ensure that any such similar operations are regulated under proposed § 1910.32(b). OSHA solicits information on any such work activities that should be regulated as "special surfaces".

14. *Use of performance language.* In some of the existing provisions and in

some of the proposed provisions, OSHA uses specific numerical limits to define and clarify the duties set forth. For example, existing § 1910.28(a)(4) and proposed § 1910.30(c)(3) require that scaffold components have a factor of safety of at least 4:1. Another example is proposed § 1910.31(d)(2) which restricts the maximum work surface height of mobile ladder stand to four times the least base dimension without additional support. In addition, some of the existing provisions specify the type of materials which employers could use. The proposed rule on the other hand emphasizes the strength and other characteristics of the material used, not the type.

These and other limits, which are based on existing consensus standards, are used in lieu of either more performance-oriented language (such as "scaffold components shall be strong enough to properly support the loads imposed on them") or language which requires a numerical limit but then allows other configurations which give "equivalent" protection. OSHA notes that requiring specific numerical limits in the rule and allowing the employer to use other limits which the employer can show will provide "equivalent" protection may both provide guidance and permit some flexibility. OSHA believes that, in some cases, it is necessary to set specific numerical requirements (such as those for minimum guardrail heights and platform widths) in order to provide clear notice to employers as to what constitutes compliance with a provision. On the other hand, OSHA recognizes that, in some circumstances, specification language increases costs without increasing safety, discourages technical innovation, prevents the use of safe alternatives, and fails to take into account varying workplace situations.

OSHA solicits public comment on the extent to which the proposed use of numerical limits is appropriate. Should OSHA move some or all of the specification language to a non-mandatory appendix which could simply provide guidance to employers. Commenters who maintain that the use of specification language is inappropriate, should submit information to support their positions and should suggest language which provides clear notice of what is required and which allows employers flexibility in setting their compliance strategies. OSHA requests that commenters who believe that the proposed use of specification language is appropriate also provide supporting information as well as input on the extent to which the

proposed language would abate the pertinent hazards. Comments should include applicable cost and injury data.

15. *Crane or derrick suspended personnel platforms.* On August 2, 1988, OSHA amended its Construction Standards for Cranes and Derricks (52 FR 29116), 29 CFR 1926.555, by adding a new paragraph (g) to prohibit the use of cranes or derricks to hoist personnel except in the situation where no safe alternative is possible, in which case the requirements for such hoisting set out in paragraph (g) would apply. OSHA initiated this rulemaking to establish clearly the conditions under which employees on personnel platforms may be hoisted by cranes or derricks, and to ensure that this information is readily available to employers. On November 29, 1988, OSHA proposed to revise the shipyard employment safety standards addressing scaffolds (53 FR 48182), requesting public input (Issue 27) regarding the appropriateness of replacing the existing shipyard provisions for personnel hoisting with those which have been adopted for construction. Should OSHA also apply the Construction Industry standard for crane or derrick suspended personnel platforms to General Industry? If OSHA was to propose the adoption of that standard in part 1910, should it be located in subpart D, subpart N—"Materials Handling and Storage" or in some other subpart? Please submit information regarding the need for such a standard, accident and injury data related to the use or lack of use of crane or derrick suspended personnel platforms, and the cost associated with the training of affected employees and the provision of equipment which could comply with the pertinent standard.

16. *Training requirements.* OSHA has proposed training requirements for employees using ladders (proposed §§ 1910.23(b)(1) and 1910.132) and mobile elevating work platforms, mobile ladder stands and powered industrial fork lift truck platforms (proposed § 1910.31(b)(4)). In both cases, the Agency believes that an explicit training requirement is necessary to ensure that affected employees know how to work safely and how to determine if the equipment in question is safe for use.

There are several provisions (such as proposed § 1910.25, Stairs, and § 1910.30, Scaffolds) in which OSHA has not explicitly proposed training requirements because the Agency believes that compliance with the pertinent requirements for proper design, construction, use and maintenance of equipment would lead employers to train their employees

appropriately. Should OSHA set more specific training requirements, either in particular sections or as a general requirement in subpart D? Should OSHA modify or delete any proposed training requirements? Comments should be accompanied by supporting information, including descriptions of any training programs which have been used to cover work activities regulated under subpart D.

IV. Summary and Explanation of Proposed Revision.

Format. Because of OSHA's proposed revisions to these standards, it is necessary to reformat the entire subpart. OSHA's proposed format changes are set forth in the Redesignation Table following:

REDESIGNATION TABLE

Existing	Proposed
§ 1910.21 Definitions.....	§ 1910.21 Scope, application, and definitions.
§ 1910.22 General requirements.	§ 1910.22 General requirements.
§ 1910.23 Guarding floor and wall openings.	§ 1910.23 Ladders.
§ 1910.24 Fixed industrial stairs.	§ 1910.24 Step bolts and manhole steps.
§ 1910.25 Portable wood ladders.	§ 1910.25 Stairs.
§ 1910.26 Portable metal ladders.	§ 1910.26 Ramps and bridging devices.
§ 1910.27 Fixed ladders.	§ 1910.27 Work surfaces.
§ 1910.28 Safety requirements for scaffolds.	§ 1910.28 Fall protection systems.
§ 1910.29 Manually propelled mobile ladder stands and scaffolds (towers).	§ 1910.29 Wall openings.
§ 1910.30 Other working surfaces.	§ 1910.30 Scaffolds.
§ 1910.31 Sources of standards.	§ 1910.31 Mobile ladder stands and powered industrial platforms.
§ 1910.32 Standards organizations.	§ 1910.32 Special surfaces.

As mentioned in the Summary, the revisions to subpart D and subpart I are being proposed concurrently. Proposed subpart D requires the use of personal fall protection equipment under certain circumstances, while proposed subpart I contains the performance criteria which personal fall protection equipment must meet in order to protect employees. OSHA notes that wherever proposed subpart D makes specific reference to the requirements in subpart I, the reference is to the pertinent provisions in proposed subpart I (which accompanies this proposal), and not to the existing subpart I requirements.

Section 1910.21 Scope, Application, and Definitions

OSHA proposes to revise existing § 1910.21, which currently contains definitions for certain terms used in subpart D. Those definitions are divided into paragraphs that correspond to the existing sections of subpart D. Because of subject matter overlapping between the existing sections, some definitions appear in more than one paragraph. OSHA has determined that a single set of definitions applicable to all of subpart D will simplify reference to the definitions and eliminate redundancy. These definitions will be included as part of revised § 1910.21.

OSHA proposes a new § 1910.21 that will contain a general scope and application statement, which states clearly that subpart D covers all walking and working surfaces used by employees, except where specifically provided otherwise, and definitions for certain terms used in the subpart. OSHA exempts coverage of fall hazards from the exposed perimeters of entertainment stages and rail station platform because the presence of fall protection, such as a guardrail system, would interface with its operation. Should OSHA exclude other walking and working surfaces? Please identify these additional walking and working surfaces and explain why they should be excluded from coverage.

OSHA is proposing three exceptions to the application of subpart D. First, in proposed § 1910.21(a)(1), OSHA exempts surfaces that are an integral part of self-propelled, motorized mobile equipment from the scope of this subpart. The Agency, however, has proposed to cover platforms hoisted or lifted by powered industrial lift trucks, through regulations in proposed § 1910.31(e) because OSHA believes that workers on such platforms are exposed to significant safety hazards. The existing general industry standards contain no requirements for safe operation of powered industrial lift trucks. Examples of exempted surfaces include ladders or steps used for access to integral machinery parts, and platforms used to reach periodic maintenance points or areas. Employee exposure to these types of surfaces is usually brief and sporadic. This proposal will not affect the existing regulations for these surfaces found elsewhere in the General Industry Standards.

Second, in proposed § 1910.21(a)(2), OSHA exempts powered platforms used for exterior building maintenance from the application of subpart D, insofar as this type of equipment is covered by specific standards in subpart F of part

1910. A final rule revising subpart F was published in the *Federal Register* on July 28, 1989 (54 FR 31408).

Third, in proposed § 1910.21(a)(3), OSHA excepts the exposed perimeters of certain types of surfaces from the proposed guardrail requirements. OSHA believes that there are circumstances, such as where employees are working on stages or subway platforms, where the use of guardrails would be inappropriate because such use would unreasonably interfere with work operations, or would create a greater hazard than would otherwise be present. Other specific situations are addressed in proposed § 1910.32. OSHA solicits comments accompanied by supporting information on the proposed exceptions. OSHA also directs attention to proposed § 1910.32, where the Agency sets requirements which take into account the difficulties that employers whose workplaces contain "special surfaces" would face if they were required to comply with the fall protection provisions of proposed § 1910.28.

Proposed paragraph (b), which contains definitions for certain terms used in subpart D, includes many that appear in existing § 1910.21, eliminates those definitions that OSHA believes are no longer needed, clarifies the meaning and intent of some existing definitions, and defines certain terms that have not previously been defined. These terms will be addressed where appropriate in the Summary and Explanation.

Section 1910.22 General Requirements

OSHA proposes to revoke the existing requirements contained in § 1910.22, and to propose new requirements that address surface hazards in a performance-oriented manner. The existing requirements in § 1910.22 address the scope of subpart D—housekeeping, aisles and passageways, covers and guardrails, and floor loading protection. Where language of the existing standards appropriately addresses surface hazards, OSHA proposes to use that language, with editorial corrections as necessary. For example, existing § 1910.22(a)(3) addresses the hazards of "protruding nails, splinters, holes, and base boards" under "Housekeeping." OSHA believes that such puncture or laceration hazards are more appropriately addressed as general surface conditions. In proposed paragraph (a)(1), therefore, OSHA would require that all surfaces be designed, constructed and maintained free of hazards that can cause injury or death to employees.

Proposed paragraph (a)(2) is a performance-oriented provision which requires the employer to implement appropriate alternative protective measures when surfaces cannot be maintained free of hazards. Such alternatives may include personal protective equipment, or even something as simple as the use of salt on icy walkways.

Proposed paragraph (a)(3) provides for a minimum 18 inch (45.7 cm) clearance for employee passage around obstacles in the workplace. This dimension is consistent with the minimum width of scaffolds that is proposed in § 1910.30(c)(7) and ANSI A10.8-1988 and will establish uniformity throughout the proposal.

Proposed paragraph (a)(4) establishes a minimum size access opening for manways and manholes built on or after (insert date one year after the effective date of the final rule in the *Federal Register*). This proposal is based on the American Society for Testing and Materials (ASTM) C 478-85a, *Standard Specification for Precast Reinforced Concrete Manhole Sections* (Ref. 44), which requires a minimum access opening of 24 inches (61 cm) in diameter for manholes. OSHA believes that a requirement for a minimum size access opening is necessary for new installations to facilitate safe passage, and for the rescue and extraction of injured employees. Existing manways and manholes would not be subject to the proposed requirement. The one year deferral of the effective date will allow for changing designs and retooling that may be necessary to come into compliance with this new requirement.

Proposed paragraph (b) of § 1910.22 addresses OSHA's concern that overloading of walking and working surfaces must be prevented in order to avoid imposing stresses which could result in collapse. Existing § 1910.22(d)(2) makes it "unlawful" for a floor or roof to be overloaded. Proposed paragraph (b)(1) requires employers to design, construct and maintain all surfaces so that they can support the maximum intended loads, and prohibits overloading of those surfaces. Existing paragraph (d)(1) of § 1910.22 requires that employers mark the pertinent floor loading limits on plates, affix and maintain those in conspicuous places in the spaces to which they relate. Proposed paragraph (b)(2) simply requires employers to ensure that affected employees know the maximum intended loads for the storage or warehousing areas where they work, leaving the choice of compliance approach to the employer. Also, existing

paragraph (d)(1) requires that plates showing load limits be placed in all structures used for mercantile, business, industrial or storage purposes. Proposed paragraph (b)(2) provides that only employees who work in storage or warehousing operations need to know the maximum intended load for the area where they work. OSHA proposes to delete the information requirement for areas not used for storage or warehousing because OSHA believes the requirement serves no purpose.

Proposed paragraph (b)(1) does not require any safety factor in the strength of the surface. Proposed § 1910.25(b)(4) requires that stairs shall be capable of supporting at least five times their maximum intended load, and proposed § 1910.30(c)(3) requires that scaffolds shall support its own weight and at least four times the maximum intended load. These safety factors were taken from national consensus standards. Should OSHA require a general safety factor? What safety factor should OSHA use? Please submit data supporting your comments on the above questions.

OSHA has proposed two new provisions for inclusion in § 1910.22. First, in proposed paragraph (c), employers are required to provide employees with a safe means of moving from one surface to another. Existing paragraph (b)(1) already addresses this concern indirectly, but OSHA has determined that the existing language does not cover all of the pertinent walking and working surfaces. Therefore, the Agency has proposed paragraph (c) to close any possible gaps in coverage.

Second, proposed paragraph (d) sets requirements for the inspection, maintenance and repair of walking and working surfaces. Proposed paragraph (d)(1) requires employers to ensure, through regular and periodic inspection and maintenance, that walking and working surfaces are safe. Proposed paragraph (d)(2) requires employers to ensure that all hazardous conditions which are discovered are corrected, repaired or temporarily guarded so that employees are not endangered. Proposed paragraph (d)(3) requires that only "qualified persons," as defined in this standard, shall be permitted to inspect, maintain, or repair walking and working surfaces except for the incidental cleanups of non-toxic materials. OSHA is proposing these requirements, which do not appear in existing § 1910.22, in order to state clearly that employers must inspect, repair and maintain their walking and working surfaces as necessary for employee safety, and that the original

design capabilities must be maintained. OSHA anticipates that employers will schedule and conduct the inspection and maintenance of walking and working surfaces according to manufacturers recommendations where applicable or in accordance with reasonable practice given the conditions and frequency of use.

Section 1910.23 Ladders

OSHA's proposed changes in § 1910.23 involve a consolidation and revision of the existing standards in § 1910.25, *Portable wood ladders*; § 1910.26, *Portable metal ladders*; and § 1910.27, *Fixed ladders*. Many of the existing standards for portable and fixed ladders are redundant or address similar hazards with different requirements. For example, the various ladder standards all address rung spacing. However, the permitted spacing varies depending upon the type of ladder addressed. The same is true for the specifications for ladder heights and rung widths.

Paragraph (a) contains the scope and application of proposed § 1910.23. This section is proposed to cover all ladders used in General Industry, except as specifically provided. In proposed paragraph (a)(1)(i), OSHA exempts ladders which are used only for fire fighting or rescue operations. OSHA is proposing this exemption because such ladders are used only in emergency situations. The Agency notes that the primary concern expressed in the design of some of those ladders, such as the single-rail ladders, is for fast placement and access. By contrast, proposed § 1910.23 focuses on the need to protect employees who use ladders routinely, in non-emergency situations. Therefore, given the circumstances in which fire fighting and rescue operations are conducted, OSHA believes that it would be inappropriate to regulate fire fighting and rescue ladders under proposed § 1910.23. When employees are members of a company fire brigade, they must be trained as required by § 1910.156 in the use of such ladders.

OSHA is also exempting ladders forming an integral part of machinery. These ladders will be covered in the future by the specific requirements for the pertinent machinery in other subparts. However, there has been some concern that ladders forming integral parts of machinery should be covered by proposed § 1910.23. Do existing ladders that form integral parts of machinery meet the proposed ladder regulations or any other regulations? Should OSHA regulate these ladders in this section? Should OSHA exempt existing ladders

forming integral parts of machinery and only cover new ladders? How long of a lead time would industry need to have new ladders come into compliance with the proposed requirements? What would be the cost of compliance? What accident data is available concerning these types of ladders? Please provide information and data to support any comments or suggestions.

In paragraph (a)(2), OSHA proposes to exempt employers with fixed ladder installations which are climbed two or fewer times a year from the proposed fall protection requirements, provided that the ladders are used only by "qualified climbers." OSHA notes that many fixed ladders used in general industry are not equipped with cages, wells or ladder safety devices, and that, therefore, those ladders would not comply with existing § 1910.27. However, OSHA recognizes that requiring employers to install and maintain ladder safety devices, cages or wells on fixed ladders climbed two or fewer times a year would impose significant costs on employers for fall protection systems that would seldom be used, and that the employees installing and maintaining this equipment would be exposed to fall hazards. Indeed, OSHA believes that the amount of time employees would spend installing, inspecting and maintaining fall protection on fixed ladders could substantially exceed the amount of time that "qualified climbers" would be spending to climb the ladders. Therefore, as an alternative, OSHA believes it appropriate to allow "qualified climbers," as defined by OSHA, to climb these ladders without fall protection under certain conditions. First, the employer would have to certify that the employee is a "qualified climber," as provided in § 1910.32(b)(5) of this proposal. Second, once the qualified climber reaches a work station, the employer would be required to provide appropriate fall protection. OSHA believes that compliance with the proposed qualified climber provisions will provide the appropriate protection from fall hazards. The Agency solicits comments and information on these provisions. OSHA has been asked to increase the maximum allowable number of climbs per fixed ladder to twelve per year to come under this proposed exemption. Please see Issue 11 for this discussion.

Proposed paragraph (b) contains general requirements that apply to all ladders. The proposed paragraph consolidates the provisions of existing standards for portable wood ladders (§ 1910.25), portable metal ladders

(§ 1910.26) and fixed ladders (§ 1910.27). Only those provisions which do not appear in the existing standards are discussed below.

Proposed paragraph (b)(1) requires that employers train employees who work on ladders at a working height of six feet (1.82 m) or more to inspect and use ladders properly. OSHA believes that the consequences of a fall from a height of six feet (1.82 m) or more are sufficiently serious to justify this requirement. The Agency requests comments and information regarding the choice of six feet (1.82 m).

Proposed paragraph (b)(8) requires that ladders placed in any location where they could be displaced by other activities or traffic shall be secured or barricaded such as through the use of traffic cones used at the base of the ladders.

Proposed paragraph (b)(13) exempts emergency escape ladders from the proposed fall protection requirements. Emergency escape ladders would have to comply with all other requirements of proposed subpart D. OSHA proposes this exemption because of the unique application of emergency escape ladders. OSHA believes that since such ladders are intended for rapid escape, the installation and use of fall prevention systems, such as ladder safety devices or off-set platforms, would hinder the rapid movement of employees during an emergency escape.

Proposed paragraph (c) contains requirements for the design, construction, maintenance, and inspection of ladders. Proposed paragraphs (c)(1) through (c)(5) contain requirements for the loading of portable ladders. Existing paragraph § 1910.26(c)(3)(ii) requires portable metal ladders to be designed as "a one-person working ladder based upon a 200 pound (90.6 kg) load." This requirement came from the 1956 edition of ANSI A14.2, *Portable Metal Ladders*, that based the test criteria on a 200 pound (90.6 kg) working load and a safety factor of four. The 1982 edition of ANSI A14.2, section 8.2.1.2, has retained use of the safety factor of four, but has changed the maximum working load from 200 pounds (90.6 kg) to a range of 200 to 300 pounds (90.6 to 136.2 kg).

Taken together, proposed paragraphs (c)(1)(i), (c)(1)(ii), (c)(4) and (c)(5) require that portable ladders be designed to support, without ultimate failure, a load equal to four times the maximum intended load (but not less than four times a 200 pound [90.6 kg] load) when the ladder is in its climbing position. Compliance with this provision would ensure that heavier employees wearing

tool belts with heavy tools, as well as lighter employees, receive the necessary protection.

Proposed paragraph (c)(2) allows, as an alternative to complying with proposed paragraph (c)(1), ladders to be designed in accordance with the current applicable A14 series ANSI code (Ref. 45-48). Since almost all manufactured portable ladders are already made and tested to meet the pertinent ANSI standard, and labeled as such, there would not be a significant burden on manufacturers or employers.

Proposed paragraph (c)(3) is a new requirement that will require combination ladders to be designed to meet the criteria for stepladders when in the stepladder position, and the criteria for extension ladders when in the extension ladder position. This is consistent with the ANSI standard, and will provide protection equivalent to that required for single purpose ladders.

Proposed paragraph (c)(4) establishes the minimum design load of portable ladders. This was taken from existing § 1910.26(c)(3)(ii).

Proposed paragraph (c)(5) requires that the combined weight of an employee and any tools and supplies on a portable ladder shall not exceed the maximum intended load of the ladder. This paragraph is based in part on proposed § 1926.1053(b)(3), which would apply to the use of ladders in construction.

Proposed paragraph (c)(6) requires that fixed ladders be capable of supporting at least two loads of at least 250 pounds (113.3 kg), concentrated between any two consecutive attachments. The proposed language would replace existing § 1910.27(a)(1), which sets specific design considerations for fixed ladders, including the minimum design load and its application. The major change in the proposed requirement is OSHA's intent to raise the design load from 200 pounds (90.6 kg) to 250 pounds (113.3 kg). Existing § 1910.27(a)(1)(i) requires that the minimum design live load shall be a concentrated load of 200 pounds (90.6 kg). OSHA believes that 250 pounds (113.2 kg) is a more representative weight for an employee wearing a tool belt. OSHA also believes that virtually all existing fixed ladders would comply with the 250 pound (113.2 kg) requirement so that the number of employers that would need to replace their fixed ladders to comply would be insignificant. The Agency notes that the 250 pound (113.3 kg) figure is consistent with ANSI A14.3-1984, *Fixed Ladders*.

The Agency believes that it is unnecessary to set minimum diameters

for rungs that satisfy the general requirements for surface conditions in proposed § 1910.22(a) and the performance criteria in proposed paragraph (c)(8). Therefore, OSHA proposes to delete existing § 1910.27(b)(1)(i), which specifies minimum rung diameters. Rungs which satisfied the performance-oriented design criteria in proposed paragraph (c)(6) could vary in diameter. OSHA anticipates that ladders which comply with the existing standard would meet the proposed language.

Proposed paragraph (c)(7) requires that ladder rungs and steps be parallel, level and uniformly spaced when the ladder is in position for use. The proposed provision, which is based on existing § 1910.25(c)(2)(i)(B) (portable wood ladders), would apply to all ladders.

Proposed paragraph (c)(8) requires that ladder steps and rungs be spaced between six and 12 inches (15 and 31 cm), as measured along the ladder side rails. The existing standards for portable wood ladders (§ 1910.25(c)(2)(i)(b)) and fixed ladders (§ 1910.27(b)(1)(ii)) set a 12-inch (31 cm) maximum spacing but do not set minimum spacing. On the other hand, the existing standard for portable metal ladders specifies 12-inch (31 cm) spacing. Based on its evaluation of the studies in the record, OSHA has determined that it is appropriate to set 12 inches (31 cm) as the maximum spacing for all ladders and to set 6 inches (15 cm) as the minimum spacing. OSHA believes that spacing of less than 6 inches (15 cm), though currently permitted technically for portable wood ladders and fixed ladders, is unsafe, because it does not sufficiently allow for free movement of feet from rung to rung. The Agency anticipates that few ladders would have to be replaced to comply with proposed paragraph (c)(8). OSHA has worked with the University of Michigan, and with Texas Tech University (Ref. 1, 3), to develop an ergonomic basis for regulating ladder step spacing. As a result of that work, OSHA has determined that, as long as steps are uniformly spaced, ladders with step spacing within the proposed range will allow for safe passage by employees. OSHA notes that all ladders which comply with existing § 1910.26(a)(1)(iii) and that most, if not all, ladders which comply with existing §§ 1910.25(c)(2)(i)(b) and 1910.27(b)(1)(ii) would also satisfy the proposed requirement. Additionally, the Agency believes that proposed paragraph (c)(8) provides clear guidance to employees who may have the capacity and the

need, as workplace conditions require, to change the spacing of their ladder steps and rungs.

OSHA proposes to eliminate the length limits for portable wood ladders, which appear in existing § 1910.25(c)(2), (c)(3), (c)(4), and (c)(5). The Agency has focused, instead, on setting performance-oriented provisions which will ensure that ladders, whatever the length, are safe to use.

Proposed paragraph (c)(9) sets minimum widths for ladder steps and rungs, retaining the existing requirements for the different kinds of ladders covered by subpart D. Thus, proposed paragraph (c)(9)(i) sets minimum widths of 16 inches (40.6 cm) for individual rung and fixed ladders (existing § 1910.27(b)(1)(iii)), 12 inches (30.5 cm) for portable metal ladders and reinforced plastic ladders (existing § 1910.26(a)(2)(i)), and 11½ inches (29.2 cm) for portable wood ladders (existing § 1910.25(c)(2)(i)(c)). OSHA solicits comment on the need to retain separate width requirements for the different kinds of ladders. Please submit supporting data and information along with any suggestions for change.

Proposed paragraph (c)(9)(ii) addresses ladders, such as those used by fruit pickers and window washers, which taper so that the width of the last few rungs is less than required under proposed paragraph (c)(9)(i). OSHA proposes to exempt such ladders from the minimum width requirements, insofar as steps or rungs on which employees would not stand are concerned. The Agency notes that all rungs on which employees may stand must comply with the proposed minimum width requirements.

Proposed paragraph (c)(10), a new provision, regulates the coating of wood ladders. This paragraph would require that wood ladders not be coated with any opaque covering, except for identification or warning labels which may be placed on one face only of a side rail. OSHA anticipates that compliance with this proposed provision would ensure that wood ladder defects are not concealed by coatings.

Proposed paragraph (c)(11), which requires employers to protect metal ladders from corrosion, is based, in part, on the existing § 1910.27(b)(7) requirements for fixed metal ladders. It is also based, in part, on the existing § 1910.26(c)(2)(iv) requirements for portable metal ladders. The proposed provision clarifies and consolidates the existing provisions.

Proposed paragraph (c)(12) restates existing § 1910.27(c)(4), without substantive changes in the wording.

Proposed paragraph (c)(13) restates the existing § 1910.27(c)(1) requirement that the minimum perpendicular clearance between the center line of fixed ladder rungs or steps and any obstruction on the climbing side shall be 30 inches (76 cm). This provision is consistent with ANSI A14.3-1984, section 5.4.1.1. In addition, the proposed paragraph provides that the minimum perpendicular distance may be reduced to 24 inches (61 cm) when an unavoidable obstruction is present, as long as a deflection device is installed to guide employees around the obstruction. This change is based on ANSI A14.3-1984, section 5.4.1.3 and, also reflects OSHA's awareness that there may be circumstances where compliance with the 30-inch (76 cm) requirement would be infeasible.

Proposed paragraph (c)(14) requires that fixed ladders be equipped with ladder safety devices, cages or wells, when the length of the fixed ladders exceeds 24 feet (7.3 m) or when the top of the ladder is more than 24 feet (7.3 m) above lower levels. OSHA notes that existing §§ 1910.27(d)(1)(ii) and 1910.27(d)(5) set a 20-foot (6.1 m) threshold for provision of fall protection. The Agency proposes raising the threshold to 24 feet (7.3 m) so that employees may climb without fall protection to the roof of a two story building that has a parapet. OSHA believes that the four-foot (1.2 m) increase, which is consistent with ANSI 14.3-1984, sections 4.1.1 and 4.1.2, and with proposed §§ 1915.86(a)(19), 1915.86(a)(20), 1926.1053(a)(20), and 1926.1053(a)(21), would not reduce employee protection. This provision reflects the Agency belief, based on the ANSI standard and its review of the record, that employees can safely climb a fixed ladder for up to 24 feet (7.3 m) above a lower level without relying on a cage, well or ladder safety device as long as the ladder complies with § 1910.23 and the other pertinent provisions of proposed subpart D. The Agency also agrees with the ANSI A14.3 Committee that employees other than "qualified climbers" who climb more than 24 feet (7.3 m) on a fixed ladder need the protection provided by ladder safety devices, cages or wells.

Questions have arisen regarding the effectiveness of cages and wells in protecting employees. The Agency solicits comments, supported by information and data, regarding the extent to which reliance on cages or wells either protects or endangers employees.

Proposed paragraph (c)(15) requires that cages and wells be designed so that

they permit easy access and egress, provide continuous coverage for length of ladder (except at access, egress and other transfer points), contain employees who fall, and direct falling employees to a lower landing.

The current OSHA Standards, in § 1910.27(d), provide very detailed specifications for the construction of cages and wells. In addition, these specifications are included in OSHA's proposals for the construction (§ 1926.1053(a)(22)) and Shipyard (§ 1915.86(a)(22)) industries, as well as in ANSI A14.3-1984. However, OSHA has eliminated these specifications in this proposal in favor of performance requirements which address the necessary characteristics for providing proper cages and wells. OSHA believes that the existing specifications are too design restrictive, and that the use of performance language will allow employers the flexibility to install cages and wells which fit a particular situation, without compromising employee protection.

Under the terms of proposed paragraph (c)(16), the length of continuous climb for a fixed ladder equipped only with a cage or well shall not exceed 50 feet (15.2 m) and the length of a continuous climb for a fixed ladder equipped with a ladder safety device shall not exceed 150 feet (45.7 m). Existing § 1910.27(d)(1)(ii) requires, in general, that cages or wells be provided on fixed ladders of more than 20 feet (6.1 m) to a maximum unbroken length of 30 feet (9.1 m). That language was adopted from ANSI A14.3-1956 when OSHA promulgated safety standards under section (6)(a) of the Act. OSHA has decided to increase the permissible length of continuous climb and to revise the fall protection provisions for fixed ladders in order to reflect ANSI A14.3-1984, sections 4.1.3, 4.1.4 and 4.1.4.1. The proposed provision is also consistent with the proposed shipyard (§ 1915.86(a)(20)) and construction (§ 1926.1053(a)(21)) standards. Proposed paragraph (c)(16) permits fixed ladders equipped with ladder safety devices to exceed 50 feet (15.2 m) in continuous length, based on ANSI A14.3-1984 and OSHA's belief that the proper use of ladder safety devices will enable employees to climb safely at levels where it would not be safe to rely on cages or wells. OSHA solicits comments accompanied by supporting information and data, on the proposed increases in the allowed climbing distances.

Proposed paragraph (c)(17) requires that fixed ladders with continuous lengths of climb greater than 150 feet (45.7 m) be provided with rest platforms

at least every 150 feet (45.7 m). OSHA believes that compliance with this provision, which is based on ANSI A14.3-1984, section 4.1.4.2, will ensure that employees have a safe place to rest while climbing ladders that are over 150 feet (45.7 m) in length. The Agency solicits comments, with supporting information and data, on the proposed platform requirement.

Proposed paragraph (c)(18) would require that when two or more ladders are used to reach a work area, except when portable ladders are used to access fixed ladders, the ladders be offset, with a landing platform between the two ladders. This provision is virtually identical to a requirement in existing § 1910.27(d)(2). While the existing provision covers only fixed ladders, the proposal would apply the requirement to all multiple ladder situations, except where portable ladders are used to access fixed ladders. OSHA believes that the exception is appropriate because the installation and maintenance of a landing platform at the point where a portable ladder would reach a fixed ladder would expose employees to a greater fall hazard than that which would be prevented by the platform. In addition, OSHA notes that, in the absence of clearly applicable OSHA regulations, the outdoor advertising industry has, apparently, provided safe access to fixed ladders without installing landing platforms between the fixed and portable ladders.

Proposed paragraphs (c)(19) through (c)(21) simply restate existing requirements.

Proposed paragraph (c)(22), which is based on existing § 1910.26(c)(3)(viii) and proposed § 1926.1053(b)(12), requires ladders that might contact uninsulated energized electrical equipment to have nonconductive siderails. While existing § 1910.26(c)(3)(iii) covers only portable metal ladders, OSHA applies proposed paragraph (c)(22) to all regulated ladders, because the Agency believes that employees should be protected from electrocution with whatever type of ladder they are using. Through a separate rulemaking (54 FR 5012, January 31, 1989), OSHA has proposed § 1910.269(h)(3), which would allow the use of conductive ladders in specialized high-voltage work where the employer can demonstrate that nonconductive ladders would present a greater hazard than conductive ladders. When the above proposal becomes final, it will be listed as an exception to proposed paragraph (c)(22).

Proposed paragraph (c)(23) requires that, except for fixed ladders used in

conical sections of manholes, all ladders, have a pitch of 90 degrees or less from the horizontal. This will replace existing § 1910.27(e) which contains specific requirements and limitations for the pitch of ladders. OSHA believes existing requirements concerning the classification of substandard pitches and the lower limit of 60 degrees from the horizontal are not necessary because proposed § 1910.23(b)(1) requires employers to ensure that employees receive the necessary training and use the ladders properly and proposed § 1910.23(b)(2) requires that ladders shall be used only for their designed purposes. If a ladder is designed to be used at a pitch of less than 60 degrees from the horizontal it would be required under proposed paragraphs (c)(1) through (c)(6), to be of sufficient strength to support the intended load.

Proposed paragraph (c)(24) is a revision of existing § 1910.27(c)(6). The minimum distance has been eliminated because OSHA does not believe that there is a hazard if the top step or rung of a fixed ladder touches the nearest edge of a structure, building or equipment provided the upper surface of the top step or rung is either at the same level or above the adjacent surface. In the event the adjacent surface is above the upper surface of the top steps or rung, proposed paragraph (c)(12) provides for a minimum toe clearance.

Proposed paragraph (c)(25) revises existing § 1910.26(c)(3)(vi) and is the same as ANSI A14.2-1962, section 8.3.11. OSHA proposes to eliminate the regulatory language which distinguishes between means of connecting ladder sections because the Agency believes that proper design is the critical factor in determining if ladder sections can be connected safely.

Proposed paragraph (c)(26) retains the requirements for metal spreaders or locking devices on stepladders in existing § 1910.25(c)(2)(i)(f) and 1910.26(a)(3)(viii), and adds a requirement that combination ladders used as stepladders must be equipped with metal spreaders or locking devices.

Section 1910.24 Step Bolts and Manhole Steps

OSHA proposes to address step bolts and manhole steps in § 1910.24. These two types of climbing devices are limited to certain types of installations, but they are heavily used in these installations, particularly in the telecommunication and public utility industries. Specific requirements for step bolts and manhole steps are currently contained in § 1910.268.

paragraph (h). However, these requirements are limited to climbing devices used in telecommunication centers and field installations. The purpose of OSHA's proposed requirements in § 1910.24 is to provide coverage of step bolts and manhole steps in locations other than those covered by § 1910.268.

OSHA's proposed standards in § 1910.24 address the design, installation, maintenance and strength requirements of step bolts and manhole steps. Section 1910.268(h) and the American Society for Testing and Materials (ASTM) consensus standard C478-85a, were used as the basis for this proposal (Ref. 44).

OSHA recognizes that many workplaces already have step bolts or manhole steps installed and that it could be unreasonably disruptive and burdensome to require employers to retrofit those bolts and steps to comply with certain provisions of the proposed standard. Therefore, OSHA proposes to require corrosion resistance only on manhole steps and step bolts installed 60 days after the standard's effective date. In addition, only those manhole steps installed 60 days after the effective date would be required to have slip-resistant surfaces, and to withstand specific pull-out or vertical loads without exceeding permanent deformation limits of the steps or spalling of the concrete. Existing manhole steps would be required to support the maximum intended load instead of a specific minimum load.

Recognizing the potential hazards to employees associated with step bolts and manhole steps located in wet, damp, or slightly corrosive atmospheres, OSHA solicits public comment on the following: (1) The need for separate design and installation criteria for these unique devices; (2) the problems associated with using the existing ladder standards or the proposed ladder standards to regulate these devices; (3) injury or fatality data related to employee falls from these devices due to inadequate design or installation; (4) whether or not fixed or portable ladders that are used to replace inadequate step bolts or manhole steps should be regulated; (5) whether or not step bolts and manhole steps should be covered in the proposed ladder section, or in this section; and (6) whether or not existing manhole steps and step bolts should be made corrosion resistant and slip resistant if used in a corrosive environment.

Section 1910.25 Stairs.

In proposed § 1910.25, OSHA continues to regulate fixed general

industrial stairs, as it does in existing § 1910.24. In addition to providing coverage for fixed general industrial stairs, OSHA is proposing additional requirements in this section for spiral stairs, ship's stairs and alternating tread type stairs. OSHA has excluded stairs forming an integral part of machinery as it excluded ladders that are integral parts of machinery in proposed § 1910.23(a). Do existing stairs that form integral parts of machinery meet the proposed stair regulations or any other regulations? Should OSHA regulate these stairs in this section? Should OSHA exempt existing stairs forming integral parts of machinery and only cover new stairs? How long of a lead time would industry need to have new stairs come into compliance with the proposed requirements? What would be the cost of compliance? What accident data is available concerning these types of stairs? Please provide information and data to support any comments or suggestions.

Although spiral stairs are addressed in existing § 1910.24, their use has been restricted to "special limited usage and secondary access situations where it is not practical to provide a conventional stairway." OSHA proposes to remove this restriction because the Agency does not believe there are any unique safety hazards in the use of spiral stairs. OSHA has proposed requirements for alternating tread type stairs because this type of stair, used by many employers, has unique design features which must be specifically addressed in order to protect employees. Ship's stairs are also used in general industry, so OSHA believes that appropriate regulations are necessary to provide employee safety.

ANSI is currently combining the ANSI A12, *Safety Requirements for Floor and Wall Openings, Railings, and Toeboards*, standard with the ANSI A64 standard, *Requirements for Fixed Industrial Stairs*, into a new ANSI A1264, *Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems*. ANSI A12 and A64 were the standards which OSHA adopted under section 6(a) rulemaking in order to establish the existing requirements for floor and wall openings and fixed industrial stairs. OSHA will place all drafts and any approved text of the ANSI A1264 standard in the record if they are obtained while the record of this rulemaking is open.

OSHA presents the scope and application of § 1910.25 in proposed paragraph (a), which is based on existing § 1910.24 (a) and (b). The Agency proposes to revise the coverage of spiral stairs as discussed above.

Proposed paragraph (b) addresses general requirements for stairs. Proposed paragraphs (b)(1) and (b)(3) are based on existing § 1910.24(h), which, in turn, requires that stair railings and handrails be installed in accordance with existing § 1910.23.

In proposed paragraph (b)(1), OSHA requires that employers provide handrails on all unprotected sides of stairways with four or more risers, rather than "on at least one side of closed stairways preferably on the right side descending" as provided in existing § 1910.24(h) because the Agency believes that the proposed language provides clearer guidance to employers and because OSHA believes compliance with the proposed language would provide the appropriate protection.

Proposed paragraph (b)(2) references the fall protection provisions of proposed § 1910.28(c) and would allow stair rail systems, when properly installed, to serve as handrails.

OSHA proposes to cover stair strength in proposed paragraph (b)(4). This provision would replace existing § 1910.24(c). Both the existing and the proposed language require that stairs be designed to carry five times their intended load. The only change to the existing language would be the removal of the 1,000 pound (454 kg) concentrated minimum loading requirement. As part of the Agency's performance-oriented approach to standards development, OSHA has determined that stairs which can support, without failure, five times their maximum intended load will adequately protect employees. Therefore, OSHA believes that the 1,000 pound (454 kg) requirement is unnecessary and unduly restrictive.

OSHA proposes in paragraph (b)(5) to lower the minimum vertical clearance above stairs to six feet, eight inches (2.06 m) for existing stairs, and to retain the seven foot (2.13 m) requirement (as in existing § 1910.24(i)) for all stairs except spiral stairs installed after (insert date 60 days after the effective date of the final rule in the *Federal Register*). The Agency believes that the proposed reduction in the minimum vertical clearance would not significantly reduce employee protection because the change would be small and because only a few stairways would be affected. OSHA is proposing this change so existing facilities with a minor deviation would not have to undergo the significant disruption and burden of retrofitting. The Agency solicits comments, with supporting information and data, on the appropriateness of the proposed changes.

Proposed paragraph (b)(6) effectively restates existing paragraph § 1910.24(f).

Paragraph (c) of § 1910.25 contains proposed requirements for fixed stairs. Proposed paragraph (c)(1) requires that fixed stairs be installed at angles 50 degrees or less from the horizontal. This would constitute a revision of the existing angle requirements in existing § 1910.24(e) and Table D-1. OSHA proposes to delete Table D-1 because the Agency has determined that there is no need to specify the angle to the horizontal in degrees and minutes. The permissible range for the height of risers and depth of tread, currently provided in existing Table D-1, would be covered in proposed paragraphs (c)(2) and (c)(4), respectively. The proposed requirements limit the height of risers and the depth of treads to the same dimensions set in Table D-1, without specifying stairway angles in degrees and minutes. In addition, proposed paragraph (c)(5) would allow stairs with open risers to have less depth than closed risers because the toe of the shoe can extend through the open riser and still have approximately the same amount of sole contact on the tread as a deeper tread with a closed riser.

Proposed paragraph (c)(3) maintains the requirement in existing § 1910.24(d), that fixed stairs shall have a minimum width of 22 inches (55.9 cm).

Proposed paragraph (c)(6) maintains the requirement in existing § 1910.24(g), that stairway landings and platforms shall be at least 22 inches (55.9 cm) wide and 30 inches (76 cm) long.

OSHA is also proposing three paragraphs which have no counterparts in existing § 1910.24. Paragraph (d) addresses spiral stairways; paragraph (e) addresses ship's stairs; and paragraph (f) addresses alternating tread type stairs. OSHA believes, based on its enforcement experience, that these types of stairways need to be addressed because of their increased use, and because applying the general fixed industrial stair requirements would be inappropriate. The proposed requirements for spiral stairways were taken from the Life Safety Code, NFPA 101-1985. The proposed requirements for ship stairs are based on the Agency's enforcement experience. OSHA requests comments on how or if existing ship stairs should be regulated. Should OSHA require existing ship stairs to meet these new requirements? What accident data is available for ship stairs? What would be the cost of bringing existing ship stairs into compliance with these proposed requirements? Please provide information and data to support any comments or suggestions. The proposed

requirements for alternating tread type stairs are based on the 1985 revisions to the Building Officials and Code Administrations International (BOCA) Code. Ship stairs and alternating tread type stairs are not addressed by the existing subpart D. The Agency solicits comments, accompanied by supporting information and data, on the adequacy of proposed paragraphs (d) through (f) to address the particular safety concerns facing employees who use such stairways.

Section 1910.26 Ramps and Bridging Devices

Proposed § 1910.26 addresses ramps and bridging devices. Bridging devices, such as car plates, dockboards and bridge plates, are currently addressed in existing § 1910.30(a). OSHA proposes to delete existing § 1910.30(b), *Forcing machine area*, and existing § 1910.30(c), *Veneer machinery*, because those provisions address specific work areas that OSHA believes would be adequately addressed by the general requirements in proposed § 1910.22.

Proposed paragraph (a) addresses the general requirements for ramps and bridging devices. In proposed paragraph (a)(1), OSHA requires that ramps and bridging devices be designed, constructed and maintained to support their intended loads. The proposed provision is essentially identical to existing § 1910.30(a)(1).

In proposed paragraph (a)(2), OSHA requires that ramps and bridging devices used by vehicles be provided with a means such as edging or curbing to prevent vehicles from running off the edge. This is a new requirement, which is being proposed to protect employees using vehicles.

Proposed paragraph (a)(3) requires separate and clearly designated areas for vehicle and pedestrian traffic when both are simultaneously permitted on a ramp or bridging device (both a vehicle and a pedestrian at the same time). If pedestrians can precede or follow a vehicle access a ramp or bridging device at a safe distance, then a separate area for pedestrian traffic is not necessary. This is a new requirement, which has been proposed to prevent accidental contact between pedestrians and vehicular traffic.

Proposed paragraph (a)(4) requires that ramps and bridging devices be secured to prevent their accidental displacement while employees are on them. It also requires that vehicles supporting a ramp or bridging device be prevented from moving while the device is being used by employees. The proposed provision consolidates existing § 1910.30 (a)(2) and (a)(5).

Proposed paragraph (a)(5) requires a safe means, such as handholds or grab rails, to grasp portable ramps and bridging devices when they are moved. The proposed provision is essentially identical to existing § 1910.30(a)(4).

In proposed paragraph (a)(6), OSHA requires that planks used to construct a ramp or bridging device be secured to each other to prevent unintentional movement or separation. This is a new requirement, which is intended to prevent failure of the plank system.

Proposed paragraph (b) presents the requirements for specific types of ramps and bridging devices. Proposed paragraph (b)(1) contains requirements for fixed ramps. In proposed paragraph (b)(1)(i), OSHA requires that any fixed ramp used by employees which has a ramp angle greater than 20 degrees from the horizontal must be provided with handrails which satisfy proposed § 1910.28. Proposed paragraph (b)(1)(ii) prohibits the use of ramps exceeding 30 degrees from the horizontal. In addition, proposed paragraph (b)(1)(iii) requires that fixed ramps with a fall distance of four feet (1.2 m) or more be provided with a stair rail system or an equivalent fall protection system meeting § 1910.28. These requirements which are new, are proposed to reduce the likelihood of employee slips and falls on inclined ramps.

Proposed paragraph (b)(2) contains requirements for portable or elevating ramps and bridging devices. In paragraph (b)(2)(i), OSHA proposes that such ramps and bridging devices overlap at least four inches (10.2 cm) onto unattached surfaces when the ramps and bridging devices are not permanently attached to the dock or vehicle. This is a new requirement, which has been proposed to provide a minimum positive contact with the unattached surface to provide proper support and limit movement of the ramps and bridging devices. The proposed provision is based upon ANSI Standard MH 14.1-1987, *Loading Dock Levelers and Dockboards* (Ref. 49).

Proposed paragraph (b)(2)(ii) provides that guardrail systems are not required for ramps or bridging devices used solely for material handling with motorized equipment, when employees are exposed to fall hazards of less than 10 (3 m) feet and the employees have been trained as provided by proposed paragraph (b)(2)(ii)(b). This proposed provision, in permitting employers to rely on training rather than on the use of fall protection systems, is consistent with the proposed requirements for loading docks in proposed § 1910.32(d). An example of this situation would be

the transfer of material between boxcars. Material handling exposure is generally of limited duration, and requires ready access to the open sides. Guardrails would interfere with the transfer and could create a greater hazard to employees. The 10 foot (3 m) limitation in proposed paragraph (b)(2)(ii)(a) reflects on OSHA's requirement for scaffolds in proposed paragraph § 1910.30(c)(27), which is based on proposed § 1926.451(e)(1), ANSI A10.3-1988 (section 4.5) and the Agency's understanding of current industry practice. OSHA requests comments and supporting documentation on the appropriateness of the 10 foot (3 m) limitation for portable or elevating ramps and bridging devices used exclusively for material handling with motorized equipment.

Section 1910.27 Work Surfaces.

Proposed paragraph (a) provides that this section regulates floors and similar surfaces, with the exception of scaffolds, stair landings and platforms, which are specifically covered elsewhere in proposed subpart D. Proposed paragraph (b) contains the general requirements applicable to floors and similar surfaces covered by this section.

Proposed paragraph (b)(1) requires that employees who are exposed to unprotected sides or edges of surfaces that present a falling hazard of four feet (1.2 m) or more shall be protected by a fall protection system which meets the requirements of proposed § 1910.28. In drafting this provision, OSHA has retained the four foot (1.2 m) fall distance threshold which appears in the pertinent existing provision, § 1910.23(c), while dispensing with other fall protection requirements in existing § 1910.23(c), because the Agency has determined that the updated and consolidated fall protection requirements in proposed § 1910.28 will provide appropriate protection for employees. OSHA notes that existing § 1910.23 repeats itself, in effect several times by presenting separate fall protection requirements for specific surfaces which all present the same basic hazard of falling four feet (1.2 m) or more. OSHA believes that referencing proposed § 1910.28 where appropriate would eliminate the redundancy and excessive specificity that the existing standards present.

Further, existing § 1910.23 recognizes only physical barriers or devices for the prevention of falls. The existing standards require railing, guardrails, covers of standard strength, screens and similar types of employee protection, the use of safety nets, lifelines, safety belts and other alternative personal

protection devices is not explicitly permitted. Proposed § 1910.28, referenced in proposed § 1910.27(b), would recognize the use of alternative fall protection systems such as nets, lifelines, safety belts and lanyards, which complied with the proposed standard, in addition to the use of railings and other fall protection currently covered in existing § 1910.23.

OSHA notes that, unlike existing § 1910.23 (b) and (c), which cover potential fall distances of four feet (1.2 m) or more, § 1910.23(a), which addresses protection for floor openings, has no such four foot (1.2 m) limit for fall protection. The existing standard requirement fall protection for all fall hazards, regardless of the potential fall distance. OSHA has determined that it shall not be necessary to require fall protection on surfaces less than four feet (1.2 m) above grade unless dangerous equipment, material or operations are below or adjacent to the floor hole. Proposed § 1910.27(b)(2), which is consistent with existing § 1910.23(c)(3), would provide for this exception. Studies by the University of Michigan and the National Bureau of Standards indicate that the severity of employee injury due to falls is significantly greater when falls exceed four feet (1.2m) (References 1, 2, 9-12). OSHA is proposing to limit the requirement for fall protection systems to surfaces four feet (1.2 m) or greater in height, except as provided in proposed paragraph (b)(2). Comments are requested on this proposed language.

OSHA recognizes that slips or trips can occur on any surface, regardless of the surface's height above its surroundings. Employees would be afforded protection from such hazards through compliance with the proposed requirements in § 1910.22(a). This provision addresses the need to design, construct, and maintain surfaces free of conditions that may cause employees to slip or trip and then fall. Employees would be protected from falls onto, rather than off of, floors and similar surfaces which are less than four feet (1.2m) above lower levels.

Proposed paragraph (b)(3) would require that employers protect employees who are exposed either to a risk of falling through a covered opening to a level four feet (1.2 m), or more, below or to a risk of falling through a skylight by providing either a cover which will carry the intended load or a fall protection system which complies with proposed § 1910.28. The proposed paragraph consolidates and revises the provisions of existing § 1910.23 (e)(7) and (e)(8), which currently regulate floor

openings and skylights, respectively. In particular, OSHA notes that the existing language, unlike that proposed, does not set a minimum height threshold for requiring fall protection. The Agency believes that the application of the four foot (1.2 m) threshold should be extended to regulation of floor openings and skylights. In addition, the proposed paragraph replaces minimum load requirements and other specification language with performance-oriented language, in order to permit employers a reasonable amount of flexibility in complying. OSHA believes that employee protection will be improved through compliance with proposed paragraph (b)(3). The Agency solicits comments, accompanied by supporting information and data, on the proposed revisions.

While OSHA considers most of the changes in proposed § 1910.27(b) to be editorial in nature, some requirements in the existing standards are substantively changed in the proposal. For example, proposed paragraph (b)(4), which was suggested by the American Boilers Manufacturers Association (ABMA), addresses floor holes provided for the passage of machinery, piping and other equipment that may expand, contract or vibrate. Existing § 1910.23(a)(9) limits the size of such openings to one inch (2.54 cm). In proposed § 1910.27(b)(4), OSHA permits the opening to be as large as 12 inches (30.5 cm) in its least dimension (the shortest distance from the edge of the work surface or toeboard to the object going through the work surface), provided that the employer guards the opening with a toeboard or equivalent means to prevent employees' feet from entering the hole, and tools from falling onto employees below. OSHA is proposing to reduce the regulatory burden in recognition of the minimal employee hazard presented by such openings, and the potential for damage to boilers, pipes and equipment when there is not enough room for vibration or expansion. OSHA agrees with the ABMA that one foot (30.5 cm) is the appropriate space to allow for such vibration or expansion. In addition, OSHA has determined that the proposed requirement for toeboards or equivalent means of preventing employees and equipment from falling into openings would provide the necessary protection.

Proposed paragraph (b)(5) requires that floor holes shall be protected by floor hole guards that are kept in place, or if the nature of the work requires the removal of floor hole guards, that alternative means of protecting the opening be provided. This provision is based on existing § 1910.23(a)(3)(i) and

has been revised to be more performance-oriented so that means of protecting the opening, other than guardrails, would be acceptable to use for employee protection. This revision to the existing provision will allow the employer to select the protection which is appropriate for a particular situation.

Proposed paragraph (b)(6) addresses the hazards to employees working at lower levels from tools or similar objects being kicked or rolling over the open edges of floors and similar surfaces. In particular, the proposed paragraph requires a guard, such as an acceptable toeboard, at unprotected sides or edges. OSHA believes that the proposed language simply clarifies the requirements of existing § 1910.23 (c)(1) and (e)(4).

Section 1910.28 Fall Protection Systems

Proposed § 1910.28 sets criteria for the fall protection systems required under proposed subpart D. OSHA would impose the duty to provide fall protection through the other sections of subpart D, which, in turn, would reference proposed § 1910.28 to indicate how an employer would go about complying with the particular fall protection requirement. OSHA believes that this approach is appropriate because it takes into account the diversity of the surfaces and the fall protection needs encompassed by subpart D. The Agency proposes to consolidate and revise the fall protection criteria, which appear in existing § 1910.23 and elsewhere, in order to provide employers with clear guidance, update specifications to reflect revisions of ANSI standards, provide consistency with other proposed OSHA rules for fall protection in shipyards and construction, and, to the extent appropriate, to replace specification language with performance-oriented language. In addition, there are several provisions where OSHA proposes to distinguish between existing fall protection systems and those which would be installed after the issuance of the revised rule. Explanation of the need for such distinctions appears with the discussion of the pertinent provisions.

Proposed paragraph (a) requires that fall protection be provided through the use of guardrail systems unless it is infeasible to use them. Appropriate alternative fall systems meeting the requirements of proposed section § 1910.28 would be acceptable when guardrail systems are infeasible. OSHA recognizes that there are circumstances where it is unnecessary to install guardrail systems on a structure.

Therefore, as an exception to the requirement for the installation of guardrail systems, OSHA would allow employees to establish designated areas which comply with paragraph (d) of this section. The requirements of paragraph (d) are discussed in detail below.

Proposed paragraph (b) contains the requirements for guardrail systems and toeboards. Proposed paragraph (b)(1), which addresses top rails, clarifies the 200 pound (890 N) strength requirement for the top rail of a guardrail system, which appears in existing § 1910.23(e)(3)(iv). Under proposed paragraph (b)(1), OSHA would require top rails installed after the issuance of the revised rule to be no less than 39 inches (1 m) above the guarded surface when 200 pound (890 N) test load is applied. OSHA selected 39 inches (1 m) as the minimum top rail height, when a test load is applied, for new installations in order to be consistent with the requirement in proposed paragraph (b)(3) that top rails shall be 42 inches (1.1 m) when no load is applied. In addition, top rails installed before 60 days after effective date of the final rule shall not be less than 36 inches (91 cm) above the guarded surface when test loads are applied. The existing rule, § 1910.23(e)(1), requires that standard railings "have a vertical height of 42 inches nominal." The rationale for the different height is discussed in detail with regard to paragraph (b)(3) below.

Proposed paragraph (b)(2) covers midrails. In addition to retaining provisions from existing § 1910.23(e)(1), OSHA proposes, in paragraph (b)(2)(ii), a new provision which requires that midrails be capable of withstanding a force at least 150 pounds (667 N), without failure or permanent deformation. OSHA determined that this proposed provision was needed to supplement the criteria proposed for top rails. The existing standard does not contain a strength requirement for midrails, and this omission has caused confusion among employers. This proposed paragraph is based on proposed §§ 1926.502(b)(5) and 1915.252(e)(4)(ix).

Proposed paragraph (b)(2)(iii) retains with minor revision the portion of existing paragraph § 1910.23(e)(1), which addresses the proper spacing of the midrail. The proposed paragraph sets the maximum opening in guardrails as 19 inches (48 cm) in their least dimension. The 19-inch (48 cm) spacing is recommended by the National Bureau of Standards in "A Model Performance Standard for Guardrails" (Reference 11). The present standard requires that the intermediate rail be "approximately

halfway between the top rail and the floor * * *". The existing standard, however, does not provide any criteria for guardrail systems which use vertical posts, ornamental designs and panels, or other alternatives to an intermediate rail. OSHA anticipates that the proposed criteria will clarify the acceptable spacing of members for all types of guardrails. OSHA solicits comments on the appropriateness of the 19-inch (48 cm) maximum size of opening in guardrail systems in their least dimension. Will this requirement unduly restrict technological development or innovative design? What should be the maximum size of this opening? Please submit rationale and cost information on the above questions.

Proposed paragraph (b)(3) sets height criteria for guardrail systems. Proposed paragraphs (b)(3)(i) and (b)(3)(ii) clarify existing paragraph § 1910.23(e)(1), which establishes the acceptable height of guardrails. Proposed paragraph (b)(3)(i) would require all guardrails installed on or after (insert date 60 days after the effective date of final rule in the *Federal Register*) to be at least 42 inches (1.1 m) in height. The current standard § 1910.23(e)(1) requires that guardrails have a vertical height of 42 inches (1.1 m) nominal, measured from the guarded surface to the upper surface of the top rail. OSHA proposes to eliminate the term "nominal" because the Agency believes that the term is vague and therefore, overly subject to conflicting interpretations. In order to provide clear guidance, the Agency proposes instead to set a minimum height for guardrails. OSHA recognizes that employers may on occasion add material, such as carpeting, tile, insulation, grating or mats, to walking and working surfaces, thereby, reducing the effective height of the guardrail. Proposed paragraph (b)(3)(i) allows this as long as the guardrail meets with proposed paragraph (b)(1), because OSHA believes it is unreasonable to require employers to raise the height of guardrails each time the walking and work surface is raised.

Proposed paragraph (b)(3)(ii) would allow existing guardrail systems to be a minimum of 36 inches (91 cm) high, which, as noted above, is consistent with OSHA field directive STD 1-1.10-1981. OSHA issued the directive because it recognized that employers with guardrails as low as 36 inches (91 cm) might have installed their systems in compliance with pre-OSHA building codes. The Agency was also concerned that employers would be unreasonably burdened by the cost of replacing their

old guardrail systems with new guardrail systems that were a nominal 42 inches (1.1 m) high. Indeed, OSHA's willingness to relax enforcement of the 42-inch (1.1 m) requirement was due, in part, to uncertainty as to what would constitute compliance with a "nominal" 42-inch (1.1 m) requirement. The Agency proposed the minimum 42-inch (1.1 m) high in order to remove this uncertainty. Therefore, OSHA determined that continuing to tolerate the use of guardrails as low as 36 inches (91 cm) would not unacceptably reduce employee protection and that the hazard to which employees would be exposed in replacing those guardrails would be greater than that from allowing the existing guardrails to remain in place. When existing guardrail systems are replaced, the requirements of proposed paragraph (b)(3)(ii) would apply to the replacement guardrail system.

Proposed paragraph (b)(3)(iii) is a new provision which allows employees as an alternative to complying with proposed paragraphs (b)(3)(i) and (ii) of this part to reduce guardrail system heights to as low as 30 inches (76 cm), provided the sum of the depth of the top rail and the height of the top edge of the top rail is at least 48 inches (1.2 m). This formula is recommended by the National Bureau of Standards in "A Model Performance Standard for Guardrails" (Reference 11). The study found that a 30 inch (76cm) high barrier with an 18 inch (46cm) deep surface or some other combination with a minimum height of 30 inches (76cm) and totaling at least 48 inches (1.2m) would be sufficient to prevent an employee from going over the edge. It would allow a employer flexibility in providing perimeter protection when parapets or other similar barriers are installed. OSHA is proposing this requirement to recognize design alternatives found in structures such as parapet walls. OSHA believes that a guardrail system which complies with the proposed paragraph would adequately protect employees from fall hazards.

Proposed paragraph (b)(4) retains the basic elements of existing § 1910.23 (e)(1) and (e)(3)(v)(a), which require the top rail to be smooth-surfaced, and extend those requirements to all guardrail system components. OSHA believes that compliance with the proposed paragraph, as with existing § 1910.23 (e)(1) and (e)(3)(v)(a), would ensure that employees are protected from injury due to either punctures, lacerations or from tripping caused by snagged clothing.

Proposed paragraph (b)(5) specifies that the outside diameter or thickness of

midrails and top rails be one-quarter inch (0.6 cm) in its smallest dimension. This is a revision of existing § 1910.23 (e)(3)(i), (e)(3)(ii), and (e)(3)(iii), which overly restrict the type and size of material that may be used in guardrail systems. This proposed provision is included to prohibit the use of thin materials such as, but not limited to, metal or plastic banding material that would be difficult to see and grasp or that may cut an employee if grabbed during a fall.

Proposed paragraph (b)(6) permits the use of movable guardrail sections using material such as gates, chains and other means, which, when open, provide a means of access and when closed, provide guardrail protection that meets the criteria of proposed paragraphs (b)(1) through (b)(5). OSHA has determined that the proposed provision simply clarifies the requirements of existing § 1910.23 (a)(3)(ii) and (b)(1)(i), except that the requirements, in existing § 1910.23(b)(1)(i), for grab handles would be deleted. The Agency believes that grab handles are not needed, given that employers comply with the other provisions of proposed paragraph (b).

Proposed paragraph (b)(7) presents requirements for toeboards. Proposed paragraph (b)(7)(i) is a new provision that specifies the minimum strength of toeboards. Omission of this criteria in the existing standard has led to confusion as to what type of toeboard is acceptable. This is consistent with proposed § 1926.502(j)(2). OSHA believes that most if not all existing toeboards will meet the proposed 50 pound (222N) strength requirement. However, the Agency solicits comments as to the appropriateness of this proposed paragraph. If 50 pounds (222N) is too stringent what would be an appropriate strength requirement? How many existing toeboards will not meet the proposed requirement and what will be the cost of bringing them into compliance?

Proposed paragraph (b)(7)(ii) is a minor revision of a part of existing § 1910.23(e)(4), and clarifies that the minimum height of toeboards required is three and one-half inches (8.9 cm), rather than the existing confusing language of four inches (10.2 cm) nominal.

Proposed paragraph (b)(7)(iii) is a minor revision of a part of existing § 1910.23(e)(4), which specifies that toeboards are to be installed not more than one-quarter inch (6.4 mm) above floor level. OSHA has determined that toeboards placed as much as one-half inch (1.3 cm) above the work surface would adequately protect employees

working below the protected surface from the hazards of tools or other equipment rolling off the surface. Increasing the space between the floor and the toeboard would also improve drainage, thereby reducing slipping hazards.

Proposed paragraph (c) contains the requirements for handrails and stair rails. Proposed paragraph (c)(1) requires handrails and the top rails of stair rail systems to be capable of withstanding, without permanent deformation or a loss of support, a force of at least 200 pounds (890 N) applied within two inches (5 cm) of the top edge, in any downward or outward direction, at any point along the top edge. This is a minor revision of existing § 1910.23 (e)(3)(iv) and (e)(5)(iv), and clarifies the design criteria for handrails and stair rails.

Proposed paragraph (c)(2)(i) requires that the height of handrails installed before (insert date 60 days after the effective date of the final rule in the Federal Register) be no less than 30 inches (76 cm) nor more than 42 inches (1.1 m), as measured from the upper surface of the handrail to the surface of the stair tread or ramp. Existing § 1910.23(e)(5)(ii) requires that handrails be between 30 and 34 inches (76 and 86 cm) in height. OSHA is aware that some existing handrails are set at heights above 34 inches (86 cm). The Agency believes that allowing handrails 30 to 42 inches (76 cm to 1.1 m) in height to remain in place would not reduce employee protection as long as the other pertinent provisions of the proposed paragraph are followed. In addition, this revision recognizes the impracticality of modifying handrails that are in place in existing buildings, but that are within a range of heights which may be considered a departure from height requirements of the existing standard.

Proposed paragraph (c)(2)(ii) requires the height of all handrails installed on or after (insert date 60 days after the effective date of the final rule of publication in the Federal Register) to be from 30 to 37 inches (76 to 94 cm) in height. OSHA believes this is the appropriate height range for handrails from an ergonomic standpoint (Ref. 1). OSHA is aware that some persons have been confused regarding the purpose of a handrail, which is to provide employees with a handhold to assist them in ascending and descending stairs. The purpose of the handrail should not be confused with the purpose of the stair rail, which is to protect employees from falling over the edge of an open-sided stairway to a lower level. It should be noted that under proposed § 1910.23(c)(2)(v), the function of

handrails and stair rails may be performed by a single system if the height of the combined handrail/stair rail is between 36 and 37 inches (92-94 cm), and the other criteria for both systems are met.

Proposed paragraph (c)(2)(iii), a minor revision of existing § 1910.23(e)(2), is also based on a recommendation by the University of Michigan (Ref. 1). It would require the height of stair rail systems installed before (insert 60 days after the effective date of the final rule in the *Federal Register*) to be no less than 30 inches (76 cm). OSHA has chosen not to raise the minimum stair rail height for existing systems, because the Agency has determined that modifying existing stair rail systems to meet the requirements set out in proposed § 1910.23(c)(2)(iv) for newly installed stair rail systems would impose unreasonable burdens on employers, and would potentially expose employees modifying the rails to significant fall hazards. In addition, the Agency is proposing to delete the current upper height limit of 34 inches (86 cm), because OSHA recognizes that the upper height limit serves no purpose. The purpose of the stair rail system is to prevent employees from falling over the edge of open-sided stairways. The Agency believes that eliminating the upper limit would allow employers flexibility which could allow the installation of safer systems.

Proposed paragraph (c)(2)(iv), a significant revision of existing § 1910.23(e)(2), requires that stair rail systems installed after (insert date 60 days after the effective date of the final rule in the *Federal Register*) shall not be less than 36 inches (91 cm) in height. This is a departure from the existing standard, which specifies a range in height of 30 to 34 inches (76 to 86 cm). OSHA has determined that in the case of stair rail height, as with guardrail height, 36 inches (91 cm) is the minimum acceptable height for employee fall protection under any circumstances. This revised requirement is consistent with the actual purpose of a stair rail system, i.e., to prevent employees from falling to lower levels. Since the stair rail system is measured at the forward edge of the step, the effective protection at the rear of the step will be at least 36 inches (91 cm) plus the riser height of the step.

Proposed paragraphs (c)(2) (v) and (vi) are new provisions which permit the top edges of stair rail systems to also serve the purpose of handrails. As stated above, when the proper conditions are met, a single system may perform the

functions of both stair rails and handrails.

Proposed paragraph (c)(3), a revision of existing § 1910.23(e)(5)(iii), requires that there be a minimum clearance of one and one-half inches (3.8 cm) between a handrail and any obstructions. The existing standard specifies a minimum clearance of three inches (8 cm). However, the new requirement is consistent with the requirements of many local building codes, ANSI A12.1-1973, *Safety Requirements for Floor and Wall Openings, Railings and Toeboards* (Ref. 51), and the draft revision of ANSI A1264, *Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems*. It is also consistent with ANSI A117.1-1986, *Providing Accessibility and Usability for Physically Handicapped People* (Ref. 52). OSHA believes that this revision will not result in a reduction of employee protection.

In paragraph (c)(4), OSHA proposes a minor revision of existing § 1910.23(e)(5)(i), which would require handrails to be smooth-surfaced, to make it clear that employers must protect employees using handrails and stair rails from puncture, laceration or snagging hazards.

Proposed paragraph (c)(5), which is a revision of existing paragraph § 1910.23(e)(2), requires that the openings in a stair rail system be a maximum of 19 inches (48 cm) in their least dimension. This is consistent with the requirements for guardrails in proposed paragraph (b)(2)(iii) of this section which in turn is based on a NBS study (Ref. 11). The existing standard requires construction similar to a "standard railing." The regulations for standard railings, such as are used in guardrail systems, in existing § 1910.23(e)(1) require that intermediate rails be installed approximately halfway between the top rail and the floor surface. OSHA believes that openings in stair rail systems should continue to have the same protection as openings in guardrail systems, following the performance-oriented approach taken for guardrails. Therefore, the Agency has proposed that openings both in stair rail and in guardrail systems shall be no more than 19 inches (48 cm) in their least dimension.

Proposed paragraph (c)(6), which is based on existing § 1910.23(e)(5)(i), requires handrails to provide a firm handhold for employees.

Proposed paragraph (c)(7), which is also based on existing paragraph § 1910.23(e)(5)(i), requires stair rail systems to be designed and constructed

so that their ends do not constitute a projection hazard into which employees may inadvertently walk.

Proposed paragraph (d), a new provision, sets forth requirements regarding the use of "designated areas" as an alternative to providing fall protection. A designated area, as defined in proposed § 1910.21(b), is a section of a walking or working surface around which a perimeter line has been erected so that employees within the area would be warned, when they saw or contacted the line, that they were approaching a fall hazard. OSHA would allow employers to establish designated areas when they can demonstrate that employees within the area will not be exposed to fall hazards, because the Agency recognizes that it would be unreasonable to require the installation of guardrails when there is no fall hazard. OSHA contemplates that this provision would apply when employees are sent to the roof of a structure for maintenance of machinery, such as a cooling tower, which is set towards the center of the roof. The Agency anticipates that setting up and maintaining a warning line system, which complies with proposed paragraph (d), around a designated area would ensure that affected employees can perform their work free from fall hazards. The construction industry standard, § 1926.500(g), provides for use of a designated area, demarcated by warning lines, when employees are performing built-up roofing work on low-pitched roofs. The designated area approach is retained in proposed §§ 1926.501(b) and 1926.502 (f), (g) and (h) (51 FR 42718, November 25, 1986). In order to ensure OSHA standards regulate comparable work situations consistently, the Agency has based the proposed paragraph on the designated area concept as reflected in the existing and proposed construction industry standards.

Proposed paragraph (d)(1) provides that designated areas may be used as an alternative for guardrails when the employer can show that employees are not exposed to fall hazards, the work is temporary, the slope of the surface is 10 degrees or less from the horizontal and the designated area is surrounded by a rope, wire or chain supported by stanchions meeting the criteria in proposed paragraphs (d)(2) through (d)(5). The 10 degree slope limitation reflects OSHA's belief that the designated area approach should apply only to essentially flat-roofs that may have a slight pitch or unevenness. In particular, OSHA is concerned that a warning line system would not work on

a surface which sloped more than 10 degrees, because visibility and the employee's ability to stop when the warning line is contacted could not be ensured.

Proposed paragraph (d)(2), which is consistent with proposed § 1926.502(f)(2), provides strength criteria for the materials used to establish designated areas. Proposed paragraph (d)(2)(i) proposes that stanchions with rope, wire or chain attached, shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion at a height of 30 inches (76 cm) above the working surface, perpendicular to the designated area line, and in the direction of the exposed edge. OSHA believes that the ability to resist a force of 16 pounds (71 N) ensures that an employee is adequately warned that the edge of the designated area has been reached. Proposed paragraph (d)(2)(ii) requires that the rope, wire or chain used to demarcate designated areas have a minimum tensile strength of 500 pounds (2.2 kN). In addition, after being attached to the stanchions, the line would be required to support, without breaking, the 16 pound (71 N) force applied to the stanchion. This performance requirement simply assures that the line is durable and capable of functioning as intended, regardless of how far apart the stanchions are placed. In addition, the minimum tensile strength of 500 pounds (2.2 kN) assures that the line is made of material more substantial than string, such as wire, chain, rope or heavy cord. OSHA believes that this minimum tensile strength is not an unreasonable burden on employers however, comments are requested on the appropriateness of this requirement. Proposed paragraph (d)(2)(iii) requires that the line be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before a stanchion tips over. In order to maximize the warning capabilities of the line which demarcates the designated area, the proposal limits the amount of potential slack in the system.

Proposed paragraph (d)(3), which is also consistent with proposed § 1926.502(f)(2), requires that the height of the designated area line be no less than 34 inches (86 cm) nor more than 39 inches (1 m) from the work surface. This height is low enough to warn a short worker while the worker is stooped over, and at the same time, it is high

enough not to be a tripping hazard for taller workers.

Proposed paragraph (d)(4) requires the perimeter of the designated area to be readily visible from a distance up to 25 feet (7.6 m). This criteria is provided so that the lines will be readily apparent and, therefore, effectively warn employees to stay away from fall hazards. OSHA does not believe that flagging, as required in proposed § 1926.502(f)(2)(i), is necessary for the designated area. In general industry work would be performed at a fixed location, while in construction there would be a greater need for aids to visibility (flagging) because the work location shifts from one part of the roof to another.

Proposed paragraph (d)(5) sets forth the details of how the designated area is to be established. Proposed paragraph (d)(5)(i) requires that the stanchions be erected as close around the work area as permitted by the work task. This criterion would be included to make the stanchions as obvious as possible without interfering with the work task. Proposed paragraph (d)(5)(ii), which is consistent with proposed § 1926.502(f)(1)(i), requires that the perimeter of the designated area be erected not less than six feet (1.8 m) from the exposed edge of the falling hazard. OSHA believes that the six foot (1.8 m) distance is sufficient to allow an employee to stop moving toward the fall hazard after realizing that the perimeter line has been contacted. Proposed paragraph (d)(5)(iii) requires that when the worker is using mobile mechanical equipment, the perimeter of the designated area be erected not less than 10 feet (3.1 m) from the unprotected side or edge, perpendicular to the direction of travel. This criterion would provide additional distance for the employee to stop moving towards the hazard, taking into account the extra momentum of the equipment being used. Proposed paragraph (d)(5)(iv) requires that access to the designated area shall be by a clear access path formed by two warning lines meeting the strength, height, and visibility requirements of proposed § 1910.28(d)(2)(4). OSHA has included this provision, which is based on existing § 1926.500(g)(3)(iii)(a) and proposed § 1926.502(f)(1)(iii), to underscore the importance of providing safe access to the work area.

Proposed paragraph (e) sets requirements for covers used to protect employees from falling into holes in floors, roofs and other walking and working surfaces. The proposed paragraph, which revises existing § 1910.23 (e)(7) and is identical to

proposed § 1926.502(i), reflects OSHA's belief that clearly worded performance-oriented language provides employers with the necessary guidance and flexibility.

Proposed paragraph (e)(1) requires that covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover. The proposed paragraph deletes the 20,000 pound (9080 kg) minimum rear-axle load requirement in existing § 1910.23 (e)(7)(i) and (e)(7)(ii) in favor of a performance-oriented approach. Proposed paragraph (e)(2), a new provision, requires that all other covers shall be capable of supporting, without failure, the maximum intended load of employees, equipment and materials to be applied to the cover at any one time, or 250 pounds (114 kg), whichever is greater. OSHA believes that compliance with the proposed paragraph would adequately protect employees who traverse covers. OSHA chose the 250 pound (114 kg) minimum capacity because the Agency's data indicates that most employees, loaded with necessary tools and material, would impose a load of less than 250 pounds (114 kg).

Proposed paragraph (e)(3), which is based on existing § 1926.500(f)(5)(ii) and proposed § 1926.502(i)(3), requires that covers be installed so as to prevent accidental displacement. This provision clarifies the requirement in existing § 1910.23(a)(9) that floor opening covers shall be held firmly in place, to ensure that employers anticipate and take precautions against all possible causes of cover displacement.

Proposed paragraph (f), a new provision, provides that personal protective equipment (PPE) used where the use of guardrails is infeasible, as provided in proposed § 1910.28(a)(1), shall meet the applicable requirements of subpart I. Existing subpart D allows for the use of the guardrails, but not the use of PPE for fall protection. Therefore, under the existing standard, an employer who finds that the use of guardrails is infeasible has no guidance as to acceptable alternatives. Subsequently, OSHA recognized that there are circumstances where employees would occasionally need to access work areas under circumstances where the guardrail requirement would be unreasonably burdensome. This understanding was reflected in STD 1-1.13, April 16, 1984. In drafting this proposed rule, OSHA has recognized the need for clear guidance on how to use PPE in situations where the use of

guardrails is infeasible. Therefore, proposed § 1910.28(a)(1) allows employers to provide their employees with appropriate alternative fall protection and proposed paragraph (f) provides that employers who use personal fall protection systems shall ensure that the equipment and systems chosen meet the applicable requirements of proposed subpart I. As noted above, OSHA is proposing the fall protection requirements of subpart D and the personal fall protection criteria of subpart I concurrently.

Proposed paragraph (g), another new provision, requires that restraint line systems satisfy the requirements of subpart I. OSHA notes that these systems may be used only in situations where, as provided in proposed § 1910.28(a)(1), it is not feasible to use guardrail systems.

Proposed paragraph (h), another new paragraph, sets criteria for the proper use of safety net systems. Existing Subpart D does not directly address safety nets. OSHA has determined that there are situations, especially in maintenance work, where due to the unsuitability of guardrail systems or personal fall protection systems, the use of a safety net system is the most appropriate means of employee protection. All of the proposed requirements in this new section are based upon the existing § 1926.105, proposed § 1926.502, and upon ANSI A10.11-1989, *American National Standard for Construction and Demolition Operations—Personal and Debris Nets* (Ref. 53).

Proposed paragraph (h)(1) requires that employers who use safety nets install them as close as practical under the guarded surface on which employees are working, but not more than 30 feet (9.1 m) below such levels. The proposed language is based upon the requirement in ANSI A10.11-1989, section 10.2.

Proposed paragraph (h)(2) requires that safety nets be installed with sufficient clearance under them to prevent contact with the surface or structures below if subjected to a drop test of 400 pounds (180 kg) falling into the net from the height of the guarded surface. The proposed requirement is based on existing § 1926.105(c)(1), and proposed § 1926.502(c)(3).

Proposed paragraph (h)(3) requires that safety nets be installed so that they extend from 8 to 13 feet (2.4 to 4 m) from the outermost projection of the work surface. These distances follow ANSI A10.11-1989, section 10.6. OSHA believes that increasing the extension of the safety net as the fall distance increases will more appropriately protect employees than the eight foot

(2.4 m) extension in ANSI A10.11-1979. The proposed requirement is identical to proposed § 1926.502(c)(2).

Proposed paragraph (h)(4) sets forth the capacity requirements for installed safety nets. These requirements are based upon the test requirements contained in ANSI A10.11-1989, section 9.3, except that OSHA's proposal specifies that the test is to be performed from the level of the guarded surface, rather than from the 25 foot (7.7 m) height specified in the ANSI standard. OSHA believes that the test as presented in the proposal is more representative of actual workplace conditions. Proposed paragraph (h)(4) allows two methods for assuring that safety nets are properly designed and installed. The general requirement is for nets to be drop tested. The drop test requirements are based on proposed § 1926.502(c)(4)(i). Where drop testing is not possible, the proposed standard allows for a qualified person to certify that the net installation complies with the strength requirements and with all the other provisions of proposed paragraph (h). The exception to the drop testing is provided since it is not always appropriate to drop test safety net installations. An example of where a drop test may not be appropriate is where the net is strung over a public thoroughfare and the test could endanger people below. Another example is where the test weight cannot be readily retrieved from the net once it has been dropped.

Proposed paragraph (h)(5) requires inspections of safety nets on a weekly basis to determine the existence of mildew, wear, damage or deterioration. It would also require that the nets be removed from service if their strength is substantially reduced. This requirement is based upon section 11.1 of ANSI A10.11-1989.

Proposed paragraph (h)(6), which is based on proposed § 1926.502(c)(6) and, in part, on section 13.2 of ANSI A10.11-1989, requires debris and tools that have fallen into safety nets be removed as soon as possible, but at least before the next work shift. OSHA believes that clearing the debris from the nets will lessen the likelihood that employees falling into the net will be injured due to contact with the debris in the net. OSHA further believes that the removal of debris and tools every work shift is more effective than the ANSI requirement which requires removal at least daily, because if there is more than one shift, foreign material would be removed more often.

Proposed paragraph (h)(7) requires the mesh openings in safety nets not to exceed 36 square inches (230 cm²), nor

be longer than six inches (15 cm) on any side measured from center to center of the material forming the mesh. This is based upon existing § 1926.105(d), proposed § 1926.502(c)(7), and, in part, on section 6.3 of ANSI A10.11-1989.

Proposed paragraph (h)(8) requires safety nets to have border ropes or border webbings with a breaking strength of at least 5,000 pounds (22.2 kN). This is based upon existing § 1926.105(d) and proposed § 1926.502(c)(8). OSHA believes this strength is needed at all times during the useful life of the net.

Proposed paragraph (h)(9) requires that the connections between net panels shall be as strong as internal net components, and that connections shall be spread between safety net panels at intervals at no more than six inches (15 cm). These requirements are based upon section 10.4 of ANSI A10.11-1989, and existing § 1926.105(f).

Section 1910.29 Wall Openings

OSHA has determined that it is appropriate to amend the existing requirements for the protection of wall openings (paragraph (b) of § 1910.23) and place those requirements in proposed § 1910.29. Where the amended language retains the substantive requirements of the existing standard, the Agency considers the change to be editorial. OSHA explains, below, where the proposed language differs significantly from existing language.

Existing § 1910.23(b)(1) provides two alternative approaches for guarding wall openings from which there is a drop of more than 4 feet. Grab handles are also required. Existing § 1910.23(b)(1)(i) provides that a wall opening can be protected through the use of an extension platform onto which material can be hoisted and which shall have side rails or equivalent guards of standard specification. OSHA proposes to revise and relocate existing § 1910.23 because the Agency expects that the provision would require appropriate protection at wall openings. The Agency proposes to delete existing § 1910.23(b)(1)(ii) which provides for the use of extension platforms with guardrails, because OSHA believes that this approach does not provide adequate protection for employees working in wall openings. As discussed below, OSHA proposes to set separate fall protection requirements for existing wall openings and for those installed 60 days or more after the effective date of the final rule.

Proposed paragraph (a) requires that an existing wall opening with the lower edge less than 36 inches (91 cm) above a

surface be guarded with a fall protection system meeting the requirements of proposed § 1910.28. This is based on existing § 1910.23(b)(3).

Proposed paragraph (b) requires that a wall opening constructed on or after (insert date 60 days after the effective date of the final rule in the Federal Register), and having the lower edge less than 39 inches (1 m) above a surface, be guarded by a fall protection system meeting proposed § 1910.28. These dimensions are consistent with those required by the proposed requirements for guardrails in proposed § 1910.28(b)(1). OSHA believes that existing wall openings, like existing guardrails, should not have to be retrofitted to protect employees at 39 inches (1m) because to do so would impose unreasonable burdens on employers and expose employees who perform retrofitting to significant fall hazards.

Proposed paragraph (c), which is based on existing 1910.23 (b)(1)(i), requires grab handles where an employee's work activity at a wall opening requires the employee to reach through or around the opening. Further, the proposed paragraph requires that each grab handle be capable of withstanding a maximum horizontal pull-out force of twice the intended load or 200 pounds (890 N), whichever is greater.

Existing paragraphs § 1910.23 (b)(2) and (b)(3) address the fall protection needs of employees working in proximity to chute wall openings and window wall openings, respectively. OSHA believes that the performance-oriented language in proposed § 1910.29 (a) and (b) adequately addresses such openings. Therefore, OSHA proposes to delete the existing requirements and to set uniform requirements for all wall openings.

Existing § 1910.23(b)(4) addresses the guarding of temporary wall openings. Existing § 1910.23(b)(4) requires "adequate guards" for the opening, but does not require that the guard be of standard construction. OSHA believes that fall protection systems which meet the requirements of proposed § 1910.28 will adequately protect employers from fall hazards. Therefore, OSHA proposes to delete existing § 1910.23(b)(4).

Existing § 1910.23(b)(5) requires that a toeboard or enclosed screen be provided at wall openings where the rear side of the lower edge is less than four inches (10 cm) above the floor, and the far side of the hole is more than five feet (1.51 m) above the next lower level. OSHA proposes to delete paragraph § 1910.23(b)(5) because guards, such as toeboards, are required to protect

employees from such a hazard under proposed § 1910.27(b)(6), which references criteria in proposed § 1910.28.

Section 1910.30 Scaffolds

OSHA proposes to revise existing § 1910.28, *Safety requirements for scaffolding*, and relocate the revised provisions in proposed § 1910.30, *Scaffolds*. OSHA has determined through its observation of general industry operations that of the nearly 20 different types of scaffolds covered in the existing OSHA standards, only four (the two-point adjustable suspension scaffold, the single-point adjustable suspension scaffold, the boatswain's chair and the mobile manually-propelled scaffold) are used regularly in general industry. OSHA has proposed subpart D regulations only for those scaffolds. OSHA has further determined that the types of scaffolds not covered by 29 CFR part 1910, subpart D, are usually used in construction operations. Therefore, in order to provide concise and consistent guidance to employers, the Agency proposes that scaffolds and scaffold components that are not addressed in proposed subpart D would be required to meet the applicable requirements of subpart L of 29 CFR part 1926. OSHA has proposed requirements for scaffolds used in general industry which are intended to be consistent with the requirements in the existing and proposed Construction Safety Standards (§§ 1926.450-1926.460, 51 FR 42680, November 25, 1986) and the proposed Shipyard Standards (§§ 1915.251-1915.253, 53 FR 48182, November 29, 1988) so that an employer could use a scaffold in either general industry, the construction industry, or shipyard employment without confronting divergent requirements.

The general requirement for guardrails on scaffolds that was originally promulgated by OSHA in 1971 under section 6(a) of the OSH Act in § 1910.28(a)(3) was revoked on February 10, 1984 (49 FR 5318). This provision was based on the advisory language of a national consensus standard, ANSI A10.8-1969, *Safety Requirements for Scaffolds*, which stated that "guardrails should be installed," but was changed by OSHA to read, "guardrails shall be installed." The courts ruled that OSHA's failure to adopt the national consensus standard verbatim under section 6(a), by changing the "should" to a "shall", rendered the resulting OSHA standard invalid and unenforceable [see *Usery v. Kennecott Copper Corporation*, 577 F.2d 1113, 1117 (10th Cir. 1977)]. Since the standard could not be enforced, OSHA subsequently revoked it and has resorted to citing employers under the

general duty clause, section 5(a)(1), in cases where the Agency believes that the use of guardrails on scaffolds was necessary to protect employees from fall hazards. Proposed § 1910.30 is intended to fill the regulatory gap in the current scaffold standards by providing fall protection requirements for employees on scaffolds.

In developing this proposal, OSHA has reviewed the existing scaffold requirements in OSHA's general industry and construction standards, and has rewritten them into performance language to the extent appropriate. The provisions of ANSI A10.8-1988, *Safety Requirements for Scaffolding*, have also been considered for incorporation into this proposal (Ref. 61). The discussion of proposed § 1910.30, below, indicates where OSHA has based provisions on ANSI requirements. OSHA has not adopted those ANSI A10.8-1988 provisions which the Agency believes are redundant, unnecessary or overly specific.

Proposed paragraph (a) states the scope and application of the proposed scaffold provisions. This proposed section would apply to the listed scaffolds and scaffold components. OSHA also proposes that the scaffold requirements of 29 CFR part 1926, subpart L, cover those scaffolds used in general industry that are not specifically covered in this section. This approach would ensure that all scaffolds are regulated, and that the scaffold requirements in the general industry and construction standards are consistent to the extent appropriate.

OSHA proposes in paragraph (b) to prohibit the use of shore scaffolds and lean-to scaffolds since they are unsafe and should never be used under any circumstances. OSHA has determined that it is appropriate to prohibit these scaffolds, even though the Agency believes they are not used in general industry, because such scaffolds are so makeshift that they do not provide a safe work surface for employees. This requirement is identical to existing § 1910.28(a)(24).

OSHA proposes the general requirements for scaffold systems in paragraph (c). Proposed paragraph (c)(1) lists general requirements for the installation and use of scaffolds.

Proposed paragraph (c)(1)(i), which is a new provision, prohibits the use of ladders and makeshift devices to increase scaffold working height. This is based upon ANSI A10.8-1988, section 4.29, and is consistent with proposed § 1926.451(d)(13). OSHA anticipates that compliance with this requirement would ensure that employees are provided

with a secure work platform and would eliminate the hazard of tipping caused by portable ladders exerting a sideways thrust on scaffold systems.

Proposed paragraph (c)(1)(ii) requires scaffold suspension ropes to hang vertically unless specifically designed to be pulled laterally during use. The proposed requirement indicates OSHA's recognition that systems specifically designed to be used on convex structures, such as water towers, adequately protect employees. This flexibility, which is consistent with ANSI A10.8-1988, section 6.1.10, is a partial departure from the requirement in existing § 1910.28(i)(8), that supporting cable shall be straight for its entire length.

OSHA proposes in paragraph (c)(1)(iii) to require overhead protection for employees on scaffolds if they are exposed to falling objects. The overhead protection used would have to deflect objects and resist penetration. This requirement is based upon existing § 1910.28(a)(16).

Proposed paragraph (c)(1)(iv) which is consistent with ANSI A10.8-1988, section 4.7, requires that scaffolds not be altered or moved horizontally while occupied, except when a scaffold has been specifically designed for such use. The proposed provision is a modification of the prohibition in existing § 1910.28(a)(5) of such moving or alteration. The proposed revision reflects technological advances and permits alteration or movement of a scaffold which is occupied. OSHA notes that proposed paragraph (f)(6) of this section provides requirements for safe movement of mobile manually propelled scaffolds which are occupied by employees.

Proposed paragraph (c)(1)(v) requires that tools, materials and debris shall not be allowed to accumulate on scaffolds so as to cause a hazard. This is identical to existing § 1910.28(a)(20). The intent of this requirement is to allow only those items on the scaffold that are necessary for a particular operation. OSHA believes that compliance with this proposal would reduce fall hazards, and would also reduce the weight imposed on the scaffold.

Proposed paragraph (c)(1)(vi) prohibits work on scaffolds covered with snow, ice or other slippery materials except as necessary for the removal of such materials. The requirements relating to snow and ice are based upon existing paragraph § 1910.28(a)(19) and ANSI A10.8-1988, section 4.23. The proposed requirements for other slippery materials are based on proposed § 1926.451(d)(8). OSHA has determined that the proposed provisions

are necessary to address the slippery surface hazards which employees may confront while working on scaffolds. OSHA has included the provision covering removal of slippery conditions in recognition of the likelihood that employees will need to be on scaffolds while removing the hazard.

Proposed paragraph (c)(1)(vii) prohibits work on or from scaffolds in winds above 40 miles per hour (64.4 km/hr) unless employees are protected from the effects of the wind's force. In addition, wind screens would not be permitted unless the scaffolding is designed for it and the scaffold is secured against the wind loads imposed on it. This requirement is based on existing § 1910.28(a)(18) and ANSI A10.8-1988, section 4.22 which prohibit work on scaffolds "during storms or high winds," and on proposed § 1926.451(d)(11). OSHA believes that working on scaffolds during storms or high winds may be necessary in certain circumstances, but only when proper precautions are taken. OSHA seeks comments on whether the standard should allow this type of operation, and what protective measures should be required. The proposed wind speed regulation is supported by the National Safety Council's "Accident Prevention Manual for Industrial Operations," 8th Edition (Ref. 55). In Table 2-A of that edition, 40 miles per hour (mph) (64.4 km/hr) is listed as the starting point for "very high wind." In addition, an OSHA report (Ref. 7) documents cases where high winds have blown scaffolds over and killed employees. In one of these cases, the wind velocity was reported as approximately 35 to 45 mph (56.3 to 72.4 km/hr). OSHA requests comments regarding the proposed 40 mph (64.4 km/hr) wind speed limitation for scaffold work and any potential compliance problems.

Proposed paragraph (c)(1)(viii) requires that scaffolds not be erected or used within specified distances from exposed and energized power lines, in order to protect employees from electrocution hazards. This requirement is identical to proposed § 1926.451(d)(6) and is consistent with the "National Electrical Code," ANSI A10.8 (section 4.37) and similar requirements applicable to portable ladders and to cranes. Separation distances are required for insulated lines as well as for uninsulated lines because insulation may be deteriorated or damaged, thus exposing energized power lines. Numerous electrocutions of employees working on scaffolds have been investigated by OSHA. As a result of these investigations, OSHA believes

that the proposed requirements are necessary for employee safety.

Proposed paragraph (c)(1)(ix) requires that where materials are being hoisted onto or near scaffolds, a tag line or other equivalent measures to control the load shall be utilized. Existing § 1910.28(a)(15) already requires the use of tag lines in such circumstances. The provision for use of "equivalent measures," which is based on proposed § 1926.451(d)(9), affords employers an opportunity to develop effective alternatives to tag lines, in keeping with OSHA's performance-oriented approach to rulemaking.

The requirements for scaffold suspension ropes are in proposed paragraph (c)(2). Proposed paragraph (c)(2)(i) requires that suspension ropes be capable of supporting, without failure, at least six times the intended load calculated to be applied to or transmitted to that rope. This is based upon existing § 1910.28(a)(22), proposed § 1926.451(a)(3) and ANSI A10.8-1988, sections 4.26 and 6.7.1. Additional guidance for inspection and maintenance of suspension ropes is provided in non-mandatory Appendix A.

Proposed paragraph (c)(2)(ii) requires that suspension ropes supporting manually powered suspended scaffolds be not less than one-fourth inch (.63 cm) diameter improved plow steel wire ropes or equivalent. This requirement is based on ANSI A10.8-1988, section 6.7.2 and has been put into performance language to allow the use of ropes equivalent to wire rope.

Proposed paragraph (c)(2)(iii) requires that suspension ropes for powered scaffolds be not less than five-sixteenths of an inch (.79 cm) diameter improved plow steel wire ropes or equivalent. This requirement is based on ANSI A10.8-1988, section 6.7.3 and has been expanded to allow the use of ropes that are equivalent to wire rope in order to be more performance-oriented.

Proposed paragraphs (c)(2)(iv) and (v) address the need to prevent suspension ropes from separating from winding drum hoists and, thereby, dropping the scaffold. These requirements are based on existing § 1910.28(h)(7), proposed § 1926.451(b)(21) and ANSI A10.8-1988, section 6.3.5.2.

In paragraph (c)(2)(vi), OSHA proposes that wire suspension ropes shall not be joined together except by eye splicing with shackles or coverplates and bolts. This requirement is based on proposed § 1926.451(b)(23) and ANSI A10.8-1988, section 6.7.11.

In paragraph (c)(2)(vii), OSHA proposes that swaged attachments and spliced eyes on wire suspension ropes

be made only by the wire rope manufacturer or a qualified person to assure that these connections are made properly. This requirement, which is based on ANSI A10.8-1988, section 6.7.11.2, is consistent with proposed § 1926.451(b)(26). A comment on that corresponding provision in the part 1926 subpart L—Scaffolds rulemaking [Ex. 2-368] suggested that OSHA delete "the wire rope manufacturers" because "the manufacturers of wire rope do not, as a rule, provide that service." OSHA requests comment, with supporting information, on the extent to which safe swaged attachments and spliced eyes are available.

Proposed paragraph (c)(2)(viii) requires that wire rope clips used on suspension scaffolds be retightened after initial loading, inspected, and kept tight thereafter. This requirement is based on ANSI A10.8-1988, section 6.7.11.3, and is consistent with proposed § 1926.451(b)(27). It is proposed to assure that wire rope clips are properly secured to prevent possible failure of the suspension system. A comment on proposed § 1926.451(b)(27) [Ex. 2-368] suggested that OSHA require, in addition, that wire rope clips be (initially) "tightened to the manufacturer's recommended torque." The apparent purpose of the suggested addition would be to ensure that the clips were properly tightened from the outset. OSHA solicits comment on the proposed provision and on the suggested revision.

In paragraph (c)(2)(ix), OSHA proposes that suspension ropes be protected from open flames, hot work, corrosive chemicals or other adverse conditions. The proposed provision combines the requirements of existing § 1910.20 (a)(21) and (a)(27). In addition, the proposed language is consistent with ANSI A10.8-1988, sections 4.27 and 4.28, and with proposed § 1926.451(d)(10), except that the proposed construction industry standard provides for the use of suspension rope which would not be adversely affected by the substance being used.

Proposed paragraph (c)(2)(x) requires that ropes be regularly inspected and serviced, and prohibits both the use of repaired suspension ropes and the use of defective suspension ropes. This provision which is based on ANSI A10.8-1988, sections 6.16 and 6.17, is consistent with the combined requirements of proposed § 1926.451 (b)(22), (b)(25) and (d)(3).

Proposed paragraph (c)(3) requires that each scaffold component, except suspension ropes and guardrail systems, be capable of supporting, without failure, its own weight and at least four

times the maximum intended load applied or transmitted to that component. This provision, which clarifies existing § 1910.28(a)(4) and is consistent with proposed § 1926.451(a)(1) and ANSI A10.8-1988, section 4.6, contains no substantive changes.

Proposed paragraph (c)(4) requires that scaffolds not be loaded in excess of their maximum intended load. The proposed ban on exceeding the intended load is based on existing § 1910.28(a)(7) and is consistent with proposed § 1926.451(d)(1) and ANSI A10.8-1988, section 4.9. In addition, employers would be required to inform employees using scaffolds of the scaffolds' maximum intended loads. Compliance with this provision would help to ensure that scaffolds would be used within their safe design limits.

Proposed paragraph (c)(5) requires that wood platform units not be covered with opaque coatings, except for unit edges which may be marked for purposes of identification. In addition, it is proposed that periodic coating with a clear wood preservative, fire retardant, or slip-resistant coating be permitted. OSHA proposed this provision, which is essentially identical to proposed § 1926.451(b)(10), because the Agency believes that structural defects in platform units could be concealed from view through the use of an opaque coating or finish. Hairline cracks can significantly reduce the strength of a wood member, so early detection of these cracks is very important. Opaque finishes can hide such cracks, decreasing the likelihood that the needed remedial measures will be taken. Unit edges are excepted from this rule to allow identification marks, grading marks, or other similar types of marks to be placed on the unit edges.

Proposed paragraph (c)(6) requires that scaffolds be erected and used in accordance with applicable manufacturers recommendations under the supervision of a qualified person, and that scaffolds be inspected by a qualified person prior to each day's use. It is also proposed that deficiencies be corrected before each use. This provision is based on existing §§ 1910.28(a)(5) and 1910.28(a)(6) and proposed §§ 1926.451(d)(3) and 1926.451(d)(7) of the OSHA Construction Standards. OSHA anticipates that compliance with the proposed paragraph will ensure that scaffolds are properly erected, inspected and repaired before employees are allowed to use them.

Proposed paragraph (c)(7) requires that scaffold platforms be at least 18 inches (46 cm) wide. OSHA has

determined that the 18-inch (46 cm) dimension is the proper minimum width for scaffolds, and that it is consistent with proposed § 1926.451(b)(2) and with section 11.1.2 of ANSI A10.8-1988.

Proposed paragraph (c)(8), which is consistent with proposed § 1926.451(b)(1), requires that all platforms be fully decked or planked. As guardrails normally can be attached only at scaffold uprights, OSHA would require the planks to be sized such that there is no gap between the outermost plank edge and the guardrail. However, most prefabricated end frames do not have a lateral spacing between uprights which can accommodate a given number of intact, commercially-available planks. Therefore, the last plank would have to be notched, slanted, or cut to size. This can lead to a significant reduction in plank strength, and possibly cause a sideways tipping of the plank if eccentrically loaded. Therefore, to address this problem, the proposed rule would require the span between uprights to be planked or decked as fully as possible, but would allow up to nine and one-half inches (24 cm) between the planking or decking and the guardrail supports. OSHA proposed nine and one-half inches (24 cm) as the maximum allowable open space because spaces larger than that can be filled by a platform unit without modification. The proposed rule also recognizes that some side warpage may occur to individual planks, and paragraph (c)(8)(i) would allow a maximum one inch (2.5 cm) gap between platform units. When side brackets are used to extend the width of a platform, a gap would be permitted in the platform to accommodate the presence of the scaffold uprights.

Proposed paragraph (c)(9) requires that the front edge of the scaffold be as close as is practical to the face of the structure on which work is being performed. Where the front edge of the scaffold is more than 14 inches (35.6 cm) from the face of the structure, a guardrail system would be required to protect that side of the scaffold. OSHA notes that ANSI A10.8-1988, section 4.5.9, requires guardrail systems on suspended scaffolds which are more than 12 inches (30.5 cm) from the structure and on all other scaffolds which are more than 16 inches (40.6 cm) from the structure. This provision, which is consistent with proposed § 1926.451(b)(4), is based on a research study of scaffold spacing (Ref. 23). OSHA believes that this study, which addresses the maximum spacing necessary for the application of stucco to buildings, presents concepts which also apply to operations in general

industry. The Agency further believes that the uses of scaffolds in general industry and construction are sufficiently similar that the same spacing requirements would apply. Based on its review of the referenced study, OSHA has determined that the proposed 14-inch (35.6 cm) threshold, rather than the ANSI 12-inch (30.5 cm) threshold, provides the appropriate level of employee protection.

Proposed paragraph (c)(10) requires that when employees are working below scaffolds, precautions must be taken to prevent tools or material from falling onto them. Such precautions could include installing toeboards or roping off danger areas. The proposed provision, which is consistent with proposed § 1926.451(f)(2), clarifies existing § 1910.28(a)(17) and restates the existing provision in performance language.

Proposed paragraph (c)(11) requires that platform units extend over their end supports not less than six inches (15 cm), unless cleated or otherwise restrained by hooks or equivalent means at both ends, and that those units extend over their end supports no more than 18 inches (46 cm), unless the unit is designed and installed to support employees on the extended area without tipping, or is guarded so that employees do not have access to the cantilevered ends. This provision, which is consistent with proposed § 1926.451(b)(5) and (b)(6), clarifies and updates existing paragraph § 1910.28(a)(13). OSHA recognizes that the means such as cleats or hooks, by which employers secure platform units which extend over the end supports less than six inches (15 cm) and the means, such as guarding, by which employers prevent access to a platform unit where it extends more than 18 inches (46 cm) over the end supports, would adequately assure the safety of employees working on scaffolds.

Proposed paragraph (c)(12) requires that, on scaffolds where platform units have been abutted to create a longer platform, each abutted end of a unit rest on a separate support, butt plate, or equivalent support. This provision, which is identical to proposed § 1926.451(b)(7), is based on existing § 1910.28(b)(12), which applies to wood pole scaffolds. OSHA believes, however, that proper platform support is a valid consideration for all scaffolds, and not just wood pole scaffolds. Abutted platform units do not rest upon one another, but are instead placed end-to-end. Consequently, one unit does not support the abutted unit, and proper support can be provided only by

separate bearers, butt plates, or equivalent supports.

Proposed paragraph (c)(13) requires that, where platform units are overlapped to create longer platforms, the overlaps can occur only over the supports, and can be no less than 12 inches (30.5 cm) unless the overlapped planks are nailed together or otherwise restrained from moving. This provision, which is identical to proposed § 1926.451(b)(8), is based upon existing § 1910.28(a)(11) and ANSI A10.8-1988, section 4.16.

Proposed paragraph (c)(14), which is identical to proposed § 1926.451(b)(11), prohibits intermixing of scaffold components produced by different manufacturers, unless the component parts fit together without force or modification and the resulting scaffold meets the requirements of this section. OSHA is concerned that one manufacturer's components may not be designed to be used with components produced by other manufacturers. Many such combinations result in scaffolds that are not in alignment or that are not plumb. Therefore, they cannot properly carry or distribute the loads imposed on the scaffolds. However, OSHA is also aware that some units may be intermixed with no problem, so the proposed language does not prohibit such combinations. Are there circumstances under which OSHA should allow the modification of component parts? What would be these circumstances? Who should be allowed to modify and/or inspect or certify modified parts?

Proposed paragraph (c)(15) requires that ladders be located to assure that they do not adversely affect the stability of the scaffold, nor tip it over and cause employees on the scaffold to lose their balance. This provision, which is equivalent to proposed § 1926.451(c)(2)(i), is based on the existing mobile scaffold rule, § 1910.29(a)(3)(viii). OSHA has proposed this provision as a general requirement because the Agency believes that all scaffold users should ensure that their ladders do not endanger employees working on scaffolds.

Proposed paragraph (c)(16) requires that a means of access be provided to all scaffold platforms. This provision is based upon existing § 1910.28(a)(12).

Proposed paragraph (c)(17) prohibits the use of gasoline-powered hoists. The proposal, which is based on proposed § 1926.451(b)(29), existing § 1926.451(k)(2) and section 6.3.6.1 of ANSI A10.8-1988. OSHA has determined that gasoline hoists create fire hazards for employees and

therefore, are not acceptable for use on scaffolds, given the confined area of a scaffold and the likelihood that escape from fire would be difficult.

Proposed paragraph (c)(18) requires that suspension scaffold hoists, both mechanically-powered and manually-powered, be of a type tested and listed by a nationally recognized testing laboratory. This provision is identical to proposed § 1926.451(b)(28) and is based on existing § 1910.28(g)(3). OSHA believes that the requirements of existing § 1910.28(g)(3), through currently applied only to two-point suspension scaffolds, should be applied to all suspended scaffolds, in order to protect employees.

Proposed paragraph (c)(19) requires that power operated gears and brakes on suspension scaffold hoists be guarded to prevent employee injury. This is the same requirement as existing paragraph § 1910.28(i)(3). OSHA is considering the inclusion of manually-powered hoists under this provision. Therefore, the Agency solicits comments and information regarding this possible action.

Proposed paragraph (c)(20) requires that a braking device other than the normal operating brake be provided to slow the hoist when the normal speed of descent, usually about 35 feet per minute (10.1 m/min), is exceeded. This is the same requirement as existing § 1910.28(i)(4).

Proposed paragraph (c)(21) requires that manually-powered hoists be built to require a positive crank force to lower the scaffold. This provision, which is identical to proposed § 1926.451(b)(32), is a new requirement for preventing uncontrolled descent, and is based upon ANSI A10.8-1988 section 6.6.10, and OSHA's view that such a provision is needed to eliminate the dangerous condition of a "free-running" hoist during descents.

Proposed paragraph (c)(22) requires that suspension support devices rest on surfaces capable of supporting the reaction forces imposed by the suspension scaffold. This provision, which is identical to proposed § 1926.451(b)(16), is consistent with existing § 1910.28(f)(10) and addresses the need for adequate support of the scaffold system.

Proposed paragraph (c)(23), which is consistent with proposed § 1926.451(b)(18)(i), requires that employers who wish to use outrigger beams with suspended scaffolds must have the direct connections to roof and floor decks evaluated by a qualified person before the outrigger beams are used, in order to ensure that such decks

are capable of supporting the loads to be imposed. The Agency believes that this requirement, while not specifically addressed in the current 1910 standards, is necessary for the protection of workers.

Proposed paragraph (c)(24), which is identical to proposed

§ 1926.451(b)(18)(ii) through (b)(18)(vii), requires stabilizing the inboard ends of outrigger beams by direct connections to the floor or roof deck or by the use of counterweights. This rule clarifies existing §§ 1926.451(h)(4) and 1926.451(j)(5), which require only that outriggers be securely fastened or anchored. Counterweights are not specifically addressed in the existing 1910 standards, and the proposal corrects this oversight. Counterweights are often the only way to anchor a scaffold without damage to the supporting floor or deck. Proposed paragraph (c)(24)(i) requires that direct connections be evaluated by a qualified person to insure that the roof or floor deck is capable of supporting the loads to be imposed. Proposed paragraph (c)(24)(ii) requires that counterweights be made of solid material, and, in effect, prohibits the practice of using sandbags or water-filled buckets as counterweights. Such counterweights are easily displaced and may leak. Proposed paragraph (c)(24)(iii) requires counterweights to be mechanically attached to the outrigger beam. This provision will help protect against accidental counterweight displacement. Proposed paragraph (c)(24)(iv) prohibits the removal of counterweights from a scaffold until the scaffold is disassembled. This new rule is also intended to prevent scaffolds from being improperly balanced. Proposed paragraph (c)(24)(v) requires outrigger beams to be tied back as an additional means of anchorage. This new provision will provide a back-up system in case the counterweights become displaced. Although tiebacks alone may not keep a scaffold from tipping, they will keep the system from falling to the ground and from causing a progressive failure of nearby scaffolds and scaffold sections. Vents, standpipes, other piping systems, and electrical conduits are not acceptable points of anchorage because they are often made of materials that cannot support the loads that would be imposed on them if a counterweight system were to fail. Proposed paragraphs (c)(24)(vi) and (vii) would specify how tiebacks are to be installed. The Agency believes that while these requirements, not specifically addressed in the current 1910 standards, are necessary for the protection of workers.

Proposed paragraph (c)(25), which is based on proposed § 1926.451(b)(17) and (b)(19), presents the construction requirements for outrigger beams. Proposed paragraph (c)(25)(i), which is based upon existing § 1910.28(f)(9), requires U-bolts or shackles at each end of a beam to prevent the beam, as well as anything supported by the beam, from becoming displaced. Proposed paragraph (c)(25)(ii) allows the use of channel beams in lieu of "I" beams, provided they are fastened together with their flanges turned out. The provision is the same as existing paragraph § 1910.28(f)(7). Proposed paragraph (c)(25)(iii), which is a new requirement, requires that outrigger beams be installed with all bearing supports installed perpendicular to the beam centerline. This would help prevent tipping of the beam due to any eccentric loading. Proposed paragraph (c)(24)(iv) requires all outrigger beams to be used with the webs in a vertical position. This provision is the same as existing § 1910.28(f)(8). Proposed paragraph (c)(25)(v) specifies the correct alignment for steel shackles, clevises, and the hoisting drum when single outriggers are used. This provision is based on existing § 1910.28(f)(13). Proposed paragraphs (c)(25)(vi) and (vii) requires that outrigger beams on suspension scaffolds be made of structural steel or equivalent material, and that they be restrained to prevent movement. These are based on existing § 1910.28(f)(4).

Proposed paragraph (c)(26), which is identical to proposed § 1926.451(b)(20), provides requirements for suspension scaffold support devices, other than outrigger beams. Proposed paragraph (c)(26)(i) requires that support devices such as cornice hooks, roof hooks, roof irons, and parapet clamps be made of mild steel or equivalent material. This is the same requirement as appears in existing § 1910.28(g)(4). Proposed paragraph (c)(26)(ii), which is based on ANSI A10.8-1988, section 6.9.6, is a new provision, and requires bearing blocks to spread loads. The ANSI standard specifically requires wooden bearing blocks, but OSHA believes that allowing employers to use blocks made of other materials, so long as they provide equivalent strength and stability, would simplify compliance without detracting from employee protection. The referenced ANSI standard addresses only mason's adjustable multiple-point suspension scaffolds. OSHA, however, believes that this provision should be applied whenever outrigger beams are used with suspension scaffolds. Proposed paragraph (c)(26)(iii) requires the use of tiebacks, just as in existing

§ 1910.28(g)(4). In addition, the proposed provision specifies that the tiebacks be equivalent in strength to the hoisting ropes. OSHA has determined that the tiebacks must be as strong as the hoisting ropes since they may have to support the full load of the scaffold in the event of a scaffold support system failure.

Proposed paragraph (c)(27) sets fall protection requirements for single-point adjustable suspended scaffolds (except for boatswains' chairs) and two-point adjustable suspension scaffolds. Employers would be required to comply with these provisions in lieu of complying with proposed § 1910.28. OSHA has determined that personal fall protection systems, in which employees wear body belts or harnesses which are properly tied off, provide the best assurance that employees working on suspended scaffolds will be adequately protected from fall hazards. OSHA considers guardrails on single-point adjustable and two-point adjustable suspension scaffolds to be barriers that delineate the scaffold edge, restrain movement, provide handholds, and prevent misstepping. Guardrails, however, do not protect employees from falling when a suspension rope fails, because the employees are either thrown from the scaffold as it tips or carried down by the scaffold as it falls. Therefore, the Agency has determined that it is appropriate to require the use of personal fall protection systems as the primary means of fall protection, which guard-rails being used to supplement that protection. OSHA would take the reduced role for guardrails into account by setting minimum height and strength requirements in proposed § 1910.30(c)(27)(i) which are lower than those proposed for guardrails regulated under proposed § 1910.28. The provisions of proposed §§ 1910.30(c)(27)(i) are consistent with the requirements for guardrails used on suspended scaffolds in proposed § 1926.451(e)(4).

The proposed paragraph consolidates and revises the fall protection provisions in existing § 1910.28(g)(5), (g)(9), (i)(5) and (i)(10). Those provisions require fall protection very similar to that required in proposed paragraph (c)(27). In particular, the existing provisions set the minimum guardrail height at 36 inches (91cm).

Proposed paragraph (c)(27)(ii) requires that employees working on single level scaffolds or on top surface of multilevel scaffolds be protected by personal fall protection systems, meeting the requirements of subpart I. Such systems must be attached either to a structure or,

if supplementary platform support lines are used in conjunction with automatic safety locking devices capable of stopping the fall of the scaffold in the event any of the main suspension lines fail, to supplementary platform support lines or a scaffold member which can withstand at least 5,000 pounds (22.2kN). The option of tying off to supplementary lines or scaffold components is not available under the existing standards. The Agency has determined that such connections, when performed in compliance with the proposed paragraph, provide protection which is equivalent to that provided through proper tie-off to a structure. OSHA believes that personal fall protection systems which satisfy the proposed requirements will adequately protect employees from fall hazards. The 5,000 pound (22.2kN) strength requirement was taken from the latest draft revision of ANSI A10.14, *Requirements for Safety Belts, Harnesses, Lanyards and Lifelines for Construction and Demolition*. The proposed paragraph is consistent with the recently issued § 1910.66 appendix C, section I(c)(10) requirements for anchorages used with powered platforms for building maintenance and with proposed § 1926.451(e)(3).

Proposed paragraph (c)(27)(iii) which is consistent with proposed § 1926.451(e)(3), requires that multilevel platforms and scaffolds with overhead protection be provided with supplementary platform support lines and automatic safety locking devices capable of stopping the fall of the loaded platform in the event any of the main suspension lines fail. Employees would be provided with personal fall protection systems, meeting the requirements of subpart I, which are attached to either a supplementary support line or a scaffold member capable of resisting an impact force of 5,000 pounds (22.2 kN). OSHA is aware that employees working on suspended scaffolds with overhead obstructions could be killed or seriously injured if body belts or harnesses connected outside the scaffold arrest a fall and the overhead obstruction strikes the employee as it falls past. Therefore, the Agency has proposed provisions which clearly state how employers who use scaffolds with overhead obstructions are to protect affected employees from fall hazards. OSHA believes that employers who comply with proposed paragraph (c)(27) would adequately protect employees working on suspended scaffolds from fall hazards.

OSHA proposes to address two-point adjustable suspension scaffolds in

paragraph (d). This type of scaffold is regulated by paragraph (g) of § 1910.28 in the existing standards. Proposed paragraph (d)(1), which is identical to proposed § 1926.452(p)(1), limits the width of platform units to a maximum of 36 inches (91 cm), unless the platform is designed to be stable under the conditions of use by a qualified person. This is consistent with the existing requirement of § 1910.28(g)(1). However, the existing requirement also sets the minimum width of scaffold platforms at 20 inches (51 cm). As discussed above, in relation to proposed § 1910.30(c)(7), OSHA requires that all scaffold platforms, including two-point suspension scaffolds, have a minimum width of 18 inches (46 cm). The proposed provision is consistent with the requirements in proposed § 1926.451(b)(2).

The purpose of proposed paragraph (d)(1) is to prevent the construction and use of platforms on two-point suspended scaffolds that could overturn or otherwise fail. OSHA recognizes that platforms wider than 36 inches (91 cm) can be properly designed so that overturning or other unstable conditions are avoided.

Proposed paragraph (d)(2), which is consistent with proposed § 1926.452(p)(2) and (p)(4) and with existing § 1926.451(i)(10) requires that platforms be securely fastened to their hangers by U-bolts or other equivalent means. This requirement is identical to existing § 1910.28(g)(1) and is consistent with ANSI A10.8-1988, section 5.1.1. The proposed paragraph revises and expands the application of existing § 1910.28(g)(2), which specifies the types of platforms to be used with two-point suspension scaffolds. The existing language covers all of the platform types covered by the proposal except the light metal-type. The testing requirement for light metal-type platforms is based on existing § 1926.451(i)(10)(iv) and proposed § 1926.452(p)(4). The proposed provision does not specify what type of material can be used to fabricate the platform. Instead, OSHA relies on the definition of "platform unit" in proposed § 1910.21(b) and compliance with the strength requirement in proposed § 1910.30(c)(3) to ensure appropriate employee protection. OSHA solicits comments as to the necessity of requiring light-metal type platforms to be tested and listed by a nationally reorganized testing laboratory.

Proposed paragraph (d)(3), which is identical to proposed § 1926.452(p)(5), requires that two-point suspension scaffolds be secured to prevent swaying, and would prohibit the use of window

cleaners' anchorages for that purpose. This proposed provision is, effectively, identical to existing § 1910.28(g)(11). There is no change in the employer's duty.

Proposed paragraph (d)(4), which is identical to proposed § 1926.452(p)(6), prohibits the bridging or connecting of two or more scaffolds during raising and lowering operations, unless they are specifically designed for use in multi-point systems; have hoists which are properly sized; and are designed to articulate. This requirement is based on ANSI A10.8-1988, section 6.10.8, and reflects concern that a bridging device could cause significant overloading of the hoist nearest the bridging device during operation of the hoist. That overloading, in turn, could cause excessive platform tipping. In addition, OSHA notes that many hoists are sized so that they can support only one end of a two-point system. If one of two bridged scaffolds were to be raised by a hoist, a bridge or connection between the scaffolds could cause the rising scaffold to pick up the second scaffold also. This would significantly increase the load on the hoist, and could also result in the second scaffold tipping up at a dangerous angle. The proposed requirement would address these two hazards.

Proposed paragraph (d)(5), which is effectively identical to proposed § 1926.452(p)(7), allows the passage of employees from one scaffold to another, provided the scaffolds are at the same height, abutted, and walk-through stirrups are used. This provision is based on ANSI A10.8-1988, section 6.10.8.

Proposed paragraph (e) provides requirements for employers who use single-point adjustable suspension scaffolds. Proposed paragraph (e)(1) requires that scaffolds, including hoists, be of a design tested and listed by a nationally recognized testing laboratory. This requirement is based on existing § 1910.28(j)(1) and ANSI A10.8-1988, section 6.11.3.1. OSHA notes that single-point adjustable suspension scaffolds designs, unlike those of other scaffolds covered by this proposal, are generally tested and listed. This indicates to OSHA that such testing and listing are generally accepted as necessary to ensure the safety of employees using single-point adjustable scaffolds. Therefore, the Agency believes that this proposed requirement is appropriate.

OSHA proposes in paragraph (e)(2) that when two single-point adjustable suspension scaffolds are combined to form a two-point adjustable suspension scaffold, the resulting scaffold must

meet the requirements for two-point adjustable suspension scaffolds. This provision is, in effect, identical to existing § 1910.28(i)(7).

In paragraph (f), OSHA proposes specific requirements for mobile manually-propelled scaffolds. Proposed paragraph (f)(1) requires that employees on mobile scaffolds be protected by a fall protection system in accordance with § 1910.28 on all open sides and ends of platforms more than 10 feet (3 m) above lower levels. This is based on proposed § 1926.451(e)(1), section 4.5 of ANSI A10.8-1988 and OSHA's understanding of current industry practice. The proposed requirement would give the employer flexibility to provide employees the type of fall protection system best suited to the particular situation.

Proposed paragraph (f)(2), a new provision which is effectively identical to proposed § 1926.451(w)(9) and ANSI A10.8-1988, section 11.2.4, requires that casters be secured to prevent them from accidentally falling out of their mountings. OSHA is concerned that when casters fall out of their mountings, scaffolds become unstable and can tip over, resulting in employee injury.

Proposed paragraph (f)(3), requires that mobile scaffolds be used only on surfaces that are rigid and capable of supporting the scaffold in a loaded condition without settling or displacement. In addition, it is proposed that unstable objects, such as barrels, boxes, loose bricks, or concrete blocks, may not be used to support scaffolds. This provision is based upon existing § 1910.28(a)(2).

Proposed paragraph (f)(4), requires that when leveling of a scaffold is required, the scaffold legs have provisions for level adjustment. This provision is effectively identical to existing § 1910.29(a)(4)(iii).

Proposed paragraph (f)(5) requires that scaffolds be secured against unintentional movement when being used in a stationary manner. This provision is effectively identical to existing § 1910.29(a)(4)(ii) and based on existing § 1926.451(e)(8).

Proposed paragraph (f)(6), which is based on existing § 1926.451(e)(6) and proposed § 1926.452(w)(3), (w)(5) and (w)(6)(i), requires that the force used to move mobile scaffolds be applied as close to the base of the scaffold as practicable, but no more than five feet (1.5 m) above the supported surface; that provisions be made to stabilize the scaffold to prevent tipping during movement; and that surfaces over which the scaffold is to pass shall be free of obstructions and openings that may cause the scaffold to tip. The movement

of mobile scaffolds is not addressed in the existing part 1910. OSHA has proposed paragraph (f)(6) because of the Agency's concern for the need to reduce the possibility of employee injury during scaffold movement.

Proposed paragraph (f)(7) specifies the conditions that must be followed if employees are allowed to ride on mobile scaffolds. OSHA proposes the following in paragraph (f)(7)(i) through (f)(7)(vi): That the surface be within three degrees of level, and free of pits, holes, and obstructions; that the maximum height-to-base width ratio of the scaffold during movement should be two to one, or less (outrigger frames, when used, may be included as part of the base width dimension); that outriggers, when used, be installed on opposite sides of the scaffold; that all tools and materials be secured or removed from the platform, or that toeboards be installed on all sides of the scaffold; that employees do not ride on any part of the scaffold which extends outward beyond the wheels, casters, or other supports; and that employees have advance knowledge of the scaffold's movement. Proposed paragraphs (f)(7)(i), (ii), (iii) and (iv) are based, in part, upon existing § 1926.451(e)(7) and are consistent with proposed § 1926.452(w) of the OSHA Construction Standards. Proposed paragraph (f)(7)(v), a new requirement, which is consistent with proposed § 1926.452(w)(6)(v), is intended to minimize the possibility of the scaffold tipping during movement. Proposed paragraph (f)(7)(vi), which is based on ANSI A10.8-1988, section 11.3.2.5, is also a new provision, and is intended to minimize the possibility that employees on the scaffold will fall due to unexpected movement of the scaffold.

As stated above, proposed paragraph (f)(7)(i), which requires surfaces to be within three degrees of level, was taken from the existing and proposed OSHA Construction Standards. However, ANSI A10.8-1988, section 11.3.2.2, specifies that the surface should be within 1½ degrees of level. The Agency has determined that requiring surfaces to be within 1½ degrees from level is unreasonable because OSHA believes that many workplaces have surfaces that deviate more than 1½ degrees of level without posing tipping hazards for mobile scaffolds. The Agency notes that following the ANSI standard would, in effect, prohibit employees from riding mobile scaffolds. Therefore, OSHA proposes three degrees of level to be responsive to actual minor unevenness which the Agency believes is reasonable to anticipate in a great number of surfaces and to be consistent with the existing and proposed Construction

Standards. OSHA requests comments, with supporting information on the proposed requirements.

Proposed paragraph (f)(8) requires that scaffolds with a height to base width ratio of more than four-to-one be restrained from tipping by guying, tying, bracing, or other equivalent means. This requirement, which is consistent with proposed § 1926.451(b)(13) and ANSI A10.8-1988, section 11.1.1, is based on a provision in existing § 1910.29(a)(3)(i).

Proposed paragraph (f)(9), requires that scaffold poles, legs, posts, and uprights be plumb, secure, and rigidly braced to prevent swaying and displacement. This requirement, which is consistent with proposed §§ 1926.451(b)(15) and 1926.452(w)(1), is essentially identical to existing § 1910.29(a)(3)(iii).

Proposed paragraph (f)(10) requires that scaffold platforms not extend outward past the base supports of the scaffold. OSHA anticipates that compliance with this provision, which is based on ANSI 10.8-1988, section 11.3.5, and is essentially identical to proposed § 1926.452(w)(7), would prevent dangerous eccentric loading on the scaffold frame which could cause the scaffold to tip over. The proposed paragraph also provides that where stabilizing means, such as outrigger supports, are used appropriately, the platform may extend outside the normal base points of support.

Proposed paragraph (g) regulates boatswains' chairs. Boatswains' chairs are currently regulated by existing § 1910.28(j). OSHA's proposal is based upon the requirements of existing § 1910.28(j) and ANSI A10.8-1988, section 6.14 (Ref. 56). The Agency notes that proposed § 1926.452(o) combines requirements for boatswains' chairs and other single-point adjustable suspension scaffolds. OSHA proposes to regulate boatswains' chairs separately from other single-point adjustable suspension scaffolds because the Agency believes that, for the sake of providing clear regulations for general industry operation, it is appropriate to emphasize requirements for safe use of boatswains' chairs.

Proposed paragraph (g)(1) sets the requirements for the chair strength. Existing paragraph (j)(1) of § 1910.28 specifies minimum dimensions for the seat and requires that the underside of the seat be reinforced to prevent splitting. OSHA believes, in keeping with its performance-oriented approach to rulemaking, that load limit criteria are more appropriate than specific size requirements. A platform meeting the existing requirement would be deemed to meet OSHA's proposed criteria.

Proposed paragraph (g)(2) requires that tiebacks, when used, shall be approximately perpendicular to the structure face. This is consistent with existing § 1910.28(j)(6).

Proposed paragraph (g)(3) requires that each employee be protected with a personal fall protection system which satisfies the requirements of subpart I. This proposed paragraph, which is based on existing § 1910.28(j)(4), adds body harnesses to the list of permissible fall protection measures, based on the Agency's belief that either body harnesses or body belts which comply with proposed subpart I will provide adequate fall protection.

Proposed paragraph (g)(4) sets criteria for boatswains' chair tackle and rope. The proposed requirement consolidates existing § 1910.28 (j)(2) and (j)(5) and, as with proposed paragraph (g)(1), revises the existing requirements so that they focus on the strength of the rope rather than a specific size and type of rope. The rating of the five-eighth inch (15.9 mm) manila rope that is required in both the existing standard and ANSI A10.8-1988, section 6.14.5, is 4,400 pounds (19.5 kN). By specifying a minimum strength rather than a specific size and type of rope, other types of rope that may be more elastic and durable than manila may be used. The proposed new requirement for "eye" splicing is based on section 6.14.5 of ANSI A10.8-1988.

In proposed paragraph (g)(5), OSHA would require that seat slings be constructed of at least three-eighth inch (.95 cm) diameter wire rope when the employee is conducting heat producing operations. This requirement is the same as existing paragraph (j)(3) of § 1910.28.

Section 1910.31 Mobile Elevating Work Platforms, Mobile Ladder Stands and Power Industrial Fork Lift Truck Platforms

OSHA proposes to revise existing § 1910.29, *Manually propelled ladder stands and scaffolds (towers)*, which covers mobile scaffolds, mobile work platforms and mobile ladder stands, so that manually propelled mobile scaffolds and mobile work platforms would be covered by proposed § 1910.30, *Scaffolds* as discussed above. The remaining provisions of existing § 1910.29, which address mobile ladder stands, would be covered in this new § 1910.31. In addition, as noted in paragraph (a) of proposed § 1910.31, OSHA proposes to include requirements for mobile elevating work platforms and powered industrial fork lift truck platforms equipment not presently covered by OSHA in the General Industry Standards.

OSHA sets forth the application of § 1910.31 in paragraph (a). OSHA is proposing general requirements in paragraph (b) that would be applicable to all equipment regulated by proposed § 1910.31. Proposed paragraph (b)(1) sets performance-oriented design criteria. It is proposed that all units regulated by § 1910.31 be designed, installed and maintained to support their maximum intended loads. The proposed requirement consolidates and clarifies the requirements in existing paragraphs (a)(2)(i), (a)(2)(ii), and (a)(2)(iii) of § 1910.29.

Proposed paragraph (b)(2) requires that all units be visually inspected, prior to use, for defects that could cause failure of the unit. This is a new requirement. Proposed § 1910.22(d) requires inspection and maintenance of walking and working surfaces by a qualified person. Proposed paragraph (b)(2) sets the additional requirement that inspections be performed prior to the use of units and meet applicable manufacturers' specifications. This proposed requirement is consistent with inspection criteria for other types of regulated surfaces in proposed §§ 1910.23(b)(11), 1910.30(c)(6) and 1926.451(d)(3). OSHA anticipates that good inspection and preventive maintenance programs will be effective in reducing employee injuries.

Proposed paragraph (b)(3) requires that units found to be defective during inspection be tagged in accordance with § 1910.145, and removed from service until repaired. This is also a new requirement, and is consistent with requirements in proposed §§ 1910.23(b)(9) and 1926.1053(b)(16) for defective ladders. OSHA believes that the requirement is necessary to prevent the unintentional use of defective equipment.

Proposed paragraph (b)(4) requires that employees be trained in the safe use of units covered by § 1910.31 prior to their use. This new requirement, which OSHA believes is necessary to ensure that new employees are made aware of hazards associated with the equipment they are expected to use, is consistent with proposed §§ 1926.460, 1926.503 and 1926.1060. Employee training, as well as inspection and maintenance programs (previously discussed), would reduce employee injury because increased employee awareness of hazards would lead employees to avoid hazards.

Proposed paragraph (b)(5) requires that each unit be secured to prevent unintended motion while in use. The proposed paragraph would be a new requirement for all types of equipment covered by § 1910.31. Existing paragraph

(a)(4)(ii) of § 1910.29 requires that mobile scaffolds mounted on casters be provided with a positive means for preventing unintended motion. OSHA believes that the existing requirement for scaffolds should have its coverage expanded so that it applies to all units regulated under this proposed section. Unintentional motion due to shifting work loads, external forces, or similar reactions could cause employees to lose their balance and fall from any type of mobile platform.

Proposed paragraph (b)(6) prohibits the use of any device to achieve additional height on a unit covered by this section. This new requirement is consistent with proposed §§ 1910.30(c)(1)(i) and 1926.451(d)(13). OSHA believes that the use of ladders, blocks, boxes, planks, or other devices to achieve greater height is likely to impose dangerous loads on the unit or create an unbalanced system that could become unstable and collapse.

Proposed paragraph (b)(7) requires that all exposed surfaces be kept free of hazards likely to cause punctures or lacerations. This proposal is consistent with existing § 1910.29(a)(2)(v) and with proposed §§ 1910.22(a)(1), 1910.28(b)(4) and 1926.451(e)(4)(xi), and is intended to prevent employee injury due to punctures or lacerations.

Proposed paragraph (c) addresses mobile elevating work platforms. OSHA is proposing this new paragraph to regulate equipment which, while not currently regulated, is being utilized in general industry.

Proposed paragraph (c)(1) requires the units to be capable of supporting at least 300 pounds (135 kg). Existing § 1910.29(e)(1), which covers mobile work platforms, requires that unit design comply with existing § 1910.29(a). Existing § 1910.29-(a), in turn, requires that units be designed to support their intended loads safely. OSHA's proposal provides employers with compliance guidelines, and reflects *American National Standard for Manually Propelled Elevating Work Platforms*, ANSI A92.3-1980 (Ref. 57).

Proposed paragraph (c)(2) requires structural safety factors for mobile work platforms. Paragraph (c)(2)(i), which is consistent with ANSI A92.3-1980, section 4.2.2.1, requires a structural safety factor of not less than two, based upon the minimum yield strength of the material used. Proposed paragraph (c)(2)(ii), which requires a structural safety factor of not less than five for structural members made of nonductile material, is consistent with ANSI A92.3-1980, section 4.2.2.2.

Under proposed paragraph (c)(3), employers must limit the maximum platform height of non-articulating units to four times the minimum base dimension. This proposal is based on the general requirements for manually propelled mobile ladder stands and scaffolds in existing § 1910.29(a)(3)(i) and is consistent with the height to base ratio for mobile scaffolds in proposed § 1910.30(f)(8).

Proposed paragraph (c)(4) sets requirements for unit platform size and perimeter protection. The existing standards do not provide requirements for the width of mobile elevating work platforms. OSHA proposes a minimum width of 18 inches (46 cm), based on ANSI A92.3-1980, section 6.1. This proposed requirement is consistent with existing requirements for minimum platform widths on scaffolds and ladder stands. Proposed paragraph (c)(4) also addresses the need for perimeter protection. While ANSI A92.3-1980 limits protection to the use of guardrails, OSHA proposes to allow the use of fall protection systems meeting the requirements of proposed § 1910.28 when the use of guardrails is infeasible. OSHA's proposal is consistent with its policy of providing for the use of alternative means of protection where possible. OSHA's proposed requirements for toeboards are consistent with the existing OSHA standards and ANSI A92.3-1980, section 6.3.

In proposed paragraph (c)(5), OSHA addresses the safety factors for the design of hydraulic or pneumatic elevating assemblies. The requirements do not have counterparts in the current OSHA standards. The proposed paragraph, which is based on ANSI A92.3-1980, section 7.1.2, specifies the minimum bursting strength for hydraulic or pneumatic system components. OSHA anticipates that compliance with the proposed paragraph will help employers to prevent system failures and the attendant employee fall hazards.

In paragraph (c)(6), OSHA proposes a minimum safety factor of eight to one (8:1) for ropes and chains used to support the maximum intended load of a platform. OSHA's proposal is based upon ANSI A92.3-1980, section 7.1.1, and is necessary to ensure employee safety while work is being conducted on a platform supported by ropes or chains. OSHA anticipates that compliance with the proposed paragraph will prevent failure of the platform system while it is bearing its rated work load.

Proposed paragraph (c)(7) addresses the hazard of uncontrolled work platform descent. This hazard arises

when the elevating assembly fails. OSHA proposes that all systems be designed to prevent free fall descent or uncontrollable falls in the event of the elevating system's failure, so that employees are protected from injury resulting from uncontrollable platform descent. OSHA also proposes that an emergency means be provided, accessible from ground level, and clearly marked, for emergency lowering of a platform, in order to permit the emergency lowering of the unit from the base level should the employee on the unit become incapacitated. The proposal is based upon recommended industry practice contained in ANSI A92.3-1980, section 7.3.

Proposed paragraph (c)(8) requires outriggers and stabilizers to be constructed in a manner that will prevent their unintentional retraction. This requirement is based upon ANSI A92.3-1980, section 7.2.7, and is consistent with proposed §§ 1910.30(c)(25)(vii) and 1926.451 (b)(17) and (b)(18). The purpose of the requirement is to prevent the accidental retraction of the outriggers or stabilizers that could result in an unstable work platform.

Proposed paragraph (c)(9) sets requirements for the lateral movement of mobile elevating work platforms. This requirement is based on ANSI A92.3-1980, section 13.3.7. OSHA believes that some guidance to employers and employees is necessary to prevent employee injury during relocation of mobile elevating work platforms.

Proposed paragraph (c)(10) requires that the employer clear the area surrounding the work platform of employees and equipment before lowering the platform. This requirement is based upon ANSI A92.3-1980, section 13.3.8(8). OSHA believes that such a requirement is necessary to prevent employees from being under the descending units, and from being struck or injured by the platform itself or by other pieces of the equipment.

Proposed paragraph (d) regulates mobile ladder stands. This type of equipment is presently addressed by paragraph (f) of existing § 1910.29, the requirements of which are based upon ANSI A92.1-1971, *Standard for Manually Propelled Mobile Ladder Stands and Scaffolds (Towers)*. The ANSI code was revised in 1977 (Ref. 58). In addition, OSHA notes that the ANSI A14.7 Committee on Mobile Ladder Stands and Mobile Work Platforms has developed a draft standard under which mobile ladder stands would be removed from the ANSI A92.1 standard and placed into the ANSI A14.7 draft standard. OSHA has assisted the ANSI

A14.7 Committee in its efforts to develop a new ANSI A14.7 standard which covers mobile ladder stands, and has used the ANSI A14.7 draft standard as a basis for this proposal.

OSHA proposes to "grandfather" certain railing requirements so that proposed provisions would not apply to existing units. This means that existing equipment could remain in use if it meets the existing standards. Units placed into service 60 days or more after the effective date of the final rule would have to meet the revised requirements for mobile ladder stands. This is explained further in the discussion of proposed paragraph (d)(3) below.

In proposed paragraph (d)(1), OSHA addresses the design strength of mobile ladder stands and requires that equipment be capable of supporting four times its intended load. The proposed standard is based upon ANSI A92.1-1977 and is an accepted industry practice.

Proposed paragraph (d)(2) limits maximum work heights to four times the least base dimension. It would also address outriggers. The proposed regulation, in effect, restates the requirements of existing § 1910.29(a)(3)(i). The latest draft revision of ANSI A14.7 allows alternative testing of units in lieu of the four to one height to base ratio. This is similar to the stability test requirements in the *American National Standard for Boom-Supported Elevating Work Platforms*, ANSI A92.5-1980, section 4. Should OSHA consider the testing of units as an alternative to the base to height ratio? Please submit recommended test criteria with appropriate justification.

Proposed paragraph (d)(3) sets requirements for guardrails and railing systems.

Proposed paragraph (d)(3)(i) requires a railing system at least 29 inches (73.6 cm) high on the exposed sides and ends of units more than five steps or 60 inches (1.5 m) in vertical height to the top step, but less than 10 feet (3 m), placed into service before (insert date 60 days after the effective date of the final rule in the *Federal Register*). The proposed standard is consistent with existing § 1910.29(f)(4), and does not change the current obligation of the employer for existing units.

Proposed paragraph (d)(3)(ii) addresses railing systems for units with a maximum work surface height of at least four feet (1.2 m), but less than 10 feet (3 m), that are placed into service on or after (insert date 60 days after the effective date of the final rule in the *Federal Register*). This requirement will

provide a minimum 30-inch (7.6 cm) barrier for employee protection and is consistent with current manufacturing practices. The use of standard guardrails on these units is not considered to be necessary since this type of equipment is similar to scaffolds, where guardrails are only required above 10 feet (3 m).

In paragraph (d)(3)(iii), OSHA proposes to require guardrail systems on units placed into service prior to (insert date 60 days after the effective date of the final rule in the Federal Register), and with a maximum work surface height of 10 feet (3 m) or higher. This guardrail would have to be at least 36 inches (91 cm) high. The Agency proposes to delete the requirement in existing § 1910.29(a)(3)(vii) for a maximum guardrail height of 42 inches (1.1 m) because OSHA feels that it is not necessary. The proposed standard is otherwise consistent with existing § 1910.29(a)(3)(vii).

In paragraph (d)(3)(iv), OSHA proposes to require a guardrail system meeting § 1910.28 for units with a maximum work surface height of 10 feet (3 m) or greater, which are placed into service on or after 60 days after the effective date of the final rule. This is a new requirement based on ANSI A92.1-1977 section 3.2.8. This provision would make the guardrail requirements for mobile ladder stands consistent with the guardrail requirements for scaffolds.

Proposed paragraph (d)(3)(v) allows the use of removal gates and non-rigid members in guardrail or railing systems, for the purpose of access, provided that the necessary guardrail or railing systems are in place when the access opening is not in use. OSHA notes that access openings are needed in a wide variety of work settings, such as where employees have to service aircraft engines, pull stock from shelves, or access areas where the presence of a barrier would seriously hinder operations. OSHA believes that the surface of the area being worked or accessed will act as a guard and prevent employees from falling to lower levels. This requirement is consistent with proposed § 1910.28(b)(6) for access through guardrails.

Proposed paragraph (d)(4) requires handrails on certain mobile ladder stands. Proposed paragraph (d)(4)(i) requires handrails at least 29 inches (73.6 cm) high for all mobile ladder stands of more than five steps or at least 60 inches (1.5 m) high and placed into service before 60 days after the effective date of the final rule. This proposed requirement is consistent with existing § 1910.29(f)(4).

Proposed paragraph (d)(4)(ii) requires handrails on mobile ladder stands, with

a maximum work surface height of four feet (1.2 m) or more placed into service on or after 60 days after the effective date of the final rule, to meet the requirement of proposed § 1910.28. This requirement would provide consistency with the other regulations in subpart D.

Proposed paragraph (d)(5) allows greater flexibility in the design of steps. This expands the existing requirement, § 1910.29(f)(3), which is consistent with ANSI A92.1-1977, section 8.3. OSHA proposes to reduce the minimum height of the steps from nine inches (22 cm) to six and one-half inches (16.5 cm) to be consistent with the minimum height requirements in existing § 1910.24(e) and proposed § 1910.25(c)(2). Lowering the minimum height of the steps will decrease the angle of the mobile ladder stands and will not adversely affect the safety of employees. OSHA has retained the existing 10-inch (25.4 cm) maximum requirement from existing § 1910.29(f)(3).

Proposed paragraph (d)(6) requires that units be locked in position to prevent movement when in use, and requires positive locks on the swivels or wheels of swivel casters. This is a minor rewording of the existing requirement, § 1910.29(a)(4)(ii).

Proposed paragraph (d)(7) prohibits employees from riding mobile ladder stands. These units are not designed for riding insofar as they are generally equipped with spring-loaded casters that retract when a load is applied.

Proposed paragraph (e) addresses a type of platform that has not previously been regulated by OSHA, but which has become a commonly used method for elevating employees to high work stations. OSHA is concerned that platforms, such as shipping pallets, attached to powered industrial trucks, may not provide employees with appropriate protection. Rather than prohibit the use of platforms attached to powered industrial trucks, such as fork lifts, OSHA proposes to regulate the use of such devices. Currently, employees who use this equipment may not receive adequate protection, so requirements for the implementation of safe work practices are necessary. These requirements are based in part on ASME/ANSI B56.1-1988, *Safety Standard for Low Lift and High Trucks* (Ref. 62).

In proposed paragraph (e)(1), OSHA requires that platforms be securely fastened or connected to the lifting carriage or the forks of the industrial truck. This proposal is necessary to prevent the unintentional movement or disengagement of the platform.

Proposed paragraph (e)(2) requires that employees be protected from moving parts on the truck. Appropriate

protection could include such measures as cages or any other barriers that would ensure that employees would not contact moving parts or the truck.

Proposed paragraph (e)(3) requires employees to be protected from objects falling on them from above their work level. The inclusion of a requirement for overhead protection is consistent with other provisions in the OSHA standards, such as existing § 1910.28(a)(16) and proposed § 1910.30(c)(1)(iii), which require protection from overhead hazards.

Proposed paragraph (e)(4) requires a minimum platform width of 18 inches (46 cm). This proposal is consistent with other OSHA standards. OSHA believes that compliance with the proposed provision would provide employees with an adequately sized work platform. Should OSHA require a minimum platform width other than 18 inches (46 cm)? Please submit recommended minimum width recommendations, along with appropriate justification.

Proposed paragraph (e)(5) requires employers to protect employees from fall hazards with a fall protection system on platforms four feet (1.2 m) or more off the ground. This is consistent with the general requirement protecting employees from fall hazards in proposed § 190.27(b)(3).

Section 1910.32 Special Surfaces

OSHA is proposing in § 1910.32 to regulate certain surfaces that are not currently covered, or which, though currently regulated, may need special consideration because of unique concerns. OSHA believes, based on its concerns for employee protection, that it is more appropriate to set specific requirements for these surfaces than to exempt them from the general requirements for fall protection. The fall protection requirements for walking and working surfaces that are set by other sections of this subpart would apply when there is no conflict with this section.

In proposed paragraph (a), OSHA sets the scope and application for this section. OSHA has determined that there are certain walking and working surfaces where it would be unreasonably burdensome to apply the fall protection provisions found elsewhere in subpart D. Therefore, the Agency has proposed alternative fall protection requirements which would apply to the specified walking and working surfaces.

In proposed paragraph (b)(1), OSHA addresses vehicle repair pits and assembly pits. These pits present a unique problem because the use of

guardrails for perimeter protection would interfere with normal work operations.

Vehicle repair pits are intended to provide employee access to the underside of vehicles, without the need to elevate the vehicle. Typically a vehicle is driven over the pit and the employee enters the pit via a flight of stairs. The employee then performs whatever repairs or adjustments are necessary to the underside of the vehicle.

Guardrails or similar fall protection systems installed at the perimeter of the pit may cause problems to employees when vehicles are moved over or away from the pit. Further, once a vehicle is moved over the pit, the hazard of falling into the pit has been eliminated. The primary falling hazard to employees exists only when vehicles are not over the pit. OSHA notes, based on its understanding of vehicle repair operations, that employees are unlikely to be in the vicinity of a repair pit unless there is a vehicle over the pit.

OSHA believes that adequate fall protection for employees can be provided by the various alternative methods allowed by proposed paragraph (b)(1). Floor markings applied to the area surrounding the pit; movable stanchions meeting the requirements of proposed § 1910.28; or a combination of both can be used to warn employees of the fall hazards resulting from the presence of the pit. A designated safe area, from the rim of the pit extending back six feet (1.8 m) from the rim, provides sufficient early warning to employees to prevent their unexpected falls into the pit. The use of caution signs that effectively notify employees of the presence of the fall hazard would restrict the area to authorized employees and would further limit employee exposure to the open perimeter.

Therefore, OSHA is proposing in paragraph (b)(1) to exempt repair and assembly pits less than 10 feet (3 m) deep from the fall protection system requirements contained in proposed § 1910.28. Instead, the employer would implement alternative methods of protection that would provide employees with timely warning of the hazards associated with working near vehicle repair and assembly pits.

In proposed paragraph (b)(2), OSHA addresses slaughtering facility platforms. OSHA proposes to exempt the working side of platforms from the perimeter protection requirements of proposed § 1910.27(b). The exemption, however, would cover only guardrails. Toeboards would still be required. All other sides of the platforms would

require perimeter guarding. Further, OSHA proposes that all employees be trained to recognize and avoid the hazards involved with this work. OSHA solicits comments, with supporting information, on the extent to which slaughterhouse workers can be protected from fall hazards through the use of personal fall arrest systems, or through other alternative measures.

Platforms in slaughtering facilities where carcasses are being processed raise unique concerns. Federal meat inspection requirements prohibit contact between the meat being processed or inspected, and surrounding surfaces. If guardrails were required, contact with the carcasses would be unavoidable. Therefore, because of the apparent conflict between the proposed rule and meat inspection standards, OSHA is proposing to exempt slaughtering facility platforms from OSHA's guardrail requirements where toeboards or similar means which reduce the likelihood that employees would slide off or fall off the surface of the exposed perimeter have been provided, and where employees have been trained to recognize the hazards of the workplace. This proposed paragraph would formalize OSHA Instruction STD 1-1.7, October 30, 1978.

Proposed paragraph (b)(3) exempts the working side of loading rack platforms used for access to tank cars, trucks or similar equipment from the fall protection requirements of proposed § 1910.27(b). OSHA believes that the exemption is appropriate because tank, truck and car configurations vary so much it is infeasible to set uniform guardrail design requirements. OSHA also notes that permanent guardrail placement makes loading or unloading operations more difficult, if not more hazardous. Therefore, OSHA proposes to exempt the working side of loading rack platforms from the perimeter protection requirements of proposed § 1910.27(b), where employees have been trained to recognize and avoid the hazards of their work. In addition, OSHA proposes that loading rack platform walkways be at least 18 inches (46 cm) wide. Should OSHA require a minimum width for loading rack platform walkways other than 18 inches (46 cm)? Please submit minimum width recommendations, along with appropriate justification.

Proposed paragraph (b)(4) exempts loading docks, teeming tables, and similar locations from the perimeter guarding requirements of proposed § 1910.27(b), where guardrails or other types of fall protection are infeasible because they would prevent the performance of normal work procedures and might create a greater hazard than

that which would be present in their absence. Therefore, OSHA proposes that in the situations where employees have been trained to recognize and avoid potential fall hazards, such as the open edge of a loading dock, employers would not have to provide guardrails.

In paragraph (b)(5), OSHA proposes to provide requirements for qualified climbers. Proposed § 1910.23(a)(2) provides that ladders which are climbed two or fewer times a year are not required to have ladder safety devices, wells or cages where their installation and maintenance would present greater hazards than having qualified climbers use a ladder without fall protection. As defined in proposed § 1910.21(b), qualified climbers are employees, who by the nature of their employment and training, routinely climb fixed ladders, step bolts or similar climbing devices attached to structures.

There are several hundred thousand triangulation towers, telecommunication towers, electrical power transmission towers, chimneys and similar structures in the United States that are climbed so infrequently that permanent installation and maintenance of ladder safety devices would be unnecessarily costly. In addition, employees responsible for the installation, repair and maintenance of cages, wells and ladder safety devices, would be exposed to fall hazards for longer periods of time than they would be if a qualified climber climbed the structure without fall protection. OSHA believes that because of the hazards encountered during installation and continued periodic maintenance, the installation at and maintenance of fall protection systems on infrequently climbed structures increases rather than reduces the hazard to employees who climb these structures, if they have been adequately trained, with retraining as necessary, to ensure that employees still have the required skills and abilities. In addition, as noted above, such climbers must be physically capable, as demonstrated through observations of actual climbing activities or by physical examinations, and must routinely climb these structures as part of their job. Proposed § 1910.32(b)(5) requires that qualified climbers who have reached their work positions be protected with fall prevention systems which comply with proposed § 1910.28.

Under existing § 1910.27, ladder safety devices or cages are required only on fixed ladders. In some cases, employers have intentionally removed fixed ladders from towers or have not installed fixed ladders on new towers to avoid installing cages or ladder safety

devices. When access to these towers is necessary, employees are required to climb the structural members of the tower. OSHA believes that it is safer to have qualified climbers climb fixed ladders rather than the structure itself.

Climbers who meet the qualifications proposed in paragraph (b)(5) are considered skilled workers capable of performing climbing activities without the need for ladder safety devices, cages or wells in limited circumstances. Therefore, OSHA is proposing to exempt ladders and step bolts from having ladder safety devices on structures such as triangulation, telecommunication, electrical power transmission and similar towers, poles, and structures, as well as stacks and chimneys which are climbed two or fewer times a year by qualified climbers. OSHA has been asked to increase the maximum allowable number of climbs per fixed ladder without ladder safety devices, wells or cages to twelve per year for qualified climbers. Please see Issue 11 for this discussion.

Appendices to Subpart D.

OSHA proposes to add three non-mandatory appendices to subpart D to provide compliance guidelines for each of the sections contained in this proposal, and to provide a list of references for further information which may be useful in implementing this standard.

Other Revisions to Part 1910.

The reorganization of subpart D necessitates changes in subparts F, N and R of the current General Industry Standards (Part 1910) so that sections of those subparts which reference either specific sections of existing subpart D, or ANSI standards, or which provide no guidance on the standard of care to be followed, will, instead, reference the appropriate new sections of proposed subpart D. These changes which are presented at the end of this proposal, do not substantially affect the requirements of these subparts.

V. Summary of the Preliminary Regulatory Impact and Regulatory Flexibility Analysis

Introduction and Regulatory History

In accordance with Executive Order No. 12291 (46 FR 13193, February 19, 1981) OSHA has prepared a Preliminary Regulatory Impact and Regulatory Flexibility Analysis of the Proposed subparts D and I of 29 CFR Part 1910. This analysis describes the costs of compliance, the expected benefits, the nonregulatory environment, and the technological and economic feasibility

of the proposed provisions and compares them to the corresponding existing provisions.

The existing subpart D of 29 CFR Part 1910 contains safety specifications for walking and working surfaces, including ladders, stairs, guardrails, floors, and ramps in general industry. This regulation does not cover the construction, agriculture, mining, and maritime industries. Subpart D was promulgated in 1971 under section 6(a) of the Occupational Safety and Health (OSH) Act, incorporating consensus standards adopted by the American National Standards Institute (ANSI). The pertinent ANSI standards, in some cases, set specifications for the design, manufacture, use and maintenance of safe equipment and systems on walking and working surfaces. While ANSI standards tend to focus on particular common work activities, subpart D regulates all walking and working surfaces. Accordingly, there are ANSI requirements adopted by OSHA which have been given much wider application in subpart D than would have been contemplated by ANSI. As a result, some employers are technically in violation of standards which, as written, did not apply to them.

Revisions to subpart D were proposed by OSHA in 1973, but after reviewing comments received in response, OSHA decided that more data was needed to assist OSHA in drafting a revised subpart D. Therefore, in 1976, OSHA withdrew the 1973 proposal and initiated a major research and data collection effort. Studies were conducted on the ergonomics of work surfaces, on fall protection systems, on the nature and frequency of accidents, and on the causes and distributions of injuries and fatalities. OSHA also solicited data from the public and held public hearings at various locations around the country. The data accumulated through those efforts form the basis for this proposal.

Proposed revisions to subpart I, Personal Protective Equipment, which add safety criteria for fall protection systems, are to be promulgated concurrently with the proposed subpart D. The proposed subpart I provisions do not impose the duty to use fall protection equipment and are only effective after provisions in other subparts are modified to reference the revised subpart I directly. Thus, to the extent that the use of such equipment is required by the proposed subpart D regulation, the costs and benefits of the proposed subpart I specifications are attributed to proposed subpart D and included in this analysis.

Significance of Risk and Nonregulatory Environment

OSHA estimates that over 24 million workers are employed in industries significantly affected by the requirements of subpart D, and that about 105,000 injuries and fatalities occur annually that directly involve surfaces covered by subpart D. For purposes of this analysis, injuries include only those causing absence from work for at least one shift. In addition, OSHA estimates that these accidents result in about 132 fatalities annually. OSHA has determined that many employees face a significant risk from the hazards of working surfaces. OSHA believes that, to the extent feasible, the safety requirements of the proposed subpart D will reduce workers' risk and maximize the number of prevented accidents.

Proposed subpart D is an outgrowth of the existing subpart D regulation, which basically addresses the same hazards. OSHA believes that while compliance with the existing regulation has improved employees' safety, compliance with the proposed rule would be significantly more protective. OSHA has evaluated the potential impacts of full compliance with the existing and proposed regulations, using current industry practice as the baseline. The proposed regulation offers lower compliance costs as well as increased safety levels. OSHA has determined that the proposed subpart D is the most cost effective alternative for significantly reducing the hazards to employees of walking and working surfaces.

The most important fact supporting the need for a mandatory standard is that adequate safety levels are currently not being provided and, as a result, many preventable injuries and fatalities are occurring. The inadequacy of nonregulatory alternatives is due, in part, to the inadequacy of information; employees are often at a disadvantage with respect to knowledge about exposure to risk. Further, as a portion of the costs of accidents is borne by third parties, such as insurance programs, individual firms maximizing profits will provide less safety than if they faced the true cost/benefit tradeoff. Despite various efforts by the insurance industry to create incentives for employers to increase safety on the job, the costs of accidents for individual employers remain largely externalized.

Technological Feasibility

The proposed subpart D provisions are all technologically feasible. OSHA

has determined that the technology and equipment necessary to meet the proposed requirements is currently available to industry. Many firms already comply with the proposed safety requirements, and the proposed changes in the subpart D regulation generally bring OSHA requirements into line with what is considered to be sound industrial safety practice.

Many of the provisions of the existing and proposed subpart D standards set specifications, such as for height, strength, or visibility of equipment. The existing standard is more specification-oriented than the proposed standard and, as a result, is often repetitive. In addition, there are gaps in the existing coverage for certain surfaces and some surfaces are not addressed at all. The proposed standard uses more performance-oriented language and consolidates and updates existing provisions.

Some proposed provisions are based on consensus standards developed by the American National Standards Institute (ANSI). The proposed regulation allows employers to choose between alternative compliance strategies, thus increasing the permissible range of technologically feasible options and encouraging cost effective use of resources. Some restrictions on dimensions are made more flexible under the proposed standard, facilitating compliance without reducing the protection of employee safety and health.

Proposed subpart D also includes some new provisions and adds requirements for some surfaces. Most of these provisions relate to maintenance of equipment, work practices, and the training and qualifications of employees. Technological feasibility is not in question for these requirements as they are in common practice in industry today. The remaining provisions that do add specific structural requirements are not technology forcing but specify design or safety criteria that are readily achievable with current technology. Therefore, with the exception of the requirements for manhole and manway diameters in proposed provision § 1910.22(a)(4), employers would be required to comply with the "new" provisions within 60 days of the effective date of the rules. Under proposed § 1910.22(a)(4), employers would have a year from the effective date of the final rule to begin constructing manholes and manways of the required diameter. When appropriate, to avoid unreasonably disrupting operations, the proposed

regulation grandfathers existing situations.

Benefits

The benefits from revising subpart D will be the reduction of injuries and fatalities among employees affected. OSHA has determined that under full compliance with each standard, proposed subpart D would provide increased safety and would be more effective in preventing accidents than the existing standard.

Approximately 105,000 lost-workday injuries and 132 fatalities attributable to walking and working surfaces occur every year in industries covered by subpart D. OSHA believes that full compliance with the proposed standard would prevent up to 84,000 injuries and up to 106 fatalities. This is 15,750 injuries and 20 fatalities more than would be prevented by full compliance with the existing standard, as summarized in Table A. The distribution of accidents by work surface is shown in Table B. The benefits of preventing these accidents involve monetary savings to industries, employees, and society as well as nonquantifiable benefits.

TABLE A.—FATALITIES AND INJURIES PREVENTABLE BY FULL COMPLIANCE WITH THE PROPOSED AND EXISTING STANDARDS (BASELINE: CURRENT INDUSTRY PRACTICE)

Type of accident	Estimated number of accidents preventable with full compliance		
	Under proposed rule	Under existing rule	Improvement due to increased effectiveness of new rule
Fatalities.....	106	86	20
Injuries.....	84,000	68,250	15,750

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.

TABLE B.—DISTRIBUTION OF FATALITIES AND INJURIES BY WORK SURFACE IN AREAS COVERED BY SUBPART D

Work surface involved	Estimated annual		Estimated annual	
	Injuries	Per-cent	Fatalities	Per-cent
Floor.....	53,970	51.4	29	22.0
Ramp.....	735	0.7	1	0.6
Roof.....	420	0.4	15	11.0
Platform.....	8,715	8.3	9	7.0
Walkway.....	5,355	5.1	6	4.3
Stairs.....	13,965	13.3	15	11.2
Ladder.....	11,025	10.5	25	19.0
Scaffold.....	8,400	8.0	25	18.6
Other.....	2,415	2.3	8	6.3
Total.....	105,000	100	132	100

Source: U.S. Dept. of Labor, OSHA, Office of Regulatory Analysis.

OSHA has estimated that the potential savings of hospital and other medical costs may be up to \$500 million. Total savings will be substantially higher after productivity losses, hiring and training costs, and administrative costs due to accidents are considered. Further significant benefits include the saving of litigation costs and foregone earnings and the value to employees of a reduction in the accident rate. Finally, the avoidance of pain and suffering associated with injuries and fatalities represents a large nonquantifiable benefit.

The potential benefits of the proposed subpart D can only become real benefits to the extent of actual compliance with the regulation. While the existing regulation has low compliance levels in some areas due to inappropriate or infeasible requirements, full compliance with the proposed regulation is feasible and cost effective. Proposed provisions would be more flexible and would allow employers to use alternative compliance approaches when appropriate. Also, compliance with the training requirements of the proposed regulation may increase compliance with other requirements related to work practices. OSHA expects that compliance with the proposed regulation will not be a significant burden for any industry and that substantial improvements in protection of employee safety and health will result.

Costs of Compliance

In order to present a more complete view of the nature of the costs of compliance with the proposed regulation, OSHA estimated the costs of full compliance with both the existing and proposed regulations, using current industry practice as the baseline.

Full compliance with the existing standard would have an estimated annualized cost of over \$3.7 billion above current expenditures, while full compliance with the proposed standard would have an estimated annualized cost of \$137.4 million above current expenditures. The cost of the proposed standard includes approximately \$6.2 million for provisions that are substantially different from those in the existing standard. Virtually every firm regulated under 29 CFR part 1910, General Industry, has walking or working surfaces and thus is potentially affected by subpart D regulations. OSHA notes, however, that many firms, such as those that use only office space, either comply with or are not affected by existing and proposed requirements.

The majority of the costs attributed to full compliance with the existing standard are for fall protection requirements. As written, the requirements are unnecessarily rigid and cost-ineffective in many cases. For example, the existing standard permits only the use of fixed guardrails for the protection of employees from most fall hazards. The proposed standard requires the use of alternative safety systems in situations where guardrails are infeasible. Proposed § 1910.28 presents requirements for personal fall protection devices as one alternative. The proposed revisions to subpart I set the criteria that must be met when such devices are used. In addition, proposed § 1910.28 provides that employers could protect employees through the use of "designated areas" where the use of guardrails or personal fall protection systems was inappropriate. OSHA estimates that permitting the use of alternatives to guardrails would save industry millions of dollars in compliance costs. OSHA also believes that this approach would require employers to provide protection in situations where the existing regulations do not, in effect, require protection.

The proposed standard also defines and permits the use of "qualified climbers" for work on fixed ladders that are climbed rarely. OSHA believes that there are many such ladders for which the installation of fall protection would be infeasible and would expose workers installing and maintaining cages, wells, or ladder safety devices to a greater fall hazard than that which would be prevented.

While the primary impact of the proposed rule is to eliminate unreasonably high compliance costs through prospective application of certain requirements and increased flexibility in the choice of compliance approach, the proposed standard also creates some new costs. Most of those costs would be incurred when complying with the training requirements in proposed

§§ 1910.23(b)(1), 1910.27(b)(2)(ii), 1910.31(b)(4) and 1910.32. OSHA believes that the imposition of those burdens is appropriate because training is an important factor in accident prevention that is not required by the existing standard.

Many of the specifications which appear in the proposed (and existing) standard are already widely complied with and have been accepted as standard safety practice by industry and trade associations. These are basic safety considerations that should be and have been incorporated in design specifications, building codes, and consensus standards. The proposed subpart D regulation would ensure that commonly followed safety criteria are legally binding.

Manufactured products, such as ladders, step bolts, manhole steps, scaffolds, and other equipment, generally meet or exceed proposed OSHA specifications. Other proposed OSHA specifications, such as for stairs or guardrails, are fundamental requirements for safety that are reflected in existing structures and current industry practices.

OSHA citation records and data collected by contractors indicate that some cases of noncompliance with proposed (and existing) safety requirements exist. Thus, although employers complying with the existing standard would be in compliance with the proposed standard, the costs of achieving full compliance with the proposed standard from a baseline of current industry practice include costs of correcting violations of existing requirements.

Areas identified by OSHA that may generate such costs include: installing cages, wells, or ladder safety devices on fixed ladders; replacing unsafe stairways; and providing guardrails or other fall protection for open-sided floors and surfaces as required. A breakdown of these estimated costs is given in Table C.

TABLE C.—ESTIMATED RETROFIT AND REPAIR COSTS TO ACHIEVE FULL COMPLIANCE WITH UNCHANGED AND SIMILAR SUBPART D PROVISIONS

Provision	Annualized cost ¹ (dollars millions)
Ladders.....	23.4
Step Bolts/Manhole Steps.....	.3
Stairs.....	20.8
Guardrail Specifications.....	7.8
Scaffolds.....	6.2
Wall Openings.....	2.1
Ladder Stands.....	.3
Open-sided Floors and Other Surfaces.....	54.7
Floor Holes.....	7.5
Other.....	8.1
Total.....	131.2

¹ Using a 10-percent-discount rate over 10 years. Source: Office of Regulatory Analysis, OSHA.

OSHA does not intend to require widespread retrofitting of existing structures; OSHA has grandfathered existing situations where safety would not be unduly compromised and has addressed specific situations separately as necessary. The proposed rule replaces overly restrictive specifications in the existing rule with performance requirements which give employers greater flexibility in providing safe work surfaces. OSHA believes that all employers should be able to comply with the proposed requirements and employers that have followed generally accepted industry safety practices would not experience higher costs as a result of this rule. OSHA requests comments regarding this preliminary finding and any unique situations where employers may face significant compliance problems as a result of this rule.

Tables D and E show the breakdown of the total costs of the proposed standard, including costs attributable to noncompliance with commonly accepted safety criteria, by provision and by SIC code of industry sectors likely to be affected.

TABLE D.—COSTS OF COMPLIANCE FOR EXISTING AND PROPOSED SUBPART D PROVISIONS BASELINE: CURRENT INDUSTRY PRACTICE

Provision	Annualized cost of compliance (\$000's)		Comments
	Existing	Proposed	
Floor loading.....	4,100	870	Proposed does not require signs in every area.
Repair/assembly pits:			
Guardrails.....	(¹)	0	Existing not feasible.
Marking area/training.....	0	595	Proposed required safety equipment and training.
Loading racks:			
Guardrails.....	(¹)	0	Existing not feasible.
Training.....	0	257	Proposed requires safety training.
Loading docks/teaming tables:			
Guardrails.....	(¹)	0	Existing not feasible.
Training.....	0	246	Proposed requires safety training.

TABLE D.—COSTS OF COMPLIANCE FOR EXISTING AND PROPOSED SUBPART D PROVISIONS BASELINE: CURRENT INDUSTRY PRACTICE—Continued

Provision	Annualized cost of compliance (\$000's)		Comments
	Existing	Proposed	
Slaughtering facility platforms:			
Guardrails.....	(1)	0	Existing violates FDA sanitation requirements.
Training.....	0	0	Proposed included in current safety training.
Portable ramps/bridging devices for materials handling:			
Guardrails.....	(1)	0	Existing obstructs work operations.
Training.....	0	308	Proposed requires safety training.
Alternative fall protection:			
Guardrails.....	1,937,000	0	Existing requires fixed guardrails for all fall hazards.
Personal fall protection or designated areas.....	0	3,585	Proposed allows alternative protection when appropriate.
Fixed ladders rarely used:			
Cages/safety devices.....	1,586,000	0	Existing requires cages on most fixed ladders.
Qualified climber training.....	0	352	Proposed allows use of qualified climbers when appropriate.
Similar and unchanged provisions: Retrofit and repair needed for full compliance with basic safety criteria and specifications (breakdown given in Table C).	135,200	131,200	Costs due to noncompliance with generally accepted industry/OSHA safety specifications. Proposed increases flexibility and allows modern technology and work practices.
Total.....	3,662,300	137,413	

¹ Compliance theoretically possible but extremely costly.

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.

TABLE E.—COSTS OF COMPLIANCE WITH EXISTING AND PROPOSED SUBPART D FOR SELECTED INDUSTRIES; BASELINE: CURRENT INDUSTRY PRACTICE

[Costs for existing standard do not include compliance with infeasible provisions]

SIC	Industry	Annualized costs of compliance (\$000's)		
		Existing	Proposed	Net savings
20	Food.....	216,055	8,104	207,951
21	Tobacco.....	2,852	105	2,748
22	Textile.....	76,646	2,879	73,767
23	Apparel.....	58,388	2,193	56,196
24	Lumber.....	113,544	4,262	109,282
25	Furniture.....	24,915	934	23,981
26	Paper.....	64,094	2,403	61,692
27	Printing.....	102,513	3,842	98,671
28	Chemicals.....	71,321	2,679	68,642
29	Petroleum.....	13,314	496	12,818
30	Rubber.....	77,027	2,889	74,138
31	Leather.....	7,797	296	7,502
32	Stone.....	56,677	2,126	54,551
33	Primary metals.....	107,647	4,042	103,605
34	Fabricated metals.....	201,031	7,541	193,490
35	Machinery.....	153,864	5,778	148,086
36	Electric equipment.....	154,244	5,787	148,457
37	Transport equipment.....	158,618	5,949	152,669
38	Instruments.....	48,118	1,802	46,316
39	Misc. manufacturing.....	16,546	620	15,926
40	Railroad transport.....	41,461	1,554	39,907
41	Local transit.....	32,712	1,230	31,483
42	Trucking/warehousing.....	228,608	8,581	220,027
44	Water transit.....	21,872	820	21,052
45	Air transit.....	71,512	2,679	68,833
46	Pipelines.....	1,714	76	1,637
48	Communications.....	122,483	4,595	117,888
49	Electric service.....	92,242	3,461	88,781
51	Nondurables.....	363,073	13,624	349,449
73	Business services.....	782,252	29,346	752,906
82	Educational services.....	179,159	6,721	172,437
	Total.....	3,662,300	137,413	3,524,887

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.

Economic Feasibility and Regulatory Flexibility

OSHA has evaluated the economic feasibility of the proposed subpart D and has determined that none of the affected industry groups would face a

significant economic impact. OSHA compared costs of compliance with revenues for the industries judged to be most heavily impacted to determine the potential effect on prices if these costs were fully passed through to consumers. OSHA found that compliance costs are

below 0.01% of revenues for most industries and below 0.1 of revenues for all industries. Thus, compliance costs will have a negligible effect on industry sales and pricing behaviour.

OSHA also compared compliance costs with industry profits to evaluate

the maximum effect the proposed regulation might have on the profitability of industries if none of the costs could be recouped by raising prices. For most industries, the costs represent less than 0.1% of profits; for no industry are costs more than 1.0% of profits. Thus, OSHA concludes that the proposed regulation is economically feasible.

Regulatory Flexibility Certification

Pursuant to the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*), OSHA has determined that the proposed standard would not have a significant impact upon a substantial number of small entities. The costs imposed by the proposed standard do not involve significant economies of scale, large capital expenditures, or substantial administrative capacity. OSHA believes that small businesses will not be put at a disadvantage relative to large companies by complying with the proposed regulation. Rather, as for large businesses, the proposed regulation offers considerable advantages over the existing regulation.

Environmental Assessment

The proposed subpart D regulation has been reviewed in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321, *et seq.*), the Guidelines of the Council on Environmental Quality (40 CFR parts 1500-1517), and the Department of Labor's NEPA procedures (29 CFR part 11). As a result of this review, OSHA has determined that the proposed regulation will have no significant environmental impact.

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VII. OMB Approval Under the Paperwork Reduction Act

This proposal does not contain any collection of information. Therefore, approval under the Paperwork Reduction Act is unnecessary.

VIII. State Plan Standards

The 25 states and territories with their own OSHA-approved occupational safety and health plans must adopt a comparable standard within six months of the publication date of a final standard. These 25 are: Alaska, Arizona, California, Connecticut (for state and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (for state and local government employees only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington and Wyoming. Until such time as a state standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate in these states.

IX. Recordkeeping

This proposal contains no recordkeeping requirements.

X. Federalism

This proposed regulation has been reviewed in accordance with Executive Order 12612 (52 FR 41685, October 30, 1987), regarding Federalism. This Order requires that agencies, to the extent possible, refrain from limiting State policy options, consult with States prior to taking any actions which would restrict State policy options, and take

such actions only when there is clear constitutional authority and the presence of problem of national scope. The Order provides for preemption of State law only if there is a clear Congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

Section 18 of the Occupational Safety and Health Act (OSH Act) expresses Congress' clear intent to preempt State laws relating to issues on which Federal OSHA has promulgated occupational safety and health standards. Under the OSHA Act, a State can avoid preemption only if it submits, and obtains Federal approval of, a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such Plan-States must, among other things, be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. Where such standards are applicable to products distributed or used in interstate commerce, they may not unduly burden commerce and must be justified by compelling local conditions (See section 18(c)(2) of the OSH Act).

The Federal standard on walking and working surfaces addresses hazards which are not unique to any one State or region of the country. Nonetheless, States with occupational safety and health plans approved under section 18 of the OSHA Act will be able to develop their own State standards to deal with any special problems which might be encountered in a particular State. Moreover, because this standard is written in general, performance-oriented terms, there is considerable flexibility for State plans to require, and for affected employers to use, methods of compliance which are appropriate to the working conditions covered by the standard.

In brief, this proposed regulation addresses a clear national problem related to occupational safety and health in general industry. Those States which have elected to participate under section 18 of the OSH Act are not preempted by this standard, and will be able to deal with any special conditions within the framework of the Federal Act while ensuring that the State standards are at least as effective as that standard.

XI. Public Participation.

Comments. Interested persons are invited to submit written data, views, and arguments with respect to this proposal. These comments must be postmarked by July 9, 1990, and submitted in quadruplicate to the OSHA Docket Officer, Docket S-041, U.S.

Department of Labor, Occupational Safety and Health Administration, Room N2625, 200 Constitution Avenue NW., Washington, DC 20210. Written submissions must clearly identify the issues or specific provisions of the proposal which are addressed and the position taken with respect to each issue or provision. 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. The preliminary regulatory impact assessment and the exhibits cited in this document will be available for public inspection and copying at the above address. OSHA invites comments concerning the conclusions reached in the regulatory impact assessment.

OSHA recognizes that there may be interested persons who, through their knowledge of safety or their experience in the operations involved, would wish to endorse or support certain provisions in the standard. OSHA welcomes such supportive comments, including any pertinent accident data or cost information which may be available, in order that the record of this rulemaking will present a balanced picture of the public response on the issues involved.

Public hearing. OSHA will hold an informal public hearing to begin at 10:00 a.m. on September 11, 1990, if any hearing requests are received by the Agency. The hearing would be held in the Auditorium of the Frances Perkins Building, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210. Hearing requests must be postmarked by July 9, 1990.

Requests for hearing. Under section 6(b)(3) of the OSH Act and 29 CFR 1911.11, interested persons may file objections to the proposal and request an informal hearing on those objections. The objections and hearing requests should be submitted in quadruplicate to the Docket Office at the above address and must comply 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 July 9, 1990;
3. The objections must specify with particularity the provisions of the proposed rule to which objection is taken and must state the grounds therefore;
4. Each objection must be separately stated and numbered; and
5. The objections must be accompanied by a detailed summary of the evidence proposed to be adduced at the requested hearing.

Interested persons who have objections to various provisions or have changes to recommend may of course make these objections or recommendations in their comments and OSHA will fully consider them. There is only need to file formal "objections" separately if an interested person requests a public hearing.

Notice of intention to appear. If a hearing is requested, any interested person desiring to participate at the hearing, including the right to question witnesses, must file, in quadruplicate, a notice of intention to appear. The notice of intention to appear must be postmarked by August 8, 1990, and addressed to Mr. Tom Hall, Division of Consumer Affairs, Room N3649, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue NW., Washington, DC 20210, (202) 523-8615. The notice of intention to appear must contain the following:

1. The name, address, and telephone number of each person to appear;
2. The capacity in which the person will appear;
3. The approximate amount of time required for the presentation;
4. The specific issues that will be addressed; and
5. A statement of the position that will be taken with respect to each issue addressed.

Filing of testimony and evidence before the hearing. Any party requesting more than 10 minutes for presentation at the hearing or who will present documentary evidence, must provide in quadruplicate, the complete text of its testimony, including all documentary evidence to be presented at the hearing. These materials must be postmarked no later than August 8, 1990, and sent to Tom Hall, Division of Consumer Affairs, at the address given above.

Each submission will be reviewed in light of the amount of time requested in the notice of intention to appear. In instances where the information contained in the submission does not justify the amount of time requested, a more appropriate amount of time will be allocated and the participant will be notified of that fact. Any party who has not substantially complied with the above requirements, may be limited to a 10 minute presentation and may be requested to return for questioning at a later time. Any party who has not filed a notice of intention to appear may be allowed to testify, as time permits, at the discretion of the Administrative Law Judge who presides at the hearing.

Notices of intention to appear, testimony and evidence, will be available for inspection and copying at

the Docket Office, Docket S-041, Room N2625, 200 Constitution Avenue NW., Washington, DC 20210.

Conduct and nature of the hearing. The hearing is scheduled to commence at 10:00 a.m. on September 11, 1990. At that time, any procedural matters relating to the proceeding will be resolved. The informal nature of the rulemaking hearing to be held is established in the legislative history of section 6 of the Act and is reflected by the OSHA hearing regulations (see 29 CFR 1911.15(a)). Although the presiding officer is an Administrative Law Judge and questioning by interested persons is allowed crucial issues, it is clear that the proceeding shall remain informal and legislative in type. The intent, in essence, is to provide an opportunity for effective oral presentation by interested persons which can be carried out expeditiously and in the absence of rigid procedures which might unduly impede or protract the rulemaking process.

The hearing will be conducted in accordance with 29 CFR part 1911. The presiding officer, an Administrative Law Judge, will have the powers necessary or appropriate to conduct a full and fair informal hearing as provided in 29 CFR part 1911, including the powers:

1. To regulate the course of the proceedings;
2. To dispose of procedural requests, objections and comparable matters;
3. To confine the presentation to the matters pertinent to the issues raised;
4. To regulate the conduct of those present at the hearing by appropriate means;
5. In the Judge's discretion, to question and permit the questioning of any witness, and to limit the time for questioning; and
6. In the Judge's discretion, to keep the record open for a reasonable stated time to receive written information and additional data, views, and arguments from any person who has participated in the oral proceedings.

Following the close of the hearing, the presiding Administrative Law Judge will certify the record of the hearing to the Assistant Secretary of Labor for Occupational Safety and Health. The Administrative Law Judge does not make or recommend any decisions as to the content of a final standard.

If no hearing requests are submitted by interested persons by the deadlines set forth above, no hearing will be held. OSHA will then publish a notice in the **Federal Register** indicating that there will be no hearing. The Agency will also contact all persons who submitted comments in response to this proposal, to inform them of this fact.

The proposal will be reviewed in light of all written submissions and testimony received as part of the rulemaking record. Decisions on the provisions of a final standard will be made by the Assistant Secretary based on the entire record of the proceeding.

List of Subjects in 29 CFR Part 1910

Guardrails, Handrails, Ladders, Occupational safety and health, Protective equipment, Safety, Safety nets, Scaffolds, Stairs, Walking and working surfaces.

Authority

This document was prepared under the direction of Gerard F. Scannell, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210.

Accordingly, pursuant to sections 4, 6(b) and 8(c) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), Secretary of Labor's Order No. 1-90 (55 FR 9033) and 29 CFR part 1911, OSHA proposes to amend 29 CFR part 1910, subpart D as set forth below.

Signed at Washington, DC this 30th day of March, 1990.

Gerard F. Scannell,
Assistant Secretary of Labor.

Part 1910 of Title 29 of the Code of Federal Regulations is proposed to be amended as follows:

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

1. The authority citation for subpart D of part 1910 is proposed to be revised as follows:

Authority: Secs. 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), and 9-83 (48 FR 35736) or I-90 (55 FR 9033), as applicable. Subpart D is also issued under 29 CFR part 1911.

2. In subpart D, §§ 1910.21 through 1910.32 would be revised, and Appendices A, B, and C would be added to read as follows:

Subpart D—Walking-Working Surfaces

Sec.	
1910.21	Scope, application and definitions.
1910.22	General requirements.
1910.23	Ladders.
1910.24	Step bolts and manhole steps.
1910.25	Stairs.
1910.26	Ramps and bridging devices.
1910.27	Work surfaces.
1910.28	Fall protection systems.
1910.29	Wall openings.
1910.30	Scaffolds.

Sec.

1910.31 Mobile elevating work platforms, mobile ladder stands and powered industrial truck platforms.

1910.32 Special surfaces.

Appendix A to Subpart D—Compliance Guidelines

Appendix B to Subpart D—National Consensus Standards

Appendix C to Subpart D—References for Further Information

Subpart D—Walking and Working Surfaces

§ 1910.21 Scope, application and definitions.

(a) *Scope and application.* This subpart covers all walking and working surfaces that are used by employees, except as follows:

(1) This subpart does not apply to surfaces that are an integral part of self-propelled, motorized mobile equipment, other than platforms hoisted or lifted by powered industrial lift trucks which are covered by paragraph (e) of § 1910.31.

(2) This subpart does not apply to powered exterior building maintenance platforms covered in subpart F of part 1910.

(3) This subpart does not cover fall hazards from the exposed perimeters of entertainment stages and rail station platforms.

(b) *Definitions.*

Allowable unit stress means the maximum stress allowed to be applied as specified by recognized national codes and standards such as the American National Standards Institute (ANSI), the American Society of Testing and Materials (ASTM), and the National Fire Protection Association (NFPA).

Alternating tread stairs means a series of steps usually attached to a center support rail in an alternating manner so that a user of the stairs normally does not have both feet on the same level.

Authorized person means an employee who, due to the requirements of work duties, is authorized by the employer to be present in a particular work area.

Boatswains' chair means a single-point adjustable suspension scaffold consisting of a seat or sling designed to accommodate one employee in a sitting position.

Body belt (safety belt) means a strap with means for securing it around the waist or body and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness means a design of straps which is secured about the employee in a manner so as to distribute the arresting forces over at least the thighs, shoulders, and pelvis, with

provisions for attaching a lanyard, lifeline, or deceleration device.

Bridging device means a surface used to span the gap between a loading dock and a vehicle or between vehicles. It may be fixed or portable, adjustable, powered or unpowered. It may also be referred to as a car plate or dockboard.

Combination ladder means a portable ladder capable of being used as a stepladder or as a single or extension ladder. It may also be capable of being used as a trestle ladder or a stairwell ladder. Its components may be used as single ladders.

Design factor means the ratio of the ultimate failure strength of a member or piece of material or equipment to the actual working stress or intended safe load.

Designated area means a space which has a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves also to designate an area where work may be performed without additional fall protection.

Equivalent means alternate designs, materials, or methods which the employer can demonstrate will provide an equal or greater degree of safety for employees than the method or item specified in the standard.

Failure means a load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Fall or fall hazard means the act or circumstances that could result in the possibility of slipping or tripping on or falling off a surface.

Fixed ladder means a ladder, including individual rung ladders, that is permanently attached to a structure, building, or equipment. It does not include ship's stairs or manhole steps.

Guardrail system means a vertical barrier, normally consisting of, but not limited to, an assembly of top rails, midrails, and posts, erected to prevent employees from falling to lower levels.

Handrail means a rail used to provide employees a handhold for support.

Hole means an opening more than two inches (5.1 cm) in its least dimension in a floor, roof, or other surface.

Individual rung ladder means a ladder consisting of rungs individually attached to a structure, building, or piece of equipment. It does not include manhole steps installed in manholes.

Ladder means a device typically used to gain access to a different elevation consisting of two or more structural members crossed by rungs, steps, or cleats.

Ladder cage means a barrier surrounding or nearly surrounding the

climbing area of a ladder. It fastens to the ladder's side rails, to one side rail, or to other structures.

Ladder safety device means a support system which will stop or limit the speed of an employee's fall from a ladder.

Lean-to scaffold means a supported scaffold which is kept erect by tilting it toward and resting it against a building or structure.

Lower level means those areas to which an employee could fall. Such areas include ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, equipment, and similar surfaces.

Manhole means an access through which an employee gains entry to a work area or to equipment below a surface or behind a vertical partition such as a vessel wall.

Manhole steps means a series of steps individually attached or set into the walls of a manhole structure. They are not considered to be an individual rung ladder.

Manually propelled elevating work platform means a vertically adjustable work platform which may be towed, skidded or manually moved horizontally or the base structure may remain stationary.

Manway means an opening through which employees access vessels and equipment.

Maximum intended load means the total load of all employees, equipment, tools, materials, transmitted loads, wind loads and other loads reasonably anticipated to be applied.

Midrail means the rail located approximately midway between the top rail and the toeboard or work surface of a guardrail system.

Mobile elevating work platform means a portable platform that can be elevated and moved about on wheels or casters.

Mobile ladder stand means a mobile fixed-size self-supporting ladder consisting of a wide flat tread ladder in the form of stairs. The assembly may include handrails, guardrails and toeboards. It may also be referred to as a ladder stand.

Mobile scaffold means a portable caster or wheel-mounted supported scaffold. It may also be referred to as a mobile work platform.

Platform means a work surface elevated above the surrounding work area.

Platform unit means the individual wood planks, fabricated planks, fabricated decks, and fabricated platforms such as ladder-type and light metal-type, which comprise the platforms and walkways of a scaffold.

Portable ladder means a ladder that can readily be moved or carried, usually consisting of side rails joined at intervals by steps, rungs, cleats, or rear braces.

Qualified climber means an employee who, by virtue of physical capabilities, training, work experience and job assignment, is authorized by the employer to routinely climb fixed ladders, step bolts or similar climbing devices attached to structures.

Qualified person means a person designated by the employer who is knowledgeable about and familiar with all relevant manufacturers' specifications and recommendations; is capable of identifying existing or potential hazards in specific surroundings or working conditions which may be hazardous or dangerous to employees; and has been trained for the specific task assigned. When work is to be supervised by a qualified person, the qualified person shall have the necessary authority to carry out the assigned work responsibilities.

Ramp means an inclined surface between different elevations for the passage of employees, vehicles, or both.

Riser means the upright member of a step situated at the back of a lower tread and near the leading edge of the next higher tread.

Safety net means a non-rigid barrier supported in such a manner as to catch employees who have fallen off a work surface and bring them to a stop before contacting surfaces or structures below the net which might otherwise injure them.

Scaffold means any temporary elevated or suspended platform, and its supporting structure, used for supporting employees or materials or both, except this term does not include crane or derrick suspended personnel platforms.

Ship's stairs means a stairway equipped with treads and stair rails with a slope greater than 50 degrees from the horizontal. It is sometimes referred to as a "ship's ladder."

Shore scaffold means a supported scaffold which is kept erect by placing it against a building or structure and holding it in place with props.

Single-point adjustable suspension scaffold means a suspension scaffold consisting of a platform suspended by one rope from an overhead support and equipped with means to permit the movement of the platform to desired work levels.

Slip-resistant surface means a surface that is capable of resisting the sliding motion on the contact surface of an object or an employee's shoe or foot.

Spiral stairway means a stairway having a spiral structure attached to a supporting column.

Stair means a series of steps used to ascend or descend between levels, and having four or more risers installed at an angle equal to or less than 50 degrees from the horizontal.

Stair rail or "stair rail system" means a vertical barrier erected along the open-side of a stairway to prevent employees from falling to lower levels. The top surface of a stair rail system may also be a handrail.

Step means any combination of risers and treads which may be part of a stair.

Step ladder means a self-supporting portable ladder, non-adjustable in length, with flat steps and a hinged back.

Step-bolt means a bolt or rung attached at intervals along a structural member and used for foot placement during climbing or standing. Step bolts may also be called "pole steps."

Structurally supported means supported by structural components such as pillars, piers, lintels, beams and joists. It does not include slabs or floors placed on a grade.

Tieback means an attachment from a structural member to a supporting device.

Toeboard means a low protective barrier placed to prevent the fall of materials to a lower level, or when used without a guardrail, to prevent an employee's feet from slipping over the edge of a surface.

Tread means the horizontal member of a step.

Two-point suspension scaffold (swing stage) means a suspension scaffold consisting of a platform supported by hangers (stirrups) suspended by two ropes from overhead supports and equipped with means to permit the raising and lowering of the platform to desired work levels.

Ultimate failure means the collapse of the structure or, where applicable, a component thereof.

Unprotected sides and edges means any side or edge of a surface, except at entrances to points of access, where there is no wall or guardrail system.

Walking and working surface means any surface, within the scope of this standard, on which employees perform or gain access to their job duties or upon which employees are required or allowed to walk or work while performing assigned tasks.

Wall opening means an opening at least 30 inches (76 cm) high and 18 inches (46 cm) wide in any wall or partition through which employees can fall to a lower level.

§ 1910.22 General requirements.**(a) Surface conditions and clearances.**

(1) Surfaces shall be designed, constructed and maintained free of recognized hazards that can result in death or serious injury to employees.

(2) When surfaces cannot be maintained free of hazards, such as snow, ice or oil, that can result in death or serious injury to employees, employees shall be provided with a means to avoid or minimize their exposure to them.

(3) A minimum free clearance of 18 inches (46 cm) shall be provided for employee passage around or between obstructions.

(4) Manways or manholes built on or after (insert date one year after effective date of the final rule in the *Federal Register*) leading to sewers, non-pressurized tanks, atmospheric vessels and enclosures, and other confined spaces shall be at least 24 inches (61 cm) in diameter.

(b) *Application of loads.* (1) All surfaces shall be designed, constructed and maintained to support their maximum intended load. The maximum intended load shall not be exceeded.

(2) The employer shall ensure that employees involved in warehousing or storage activities know the intended load limits for structurally supported surfaces in the areas where they work.

(c) *Access and egress.* The employer shall ensure that employees are provided with and use a safe means of access to, and egress from, one surface to another.

(d) *Inspection, maintenance, and repair.* (1) The employer shall ensure through regular and periodic inspection and maintenance that walking and working surfaces are in safe condition for employee use.

(2) The employer shall ensure that all hazardous conditions which are discovered are corrected, repaired, or temporarily guarded to prevent employee use. Repairs shall be made in a manner that will restore the walking and working surface to a safe condition for employee use.

(3) Only qualified persons shall be permitted to inspect, maintain or repair walking and working surfaces except for the incidental cleanup of non-toxic materials.

§ 1910.23 Ladders.

(a) *Scope and application.* This section covers all ladders, except that:

(1) This section does not apply to ladders which are used only for firefighting or rescue operations, or to those ladders which form an integral part of machinery; and

(2) Fixed ladders that are used only by qualified climbers, as defined in § 1910.32(b)(5), are not required to be equipped with ladder safety devices, wells or cages provided the following requirements are met:

(i) The installation and maintenance of the ladder safety devices, wells or cages present a greater hazard than having a qualified climber use a fixed ladder without this protection, and

(ii) The ladder is climbed two or fewer times per year.

(b) *General requirements.* (1) Employers shall ensure that all employees who use ladders with a working height of six feet (1.82 m) or more receive the necessary training, such as how to inspect ladders, and use such ladders properly.

(2) Ladders shall be used only for the purposes for which they were designed.

(3) Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-fourth of the working length of the ladder (the distance along the ladder between the foot and top support).

(4) When ladders are used for access to an upper landing surface, the ladder siderails shall extend at least three feet (.9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the ladder's length, the ladder shall be secured at the top and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder.

(5) Ladders shall be used only on stable and level surfaces unless secured to prevent their accidental displacement. Non-self-supporting ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement.

(6) Single rail ladders shall not be used.

(7) Ladders shall not be moved, shifted or extended while occupied by employees.

(8) Ladders placed in any location where they can be displaced by other activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade, such as through the use of traffic cones, shall be used to keep the activities or traffic away from the ladder.

(9) Ladders with structural or other defects shall be immediately tagged with a danger tag reading "Out of Service," "Do Not Use," or similar legend in accordance with § 1910.145,

and shall be withdrawn from service until repaired.

(10) All ladder repairs shall be made by a qualified person trained and familiar with the design and the proper procedures for repairing defective components.

(11) Ladders shall be inspected for visible defects prior to the first use each workshift, and after any occurrence which could affect their safe use.

(12) The top of a non-self-supporting ladder shall be placed with the two rails supported unless it is equipped with a single support attachment.

(13) Emergency escape ladders shall comply with all applicable requirements of this section except those requiring fall protection systems.

(14) The top of a stepladder shall not be used as a step.

(c) *Design, construction, maintenance and inspection.* (1) Portable ladders shall be capable of supporting, without ultimate failure, the following loads:

(i) Each non-self-supporting ladder: At least four times the maximum intended load applied or transmitted to the ladder in a downward and vertical direction when the ladder is placed at a 75½ degree angle from the horizontal.

(ii) Each self-supporting ladder: At least four times the maximum intended load in a fully opened position on a level surface.

(2) Ladders designed in accordance with ANSI A14.1-1982, ANSI A14.2-1982, and ANSI A14.5-1982 are deemed to be in compliance with the requirements of paragraph (c)(1) of this section for the type of ladder to be used. The working loads corresponding to the duty ratings of portable ladders that pass the applicable ANSI test requirements shall be as follows:

Duty rating	Ladder type	Working load	
		(Pounds)	(Kg)
Extra heavy duty...	IA	300	136.2
Heavy duty	I	250	113.5
Medium duty	II	225	102.2
Light duty	III	200	90.8

(3) The design of combination ladders shall be such that the ladder will be capable of meeting the requirements in paragraph (c)(1) or (c)(2) of this section for stepladders when in the stepladder position, and for extension ladders when in the extension ladder position.

(4) The maximum intended load used for the design of portable ladders shall be at least 200 pounds (90.6 kg).

(5) The combined weight of the employee using the portable ladder and any tools and supplies carried by the

employee shall not exceed the maximum intended load of the ladder.

(6) Fixed ladders shall be capable of supporting at least two loads of at least 250 pounds (114 kg) each, concentrated between any two consecutive attachments, plus anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from the use of ladder safety devices. The number and position of additional concentrated loads of 250 pounds (114 kg) each, determined from anticipated usage of the ladder, shall also be included in determining the capabilities of fixed ladders. Each step or rung shall be capable of supporting at least a single concentrated load of 250 pounds (114 kg) applied in the middle of the step or rung.

(7) Ladder rungs and steps shall be parallel, level, and uniformly spaced when the ladder is in position for use.

(8) Ladder rungs and steps shall be spaced not less than six inches (15 cm) apart, nor more than 12 inches (31 cm) apart as measured along the ladder siderails.

Exception to paragraph (c)(8) of this section: End frames of scaffolds and ladders in elevator shafts shall have rungs and steps spaced not less than six inches (15 cm) apart, nor more than 16½ inches (41 cm) apart, as measured along the ladder siderails.

(9) Ladder rungs and steps shall have a minimum clear width of 16 inches (41 cm) for individual rung and fixed ladders, 12 inches (30 cm) for portable metal ladders and portable reinforced plastic ladders, and 11½ inches (29 cm) for portable wood ladders, as measured between the ladder siderails.

Exception to paragraph (c)(9) of this section: Narrow rungs, which are not designed to be stepped on, on the tapered ends of window washer ladders, fruit pickers' ladders, and similar ladders are exempt from the minimum rung width requirement.

(10) Wood ladders shall not be coated with any opaque covering, except for identification or warning labels which may be placed on one face only of a side rail.

(11) Metal ladders shall be protected against corrosion.

(12) The minimum toe clearance between the center line of ladder rungs and steps and any obstructions behind the ladder shall be seven inches (18 cm).

Exception to paragraph (c)(12) of this section: Toe clearances of no less than four and one-half inches (11.4 cm) are acceptable when a specific work operation renders a seven inch (17.8 cm) clearance infeasible.

(13) The minimum perpendicular clearance between the center line of fixed ladder rungs and steps and any obstruction on the climbing side of the ladder shall be 30 inches (76 cm).

Exception to paragraph (c)(13) of this section: When unavoidable obstructions are encountered, the minimum perpendicular clearance between the centerline of fixed ladder rungs and steps and the obstruction on the climbing side of the ladder may be reduced to 24 inches (61 cm) provided that a deflection device is installed to guide employees around the obstruction.

(14) Fixed ladders shall be equipped with personal fall protection systems in accordance with subpart I of this part, or with cages or wells, wherever the length of any fixed ladder exceeds 24 feet (7.3 m), or wherever the top of the ladder is at a distance greater than 24 feet (7.3 m) above lower levels.

(15) Cages and wells provided for fixed ladders shall be designed to permit easy access to or egress from the ladder which they enclose. The cages and wells shall be continuous throughout the length of the fixed ladder except for access, egress and other transfer points. Cages and wells shall be designed and constructed to contain employees in the event of a fall, and to direct them to a lower landing.

(16) The length of continuous climb for any fixed ladder equipped only with a cage or well shall not exceed 50 feet (15.2 m). When ladder safety devices are also used with cages or wells, the length of continuous climb may exceed 50 feet (15.2 m).

(17) Fixed ladders with continuous lengths of climb greater than 150 feet (45.7 m) shall be provided with rest platforms at least every 150 feet (45.7 m). The rest platforms shall provide a horizontal surface of at least 18 inches by 24 inches (46 cm by 61 cm) and have at least the same strength as required for the fixed ladder.

(18) Except where portable ladders are used to access fixed ladders, ladders shall be offset with a landing platform between each ladder when two or more separate ladders are used to reach a work area. Landing platforms shall provide a horizontal surface of at least 24 inches by 30 inches (61 cm by 76 cm) and have at least the same strength as the ladders.

(19) Ladder surfaces shall be free of puncture or laceration hazards.

(20) Fixed individual rung ladders shall be constructed to prevent the employee's feet from sliding off the end.

(21) The distance from the centerline of fixed ladder grab bars to the nearest permanent object in back of the grab bars shall be no less than four inches (10 cm).

(22) A ladder that might contact uninsulated energized electrical equipment shall have nonconductive siderails.

(23) Ladders having a pitch in excess of 90 degrees from the horizontal shall not be permitted, except for fixed ladders used in conical sections of manholes.

(24) The step-across distance from the centerline of the steps or rungs of a fixed ladder to the nearest edge of the structure, building, or equipment accessed shall not exceed 12 inches (30 cm).

(25) Ladders and ladder sections, unless so designed, shall not be tied or fastened together to provide longer length. Ladders and ladder sections shall not have their length increased by other means unless specifically designed for the means employed.

(26) A metal spreader or locking device shall be provided on each stepladder or combination ladder when used in the stepladder mode to hold the front and back sections securely in an open position.

§ 1910.24 Step bolts and manhole steps.

(a) *Scope and application.* This section covers step bolts and manhole steps used on structures such as, but not limited to, towers, stacks, conical manhole sections, and vaults. This section does not apply to individual rung ladders.

(b) *General requirements.* (1) Step bolts and manhole steps shall be continuous and spaced uniformly, not less than six inches (15 cm) nor more than 18 inches (46 cm) apart.

(2) The minimum clear step width of step bolts shall be four and one-half inches (11.4 cm). The minimum clear step width of manhole steps shall be 10 inches (25.4 cm).

(3) The minimum toe clearance for manhole steps shall be four inches (11.1 cm) from the point of embedment on the wall to the outside face of the step. The toe clearance in the center of the manhole step shall be a minimum of four and one-half inches (11.4 cm) measured to the outside face of the step.

(4) The minimum toe clearance for step bolts shall be seven inches (17.8 cm). Where obstructions cannot be avoided, toe clearances may be reduced to four and one-half inches (11.4 cm).

(5) Step bolts and manhole steps shall be designed to prevent the employee's foot from slipping or sliding off the end of the step bolt or manhole step.

(6) All manhole steps and step bolts installed after (insert date 60 days after the effective date of the final rule in the *Federal Register*) and used in corrosive environments, shall be constructed of, or coated with, a material that will retard corrosion of the step or bolt.

(7) All manhole steps installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall be provided with slip-resistant surfaces such as, but not limited to, corrugated, knurled, or dimpled surfaces.

(c) *Design, construction, maintenance, and inspection.* (1) *Step bolt design.* Each step bolt shall be capable of withstanding, without failure, at least four times the intended load to be applied to the bolt.

(2) *Design of manhole steps installed before* (insert date 60 days after the effective date of the final rule in the Federal Register). Manhole steps installed before (insert date 60 days after the effective date of the final rule in the Federal Register) shall be capable of supporting their maximum intended load.

(3) *Design of manhole steps installed after* (insert date 60 days after the effective date of the final rule in the Federal Register). The employer shall ensure that manhole steps installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall meet the following requirements:

(i) The manhole steps shall be capable of withstanding and remaining solidly secured after being subjected to a separate application of a horizontal pull out load of 400 pounds (1780 N), and a vertical load of 800 pounds (3650 N).

(ii) The manhole steps shall be capable of sustaining the vertical test load without developing a permanent set greater than one-half inch (12.7 mm).

(iii) The loads shall be applied over a width of three and one-half inches (8.9 cm) centered on the step, and applied at a uniform rate until the required load is reached.

(iv) No cracking or fracture of the step nor spalling of the concrete shall be visible.

(4) *Maintenance and inspection.* Step bolts and manhole steps shall be maintained in a safe condition and visually inspected prior to each use.

(5) *Component replacement.* Step bolts which are bent greater than 15 degrees below the horizontal shall be removed and replaced with bolts that meet the requirements of this section. Manhole steps that are bent to such an extent as to reduce the step's projection from the wall to less than four inches (1.1 cm) shall be removed and replaced with a step meeting the requirements of this section, or with a climbing device meeting the requirements of this subpart.

§ 1910.25 Stairs.

(a) *Scope and application.* This section covers fixed stairs, spiral stairs, ship's stairs and alternating tread type stairs. It does not apply to stairs on mobile equipment; to articulated stairs that may be installed on floating roof tanks, waterfront dock facilities or access facilities to mobile equipment at angles which change with the rise and fall of the floating support or various heights of mobile equipment; or to stairs forming an integral part of machinery. It also does not apply to stairs used only for an emergency means of egress, which are covered by subpart E of this part.

(b) *General requirements.* (1) Stairs with four or more risers shall be provided with at least one handrail. A stair rail system shall be provided on all unprotected sides or edges of stairways with a fall hazard of four feet (1.2 m) or more.

(2) Handrails and stair rails shall meet the applicable requirements in § 1910.28(c). Stair rail systems may also serve as handrails when properly installed.

(3) The sides and edges of stair landings with a fall hazard of four feet (1.2 m) or more, unless otherwise enclosed, shall be provided with guardrail systems meeting the requirements of § 1910.28.

(4) Stairs shall be capable of supporting, without failure, at least five times their maximum intended load.

(5) All stairs installed before (insert date 60 days after the effective date of the final rule in the Federal Register) shall have a minimum vertical clearance of six feet, eight inches (2.05 m). The vertical clearance for all stairs (except spiral stairs) installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall be a minimum of seven feet (2.1 m).

(6) Stairs shall be installed with uniform riser heights and tread depths between landings.

(c) *Fixed stairs.* (1) Fixed stairs shall be installed at angles up to 50 degrees from the horizontal.

(2) Riser heights on fixed stairs shall be from six and one-half inches to nine and one-half inches (16.5 to 24.1 cm).

(3) Fixed stairs shall have a minimum width of 22 inches (55.9 cm) between vertical barriers.

(4) Fixed stairs with closed risers shall have a minimum stair tread depth of eight inches (20.3 cm).

(5) Fixed stairs with open risers shall have a minimum tread depth of six inches (15.2 cm).

(6) Stairway landings and platforms measured in the direction of travel shall

be at least 22 inches (55.9 cm) wide, and not less than 30 inches (76 cm) in length.

(d) *Spiral stairways.* (1) The clear width of the stairs shall not be less than 28 inches (66 cm).

(2) The height of the riser shall not exceed nine and one-half inches (24.1 cm).

(3) The minimum headroom above spiral stairways shall be six feet, six inches (198 cm).

(4) Treads shall have a minimum depth of seven and one-half inches (19.1 cm) at a point 12 inches (30.5 cm) from the narrowest edge.

(5) All treads shall be identical.

(6) Where doors or gates open directly onto spiral stairways, landings shall be provided meeting the requirements of paragraph (c)(6) of this section.

(e) *Ship's stairs installed on or after* (insert date 60 days after the effective date of the final rule in the Federal Register). (1) Ship's stairs shall be installed at a slope between 50 degrees and 70 degrees from the horizontal.

(2) Risers shall be open; treads shall be at least four inches (10 cm) in depth, 18 inches (46 cm) in width, and have a vertical rise between tread surfaces of six and one-half to 12 inches (16 to 30 cm).

(3) Handrails meeting the requirements of § 1910.28 shall be installed on both sides of ship's stairs.

(f) *Alternating tread type stairs.* (1) Alternating tread type stairs shall have a series of steps between 50 and 70 degrees from the horizontal.

(2) Handrails shall be provided on both sides of alternating tread type stairs.

(3) The width between handrails shall be from 17 to 24 inches (43 to 61 cm).

(4) Alternating tread type stairs shall be equipped with slip-resistant surfaces on the treads.

(5) The tread shall have a minimum depth of eight and one-half inches (22 cm).

(6) The tread shall be at least seven inches (18 cm) wide at the nosing.

(7) Landings or platforms shall meet the requirements in paragraph (c)(6) of this section.

§ 1910.26 Ramps and bridging devices.

(a) *General requirements.* (1) Ramps and bridging devices shall be designed, constructed and maintained to support their maximum intended loads.

(2) Ramps and bridging devices used for the passage of vehicles shall be designed, constructed and maintained to prevent vehicles from running off the edge.

(3) There shall be a clearly designated and separated walkway for foot passage

outside of the vehicle lane when ramps and bridging devices are used for the simultaneous passage of pedestrians and motorized vehicles except when pedestrians can precede or follow a vehicle at a safe distance.

(4) Ramps and bridging devices shall be secured to prevent their displacement while employees are on them. Vehicles, such as freight cars, onto which a ramp or bridging device has been placed, shall be prevented from moving, by such means as chocks or sand shoes, while the ramp or bridging device is being used by employees.

(5) A safe means of handling portable ramps and bridging devices, such as handholds or grab handles, shall be provided for employee use.

(6) Ramps and bridging devices constructed of two or more planks shall have the planks securely connected together to prevent displacement.

(b) *Specific requirements.* (1) *Fixed ramps.* (i) Each ramp used by employees that has a ramp angle greater than 20 degrees from the horizontal shall be provided with handrails meeting the requirements of § 1910.28.

(ii) The employer shall assure that the angle of ramps used by employees does not exceed 30 degrees from the horizontal.

(iii) Ramps which have a fall hazard of four feet (1.2 m) or more shall be provided with a stair rail system or equivalent fall protection system meeting § 1910.28.

(2) *Portable or elevating ramps and bridging devices.* (i) When one or both ends of a portable or elevating ramp or bridging device are not secured to the vehicle or dock, there shall be an overlap of at least four inches (10.2 cm) onto the unattached surface or surfaces.

(ii) Fall protection systems are not required for ramps or bridging devices when they are being used exclusively for material handling operations with motorized equipment, when:

(a) Employees engaged in those operations are exposed to fall hazards less than 10 feet (3 m); and,

(b) Those employees have been trained to recognize and avoid the hazards involved with this work. This training shall consist of instructions in the proper placement and securing of the ramps and bridging devices, securing of vehicles, and the proper use of material handling equipment.

§ 1910.27 Work surfaces.

(a) *Scope and application.* (1) *Scope.* This section covers floors, ramps, roofs and similar walking and working surfaces, unless they are specifically covered elsewhere in this subpart.

(2) *Application.* This section does not apply to the following surfaces:

(i) Scaffolds covered in § 1910.30.

(ii) Landings on stairs which are covered in § 1910.25.

(iii) Platforms which are covered in § 1910.31.

(b) *General requirements.* (1) Employees exposed to unprotected sides or edges of surfaces that present a falling hazard of four feet (1.2 m) or more to a lower level or floor holes shall be protected by a fall protection system meeting the requirements of § 1910.28.

(2) Employees on surfaces which are less than four feet (1.2 m) above a lower level, but are above or adjacent to dangerous equipment, materials or operations, shall be protected by a fall protection system meeting the requirements of § 1910.28 to prevent their falling into or onto the hazardous areas.

(3) Employees who are exposed to falling through a covered opening in a surface that presents a fall hazard of four feet (1.2 m) or more to a lower level, and employees who are exposed to falling through skylights, shall be informed of the potential hazard and be protected by one of the following:

(i) The surface shall be designed, covered or reinforced to carry the intended load; or

(ii) Employees shall be protected by a fall protection system in accordance with § 1910.28.

(4) A floor hole less than one foot (30.5 cm) in its least dimension (the shortest distance from the edge of the work surface or toeboard to the object going through the work surface) provided for passage of machinery, piping, or other equipment that may expand, contract, vibrate and/or move in a similar manner, need only be guarded by a toeboard or equivalent means to prevent the feet of employees from entering the hole or tools from falling through the opening and onto employees below.

Note: See § 1910.28(e) for all other floor holes.

(5) Floor hole guards shall be kept in place at all times, except when the nature of work operations require their removal, and where alternative means of protection have been provided.

(6) Employers shall install an appropriate guard, such as a toeboard which complies with § 1910.28, on the perimeter of a walking or working surface, when employees below that surface might be exposed to falling material.

§ 1910.28 Fall protection systems.

(a) *General Requirement.*—(1) *Guardrail use.* Employers shall provide

a guardrail system as the primary fall protection system for all walking and working surfaces regulated under this subpart unless the use of a guardrail system is infeasible. When the use of a guardrail system is infeasible, the employer shall provide an appropriate alternative fall protection such as personal fall protection systems, hole covers, safety nets, etc. which complies with the requirements of this section.

(2) *Exceptions:* Employers that comply with paragraph (d) of this section need not use guardrail systems.

(b) *Guardrail systems and toeboards.* Requirements for suspension scaffold fall protection systems are contained in § 1910.30. All other guardrail systems and their components shall meet the following criteria:

(1) *Top rails.* The top rail or member of a guardrail system shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within two inches (5 cm) of the top edge of the rail in any downward or outward direction at any point along the top edge. For guardrail systems installed before (insert date 60 days after the effective date of the final rule in the *Federal Register*) when the 200 pound (890 N) test load is applied in a downward direction, the top edge of the guardrail shall not be less than 36 inches (91 cm) above the guarded surface level. For guardrail systems, other than those which comply with paragraph (b)(3)(iii) of this section installed on or after (insert date 60 days after the effective date of the final rule in the *Federal Register*) when the 200 pound (890 N) test load is applied in a downward direction, the top edge of the guardrail shall not be less than 39 inches (1 m) above the guarded surface level. No permanent deformation is permitted in the system when the force is removed.

(2) *Midrails.* (i) Midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent structural members shall be provided between the top rail of the guardrail system and the work surface.

(ii) Midrails and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (667 N) applied in any downward or outward direction at any point along the midrail. No permanent deformation is permitted in the system when the force is removed.

(iii) Midrails and other intermediate members shall be positioned so that the openings in the guardrail system are a maximum of 19 inches (48 cm) in their least dimension.

(3) *Height criteria.* (i) The top member of guardrail systems installed before

(insert date 60 days after the effective date of publication of the final rule in the Federal Register) shall be at least 36 inches (91 cm) above the work surface under all conditions.

(ii) The height of the top rail or equivalent component of guardrail systems installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall be at least 42 inches (1.1 m) above the walking or working surface. Employers may build up the walking and working surface provided the requirements of paragraph (b)(1) of this section are met.

(iii) As an alternative to complying with paragraphs (b)(3)(i) and (b)(3)(ii) of this section, employers may reduce the height of the top surface of a guardrail system to no less than 30 inches (76 cm) at any point, provided the sum of the depth (horizontal distance) of the top edge, and the height of the top edge (vertical distance from the work surface to the top edge of the top member), is at least 48 inches (1.2 m).

(4) *Surfaces of guardrails.* Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing which could cause an employee to fall.

(5) *Size criteria.* Top rails and midrails shall be at least one-quarter inch (0.6 cm) in outside diameter or thickness.

(6) *Access openings.* Employers may use movable guardrail sections using such materials as gates, non-rigid members and chains to provide access when opened and guardrail protection when closed, provided the criteria in paragraphs (b)(1) through (b)(5) of this section. Toeboards are not required in access openings.

(7) *Toeboard requirements* (i) Toeboards shall be capable of withstanding, without failure, an outward force of at least 50 pounds (222 N) applied at any point in the direction of the exposed perimeter.

(ii) Toeboards shall be at least three and one-half inches (8.9 cm) in vertical height from their top edge to the level of the work surface.

(iii) Toeboards shall not be placed more than one-half inch (1.3 cm) above the work surface. They shall be solid or have openings not over one inch (2.5 cm) in their greatest dimension.

(c) *Handrail and stair rail systems—*
(1) *Strength criteria.* Handrails and the top rails of stair rail systems shall be capable of withstanding, without permanent deformation or a loss of support, a force in any downward or outward direction at any point along the top edge, of at least 200 pounds (890 N)

applied within two inches (5 cm) of the top edge of the rail.

(2) *Height criteria.* (i) The height of handrails installed before (insert date 60 days after date of the final rule in the Federal Register) shall not be less than 30 inches (76 cm) nor more than 42 inches (1.1 m) from the top of the handrail to the surface of the tread in line with the face of the riser at the forward edge of the tread.

(ii) The height of handrails installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall not be more than 37 inches (94 cm) nor less than 30 inches (76 cm) when measured in a manner consistent with the method described in paragraph (c)(2)(i) of this section.

(iii) The height of stair rail systems installed before (insert date 60 days after the effective date of the final rule in the Federal Register) shall not be less than 30 inches (76 cm) from the upper surface of the tread. This distance shall be measured in a vertical direction at the intersection of the riser face and tread surface, or in the case of open risers, at the forward edge of the tread surface.

(iv) The height of stair rail systems installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall be not less than 36 inches (91 cm) when measured in a manner consistent with the method described in paragraph (c)(2)(iii) of this section.

(v) A stair rail installed before (insert date 60 days after the effective date of the final rule in the Federal Register) may also serve as a handrail when the height of the top edge is not more than 42 inches (1.1 m) nor less than 36 inches (91 cm) when measured at the forward edge of the tread surface.

(vi) A stair rail installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register) may also serve as a handrail when the height of the top edge is not more than 37 inches (94 cm) nor less than 36 inches (91 cm) when measured at the forward edge of the tread surface.

(3) *Finger clearance.* The minimum clearance between handrails, including the top edge of stair rail systems serving as handrails, and any obstructions shall be one and one-half inches (4 cm).

(4) *Surfaces.* Handrail and stair rail systems shall be surfaced to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothing.

(5) *Openings in stair rails.* Openings in a stair rail system shall be a maximum of 19 inches (48 cm) in their least dimension.

(6) *Handhold.* Handrails shall have the shape and dimension necessary to provide a firm handhold for employees.

(7) *Projection hazards.* Ends of stair rail systems and handrails shall not present a projection hazard.

(d) *Designated areas—*(1) *General requirements for use.* Employers may establish designated areas which comply with the provisions of this paragraph as an alternative to installing guardrails, where employers demonstrate that employees within the designated areas are not exposed to fall hazards. In addition, the following conditions and requirements must be met in order to use designated areas in lieu of other fall protection measures:

(a) The work must be of a temporary nature, such as maintenance on roof top equipment.

(b) Designated areas shall be established only on surfaces that have a slope from horizontal of 10 degrees or less.

(c) The designated area shall consist of an area surrounded by a rope, wire or chain and supporting stanchions erected in accordance with the criteria in paragraphs (d)(2) through (d)(5) of this section.

(2) *Strength criteria.* (i) After being erected with the line (such as rope, wire or chain) attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion. The force shall be applied 30 inches (76 cm) above the work surface and perpendicular to the designated area perimeter, and in the direction of the unprotected side or edge;

(ii) The line shall have a minimum breaking or tensile strength of 500 pounds (2.2 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions as prescribed in paragraph (d)(2)(i) of this section; and

(iii) The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

(3) *Height criteria.* The line shall be installed in such a manner that its lowest point (including sag) is no less than 34 inches (86 cm) nor more than 39 inches (1 m) from the work surface.

(4) *Visibility criteria.* The line forming the designated area shall be clearly visible from any unobstructed location within the designated area up to 25 feet (7.6 m) away, or at the maximum distance a worker may be positioned away from the line, whichever is less.

(5) *Location criteria.* (i) The stanchions shall be erected as close to the work area as is permitted by the task.

(ii) The perimeter of the designated area shall be erected no less than six feet (1.8 m) from the unprotected side or edge.

(iii) When mechanical equipment is being used, the line shall be erected not less than six feet (1.8 m) from the unprotected side or edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the unprotected side or edge which is perpendicular to the direction of mechanical equipment operation.

(iv) Access to the designated area shall be by a clear path, formed by two lines, attached to stanchions, which meet the strength, height and visibility requirements of this paragraph.

(e) *Holes.* Covers for holes in floors, roofs and other walking and working surfaces shall comply with the following provisions:

Note: See § 1910.27(b)(4) for floor holes provided for the passage of machinery, piping or other equipment.

(1) Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

(2) All other covers shall be capable of supporting, without failure, the maximum intended load of employees, equipment and material to be applied to the cover at any one time, or 250 pounds (114 kg), whichever is greater.

(3) All covers shall be installed so as to prevent accidental displacement.

(f) *Personal fall protection systems.* All body belts and body harnesses and their associated fall protection systems shall meet the applicable requirements of subpart I of this part.

(g) *Restraint line systems.* Where, an employee is tethered, restraint line systems shall meet the applicable requirements of subpart I in order to prevent a fall from an unprotected side or edge or into an opening.

(h) *Safety net systems.* Safety net systems and their use shall comply with the following provisions:

(1) Safety nets shall be installed as close as practicable under the work surface on which employees are working, but in no case more than 30 feet (9.1 m) below such work surfaces.

(2) Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below if subjected to an

impact equal to that imposed under the required drop test.

(3) Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance— (working level to horizontal plane of net)	Minimum required horizontal distance—(net outer edge to working surface edge)
Up to 5 feet (1.5 m).....	8 feet (2.4 m).
More than 5 feet (1.5 m) up to 10 feet (3 m).....	10 feet (3 m).
More than 10 feet (3 m)....	13 feet (4 m).

(4) Safety nets and their installations shall be capable of absorbing the impact force of a drop test, consisting of a 400 pound (180 kg) bag of sand 30 ± 2 inches (76 ± 5 cm) in diameter dropped into the net from the highest work surface on which employees are to be protected. Each safety net and its installation shall be successfully drop-tested to meet this requirement at the job site before being used as a fall protection system.

Exception to paragraph (h)(4) of this section: When the employer can demonstrate that such a drop test is not practicable, the net installation may be used if a qualified person certifies that the installation meets the strength requirements of this paragraph (h)(4) and all other requirements of this paragraph (h).

(5) Safety nets which are in use shall be inspected weekly for mildew, wear, damage or deterioration, and shall be removed from service if their required strength has been substantially reduced.

(6) Any materials, scrap pieces or tools which may have fallen into the safety net shall be removed as soon as possible, but at least before the next work shift.

(7) The maximum size of each safety net mesh opening shall not exceed 36 square inches (232 cm²), nor be longer than six inches (15 cm) on any side measured center-to-center of mesh ropes or webbing. All mesh crossings shall be secured to prevent enlargement of the mesh opening.

(8) Each safety net, or section of it, shall have a border rope or webbing with a minimum breaking strength of 5,000 pounds (22.2 kN).

(9) Connections between safety net panels shall be as strong as integral net components, and shall be spaced at intervals not more than six inches (15 cm) apart.

§ 1910.29 Wall openings.

(a) *Existing wall openings.* Existing wall openings shall be guarded by a fall protection system meeting the applicable requirements of § 1910.28 if their lower edge is less than 36 inches (91.4 cm) above a work surface, and if

they present a hazard to employees of falling through and down more than four feet (1.2 m).

(b) *New wall openings.* Wall openings constructed on or after (insert date 60 days after the effective date of the final rule in the **Federal Register**) shall be guarded by a fall protection system meeting the applicable requirements of § 1910.28 if their lower edge is less than 39 inches (1 m) above a work surface, and if they present a hazard to an employee of falling through and down more than four feet (1.2 m).

(c) *Grab handles.* Wall openings shall be provided with accessible grab handles on each side of the opening whenever the work activity requires employees to work through an unprotected opening by reaching through or around the opening. Each grab handle shall be capable of withstanding a maximum horizontal pull-out force equal to two times the intended load, or 200 pounds (890 N), whichever is greater. In addition, employees shall be provided with a fall protection system meeting the requirements of § 1910.28.

§ 1910.30 Scaffolds.

(a) *Scope and application.* This section applies to two-point adjustable scaffolds, single-point adjustable suspension scaffolds, mobile manually propelled scaffolds, and boatswains' chairs and components when used in general industry. Any other type of scaffolds not specifically covered in this section shall meet the applicable requirements of 29 CFR part 1926, subpart L.

(b) *Restrictions.* The use of "lean-to" or "shore" scaffolds is prohibited.

(c) *General requirements.*—(1) *Scaffold installation and use.* Scaffold installation and use shall meet the following conditions:

(i) Ladders or makeshift devices shall not be used on top of scaffold platforms to increase the height at which employees work.

(ii) Scaffold suspension ropes or devices shall hang vertically without being pulled laterally unless specifically designed and intended for such use.

(iii) When employees on scaffolds are exposed to falling objects, overhead protection shall be provided in such a manner as to deflect or resist penetration of objects that are likely to fall onto the employees.

(iv) Scaffolds shall not be moved horizontally nor altered while they are in use or occupied by employees, except when a scaffold has been specifically designed for such use.

(v) Tools, materials and debris shall not be allowed to accumulate in quantities to cause a hazard.

(vi) Work is prohibited on scaffolds covered with snow, ice or other slippery material except as necessary for removal of such material.

(vii) Work on or from scaffolds is prohibited when winds are above 40 miles per hour (64.4 km/hr) unless the employer can establish that employees are protected from the effects of the wind's force and that the scaffold is properly secured against the wind loads imposed on it. Wind screens shall not be used unless the scaffold is designed for them and the scaffold is secured against wind loads imposed on it.

(viii) Scaffolds shall not be erected, used, or moved closer to exposed and energized power lines than as follows:

(a) For all lines of more than 50 kv, minimum clearance between the lines and all parts of the scaffold shall be 10 feet (3.1 m) plus 0.4 inch (1 cm) for each 1 kv over 50 kv, or twice the length of the line insulator, but never less than 10 feet (3.1 m);

(b) For all insulated lines between 300 volts and 50 kv, the minimum clearance between the lines and all parts of the scaffold shall be 10 feet (3.1 m);

(c) For all insulated lines of less than 300 volts, the minimum clearance between the lines and all parts of the scaffold shall be two feet (0.6 m);

(d) For all lines of any voltage which are uninsulated, the minimum clearance between the lines and all parts of the scaffold shall be 10 feet (3.1 m) for lines of 50 kv and less; and for lines more than 50 kv, 10 feet (3.1 m) plus 0.4 inch (1 cm) for each 1 kv over 50 kv, or twice the length of the line insulator, but never less than 10 feet (3.1 m).

(ix) Where material is being hoisted onto or near a scaffold, tag lines or other equivalent measures to control the hoisted load shall be utilized.

(2) *Suspension ropes.* (i) Suspension ropes shall be capable of supporting, without failure, at least six times the intended load applied or transmitted to that rope.

(ii) Suspension ropes supporting manually-powered suspended scaffolds shall be no less than one-fourth of an inch (.63 cm) diameter steel wire rope or equivalent. The minimum grade of wire rope shall be improved plow steel.

(iii) Suspension ropes supporting suspended powered scaffolds shall be no less than five-sixteenths of an inch (.79 cm) diameter wire rope or equivalent. The minimum grade of wire rope shall be improved plow steel.

(iv) Winding rope hoists shall contain at least four wraps of the suspension rope when the scaffold is at the lowest

point of travel. In all other situations, the suspension ropes shall either be of such length that the scaffold can be lowered to the level below without the rope end passing through the hoist, or the rope end shall be configured or provided with a means to prevent its end from passing through the hoist.

(v) Ropes terminating at drums shall be attached to the drum by a positive mechanical means.

(vi) Wire suspension ropes shall not be joined together except by eye splicing with shackles, or by coverplates and bolts.

(vii) Swaged attachments or spliced eyes on wire suspension ropes shall be made only by the wire rope manufacturer or by a qualified person. The swaged attachments or spliced eyes made by a qualified person shall be at least equivalent to devices made by the rope manufacturer.

(viii) Wire rope clips shall be installed by a qualified person, retightened after initial loading, and be inspected and kept tight thereafter.

(ix) Suspension ropes shall be protected from exposure to open flames, hot work, corrosive chemicals or other destructive conditions.

(x) Ropes shall be regularly inspected and serviced. The use of repaired wire rope as suspension rope is prohibited, and defective suspension ropes shall not be used.

(3) *Strength.* Each scaffold and scaffold component, except suspension ropes and guardrail systems, shall be capable of supporting, without failure, its own weight and at least four times the maximum intended load applied or transmitted to that component. Scaffold components selected, built and loaded in accordance with Appendix A of this Subpart, will be deemed to meet this requirement.

(4) *Loading of scaffolds.* No scaffold shall be loaded in excess of its maximum intended load. The employer shall inform all employees working with scaffolds of the maximum intended load for the scaffold in use.

(5) *Coating of wood platforms.* Wood platform units shall not be covered with opaque coatings. Unit edges may be marked for purposes of identification. Periodic coating with a wood preservative, fire retardant or slip-resistant coating is permitted, so long as the coating does not obscure the top or bottom wood surface.

(6) *Erection and inspection.* Scaffolds shall be erected and used under the supervision of a qualified person in accordance with applicable manufacturers' recommendations.

Scaffolds shall be inspected for visible defects prior to each day's use and after

any occurrence which could affect a scaffold's structural integrity. Deficiencies shall be corrected before use.

(7) *Platform width.* Scaffold platform units shall be at least 18 inches (46 cm) wide.

(8) *Platforms.* Platforms at all working levels shall be fully planked or decked with platform units between the front uprights and the guardrail supports as follows:

(i) Platform units shall be placed as close as possible to adjacent units. Any space between adjacent units shall be no more than one inch (2.5 cm) except as necessary to fit around uprights when side brackets are used to extend the width of the platform.

(ii) Where full planking or decking cannot be obtained using standard width units, the platform shall be planked or decked as fully as possible; however, the remaining open space between the platform and guardrail supports shall not exceed nine and one-half inches (24 cm).

(9) *Positioning the front edge of a scaffold.* The front edge of all scaffold platforms shall be positioned as close as practical to the structure being worked, but not more than 14 inches (35 cm) from the face of the structure unless a guardrail system meeting the requirements of § 1910.28 is used. When scaffold frames cannot be positioned within this maximum distance, side brackets or other means may be used to extend the platform width to within 14 inches (35 cm) from the face of the structure being worked.

(10) *Protection of employees working below scaffolds.* Toeboards, overhead protection or other equivalent protection shall be provided to prevent tools or material from falling onto employees working below scaffolds.

(11) *Extension of platform units over supports.* Scaffold platform units, unless cleated or otherwise restrained by hooks or equivalent means at both ends, shall extend over their end supports no less than six inches (15 cm) and not more than 18 inches (46 cm). A unit may extend more than 18 inches (46 cm) over the end support when the unit is designed and installed to support employees on the extended area without tipping, or guarded to prevent access to the cantilevered ends.

(12) *Abutment of platforms.* On scaffolds where units are abutted to create a longer platform, each abutted end shall rest on a separate support, butt plate, or equivalent means of support.

(13) *Overlapping of platforms.* On scaffolds where platform units are

overlapped to create a longer platform, the overlap shall occur only over supports, and shall not be less than 12 inches (30.5 cm), unless the planks are nailed together or otherwise restrained to prevent movement.

(14) *Intermixing of components.* Scaffold components manufactured by different manufacturers shall not be intermixed unless the component parts fit together without force or modification, and the resulting scaffold meets the requirements of this section.

(15) *Ladders.* All ladders shall be located so as not to adversely affect the stability of the scaffold.

(16) *Access.* An access ladder, or equivalent safe access, shall be provided to scaffold platforms.

(17) *Gasoline-powered hoists.* Gasoline-powered hoists shall not be located on suspension scaffolds.

(18) *Listing of hoists.* Suspension scaffold mechanically-powered hoists and manually-powered hoists shall be of a type tested and listed by a nationally recognized testing laboratory. Refer to § 1910.7 for definition of nationally recognized testing laboratory.

(19) *Power-operated gears and brakes.* All power-operated gears and brakes on suspension scaffold hoists shall be guarded to prevent employee injury.

(20) *Automatic braking devices.* In addition to the normal operating brake, mechanically-powered hoists on suspension scaffolds shall have a braking device which engages automatically when the normal speed of descent of the hoist is exceeded.

(21) *Manually powered hoists.* Manually powered hoists shall require a positive crank force to descend.

(22) *Support surfaces for suspension scaffold support devices.* All suspension scaffold support devices such as outrigger beams, cornice hooks, parapet clamps, and similar devices, shall rest on surfaces capable of supporting the reaction forces imposed by the scaffold hoist operating at its maximum rated load.

(23) *Evaluating decks to support intended loads.* When an employer chooses to use outrigger beams in conjunction with a suspended scaffold, a qualified person shall evaluate the direct connections to roof and floor decks before suspension scaffold outrigger beams are used, in order to ensure that such decks are capable of supporting the loads to be imposed.

(24) *Inboard ends of outrigger beams.* The inboard ends of suspension scaffold outrigger beams shall be stabilized by bolts or other direct connections to the floor or roof deck, or they shall have their inboard ends stabilized by counterweights.

(i) Direct connections shall be evaluated before use by a qualified person who shall affirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads to be imposed.

(ii) Counterweights shall be made of non-flowable solid material.

(iii) Counterweights shall be secured by mechanical means to the outrigger beams.

(iv) Counterweights shall not be removed from a scaffold until the scaffold is disassembled.

(v) Outrigger beams shall be secured by tiebacks equivalent in strength to the suspension ropes.

(vi) Tiebacks shall be secured to a structurally sound portion of the building or structure.

(vii) Tiebacks shall be installed parallel to the centerline of the beam.

(25) *Outrigger beams.* Scaffold outrigger beams:

(i) Shall be provided with stop bolts or shackles at both ends;

(ii) Shall be securely fastened together, with the flanges turned out when channel iron beams are used in place of I-beams;

(iii) Shall be installed with all bearing supports perpendicular to the beam centerline;

(iv) Shall be set and maintained with the web in a vertical position;

(v) Where a single outrigger beam is used, shall have the steel shackles or clevises with which the wire ropes or equivalent are attached to the outrigger beam placed directly over the hoisting machine;

(vi) Shall be made of structural metal or equivalent material; and,

(vii) Shall be restrained to prevent movement.

(26) *Suspension scaffold support devices.* Suspension scaffold support devices such as cornice hooks, roof hooks, roof irons, parapet clamps or similar devices shall be:

(i) Made of mild steel, wrought iron, or materials of equivalent strength;

(ii) Supported by bearing blocks; and

(iii) Secured against movement by tiebacks installed at right angles to the face of the structure whenever possible, and secured to a structurally sound portion of the structure. Vents, standpipes, other piping systems, and electrical conduit shall not be used as points of tie-off for tiebacks. Tiebacks shall be equivalent in strength to the hoisting rope.

(27) *Fall protection for suspension scaffolds.* Employees working on single-point suspension scaffolds and two-point suspension scaffolds shall be protected from falls in the following manner:

(i) All open sides and ends of the scaffolds shall be protected by barriers that meet the following:

(a) At least 36 inches (91 cm) in height;

(b) The top member of barrier shall withstand at least a 100 pound (444 N) force in any downward or outward direction;

(c) The midrails shall withstand at least a 75 pound (333 N) force in any downward or outward direction; and

(d) A standard toeboard meeting the requirements of § 1910.28 is also required when employees below are exposed to hazards from tools, equipment or other objects falling from the scaffold edges;

(ii) Employees on single level scaffolds (one working level) or the top surface of multilevel scaffolds shall be protected by a personal fall protection system meeting the requirements of subpart I, which is attached to either:

(a) A structure (anchorage point) not to the scaffold or the scaffold suspension means, or:

(b) A supplementary platform support line, or a scaffold member which can withstand an impact force of 5,000 pounds (22.2 kN) if supplementary platform support lines are used in conjunction with automatic safety locking devices capable of stopping the fall of the scaffold in the event any of the main suspension lines fail.

(iii) Multilevel platforms and scaffolds with overhead protection shall be provided with supplementary platform support lines and automatic safety locking devices capable of stopping the fall of the loaded platform in the event any of the main suspension lines fail. Employees shall be provided with a personal fall protection system meeting the requirements of subpart I of this part. Employees working below an obstruction shall be attached to a scaffold member capable of withstanding an impact force of 5,000 pounds (22.2 kN) or greater.

(d) *Two-point adjustable suspension scaffolds (swing stages).*—(1) *Platform unit width.* Platform units shall be no more than 36 inches (91 cm) wide, unless designed by a qualified person to be stable under the conditions of use.

(2) *Platform units.* Platform units shall be securely fastened to hangers (stirrups) by U-bolts or by other equivalent means. Light-metal type platforms shall be tested and listed by a nationally recognized testing laboratory.

(3) *Securing scaffolds.* Two-point adjustable suspension scaffolds shall be secured to prevent them from swaying. Window cleaners' anchorages shall not be used for this purpose.

(4) *Bridging scaffolds.* Scaffolds designed for use as two-point suspension scaffolds shall not be bridged or otherwise connected one to another during raising and lowering operations. Two-point suspension scaffolds designed for use in multi-point suspension systems may be bridged one to another if the bridge connections are articulated and the hoists properly sized.

(5) *Passage between scaffolds.* Passage may be made from one platform unit to another only when the platform units are at the same height, are abutted, and have walk-through stirrups specifically designed for this purpose.

(e) *Single-point adjustable suspension scaffolds—(1) Testing and listing.* Single-point adjustable suspension scaffolds including hoists, shall be of a type that is tested and listed by a nationally recognized testing laboratory.

(2) *Combining single-point adjustable suspension scaffolds.* When two single-point adjustable suspension scaffolds are combined to form a two-point suspension scaffold, the resulting scaffold shall meet the requirements for two-point adjustable suspension scaffolds.

(f) *Mobile manually propelled scaffolds—(1) Guarding against falls.* Employees on mobile scaffolds more than 10 feet (3 m) above lower levels shall be protected from falling to lower levels along all open sides and ends of the platform unit by a fall protection system meeting the requirements of § 1910.28.

(2) *Casters and wheels.* Caster stems and wheel stems shall be secured to prevent them from accidentally falling out of their mountings.

(3) *Supporting surfaces.* Mobile scaffolds shall only be used on surfaces that are rigid and capable of supporting the scaffold in a loaded condition. Unstable objects, such as barrels, boxes, loose bricks, or concrete blocks shall not be used to support the scaffolds.

(4) *Leveling.* Screw jacks or equivalent means shall be used when leveling of the scaffold is necessary.

(5) *Securing mobile scaffolds.* Mobile scaffolds being used in a stationary manner shall be secured against unintentional movement.

(6) *Moving mobile scaffolds.* The force used to move a mobile scaffold shall be applied as close to the base as practicable, but no more than five feet (1.5 m) above the supporting surface, and provisions shall be made to stabilize the scaffold to prevent tipping during movement. Surfaces over which the scaffold is to pass shall be free of obstructions and openings that may cause the scaffold to tip.

(7) *Riding mobile scaffolds.* Employees shall not be allowed to ride on scaffolds unless the following conditions are met:

(i) The surface over which the scaffold will pass shall be within three degrees of level, and free of pits, holes, and obstructions;

(ii) The maximum height to base width ratio of the scaffold during movement shall be two to one or less. Outrigger frames may be included as part of the base width dimension;

(iii) Outrigger frames, when used, shall be installed on opposite sides of the scaffold;

(iv) Tools and materials shall be secured to prevent movement or removed from the platform unit, or toeboards shall be installed on all sides of the scaffold;

(v) Employees shall not be on any part of the scaffold which extends outward beyond the wheels, casters, or other supports; and

(vi) Employees on the scaffold shall have advance knowledge of the movement.

(8) *Height to base ratios.* Scaffolds with height to base width ratios more than four to one shall be restrained by guying, tying, bracing, or other equivalent means sufficient to prevent tipping.

(9) *Preventing swaying and displacement.* Scaffold poles, legs, posts, and uprights shall be plumb, secure, and rigidly braced to prevent swaying and displacement.

(10) *Extending platform units beyond base supports.* Platform units shall not extend outward past the base supports of the scaffold unless outrigger supports or equivalent devices are used and will assure stability.

(g) *Boatswains' chairs—(1) Chair strength.* The chair shall be of a size suitable for the intended purpose, and shall be of such strength to hold the intended live load, but not less than 250 pounds (1.1 kN) without failure.

(2) *Tiebacks.* Tiebacks, if used, shall be approximately perpendicular to the structure face.

(3) *Personal fall protection system.* Each employee shall be protected from falling by body belts or harnesses, lanyards and lifelines, separate from the chair support system. The personal fall protection system shall meet the requirements of subpart I of this part.

(4) *Tackle.* Boatswains' chair tackle shall be correctly sized for the rope being used and the rope shall be "eye" spliced. The breaking strength of the suspension rope shall be at least 4,400 pounds (19.5 kN).

(5) *Seat slings for heat producing processes.* The seat sling shall be

constructed of at least three-eighths of an inch (9.5 cm) diameter wire rope when the employee using it is conducting a heat-producing process.

§ 1910.31 Mobile elevating work platforms, mobile ladder stands and powered industrial truck platforms.

(a) *Application.* This section applies to the design and installation of platforms used in conjunction with powered industrial trucks, and to mobile elevating work platforms and mobile ladder stands. The three types of equipment covered by this section shall be collectively referred to as "units".

(b) *General requirements.* (1) All units shall be designed, installed and maintained to support the maximum intended loads in any configuration that may be used.

(2) All units shall be given a visual inspection prior to use for defects that could cause employee injury. The employer shall ensure that the manufacturers' specifications for inspection and maintenance are met where applicable.

(3) Defective units shall be tagged "Do not use" or with a similar legend in accordance with § 1910.145, and removed from service until repaired by a qualified person.

(4) Employees shall be trained in the safe use of units before they are allowed to use them.

(5) Each unit shall be secured to prevent unintended motion while in use.

(6) The use of any device to achieve additional height on a unit is prohibited.

(7) All surfaces shall be free of hazards that can cause puncture or laceration injuries to employees.

(c) *Mobile elevating work platforms—(1) Minimum loading.* Units shall be capable of supporting at least 300 pounds (135 kg).

(2) *Structural safety factors.* (i) All load-supporting structural elements of the units shall have a structural safety factor of not less than two, based on the minimum yield strength of the material.

(ii) All load-supporting structural elements of units that are made of nonductile materials (such as cast iron or fiberglass) shall have a structural safety factor of not less than five, based on the allowable unit stress of the material.

(3) *Maximum platform height.* The maximum platform height of units that only elevate in the vertical plane, without any articulation, shall not exceed four times the minimum base dimensions unless the employer demonstrates that equivalent stability is provided. When greater heights are necessary, properly fitted outrigger

frames, guying or bracing shall be provided.

(4) *Platforms.* Unit platforms shall meet the following requirements:

(i) The minimum platform width shall be 18 inches (46 cm).

(ii) The platform shall be provided with a fall protection system meeting the requirements of § 1910.28.

(iii) Toeboards meeting the requirements of § 1910.28 shall be provided on all sides of the platform except across access openings.

(5) *Hydraulic or pneumatic systems.* All components of a hydraulic or pneumatic system, whose failure could result in free descent or an uncontrollable fall of the unit, shall have a bursting strength that exceeds the pressure attained when the system is subjected to the equivalent of four times the system's design factor. All other hydraulic components shall have a bursting strength of at least two times the design factor.

(6) *Safety factor for wire ropes and chains.* Where the platform is supporting its maximum intended load by a system of wire ropes, chains, or both, the safety factor of the wire rope or chain shall not be less than eight to one, based on the ultimate strength of the rope or chain in use.

(7) *Elevating assembly.* The elevating assembly shall be equipped and maintained so that it will not allow a free descent or an uncontrollable fall in the event of the assembly's failure. Any unit equipped with a powered elevating assembly shall be supplied with a clearly marked means for emergency lowering that is accessible from the ground level.

(8) *Outriggers and stabilizers.* Outriggers and stabilizers shall be constructed to prevent unintentional retraction.

(9) *Lateral movement.* The employer shall assure before and during lateral movement of units that:

(i) The platform has been lowered to base level;

(ii) Tools and materials on the platform have been secured from falling or have been removed;

(iii) Employees are off the platform; and

(iv) The area the unit is being moved through has a firm footing and is cleared of obstructions.

(10) *Lowering platforms.* The area surrounding the unit shall be cleared of employees and equipment before the platform is lowered.

(d) *Mobile ladder stands.*—(1) *Strength.* Mobile ladder stands shall be capable of supporting at least four times their intended loading. The minimum design working load shall be calculated

on the basis of one or more 200 pound (91 kg) persons, together with 50 pounds (23 kg) of equipment each for a combined weight of 250 pounds (114 kg) for each employee.

(2) *Maximum work surface height.* The maximum work surface heights of mobile ladder stands shall not exceed four times the least base dimension without additional support. When greater heights are needed, outrigger frames shall be employed to achieve this minimum base dimension, or the units shall be guyed or braced to prevent tipping.

(3) *Guardrails and railing systems.* (i) Units having more than five steps or 60 inches (1.5 m) in vertical height to the top step, but less than 10 feet (3 m), placed into service before (insert date 60 days after the effective date of the final rule in the Federal Register) shall have a railing system on all exposed sides and ends at least 29 inches (73.6 cm) high.

(ii) Units with a maximum work surface height of at least four feet (1.2 m), but less than 10 feet (3 m), placed into service on or after (insert date 60 days after the effective date of the final rule in the Federal Register) shall have a railing system on all exposed sides and ends at least 30 inches (76 cm) high.

(iii) All units placed into service before (insert date 60 days after the effective date of the final rule in the Federal Register) with a maximum work surface height of 10 feet (3 m) or higher, shall be protected on the exposed sides and ends with a guardrail system at least 36 inches (91 cm) high.

(iv) Units placed into service on or after (insert date 60 days after the effective date of the final rule in the Federal Register) and with a maximum work surface height of 10 feet (3 m) or greater, shall have a guardrail system and toeboards meeting the requirements of § 1910.28 of this subpart on all exposed sides and ends.

(v) Removable gates and non-rigid members such as chains or other means to provide access are permitted in guardrail systems and railing systems provided that the access openings are appropriately guarded when not in use. Toeboards are not required in access openings.

(4) *Handrails.* (i) Units having more than five steps, or units that are 60 inches (1.5 m) or greater in vertical height to the top step, placed into service before (insert 60 days after the effective date of the final rule in the Federal Register) shall be equipped with handrails that are at least 29 inches (73.6 cm) high (measured vertically from the center of the step) on both sides of its steps.

(ii) Units with a maximum work surface height of four feet (1.2 m) or more, placed into service on or after (insert 60 days after the effective date of the final rule in the Federal Register) shall be equipped with handrails meeting the requirements of § 1910.28 of the subpart on both sides of its steps.

(5) *Steps.* Steps shall be uniformly spaced and create a uniform slope, with a rise of not less than six and one-half inches (16.5 cm) nor more than 10 inches (25.4 cm); a depth of not less than seven inches (17.7 cm); and a minimum width of 16 inches (40.6 cm). The slope created by the steps shall be a maximum of 60 degrees measured from the horizontal.

(6) *Locking the unit.* Units shall be locked in position using at least two means of locking when units are in use. Swivel casters, if used, shall be provided with a positive lock on the swivel or wheel or both.

(7) *Riding on units.* Employees shall not ride on mobile ladder stands.

(e) *Powered industrial truck platforms.*—(1) *Platforms.* Platforms shall be secured to the lifting carriage or forks of the industrial truck.

(2) *Protection from moving parts.* Employees on a platform shall be protected from the moving parts of the truck.

(3) *Overhead protection.* Overhead protection shall be provided when employees are exposed to objects falling from above.

(4) *Minimum width.* The minimum width of the platform shall be 18 inches (46 cm).

(5) *Fall protection system.* Employees on platforms four feet (1.2 m) or more off the ground shall be protected by a fall protection system meeting the requirements of § 1910.28.

§ 1910.32 Special surfaces.

(a) *Scope and application.* This section regulates fall protection for the walking and working surfaces specified herein. The requirements in other sections of this subpart apply except when they conflict with the specific requirements in this section.

(b) *Specific requirements.*—(1) *Repair pits and assembly pits.* Repair pits and assembly pits over four feet (1.2 m) but less than 10 feet (3 m) deep need not be protected by a fall protection system meeting the requirements of § 1910.28, provided that the following requirements are met:

(i) Access within six feet (1.8 m) of the edge of the pit is limited to authorized employees;

(ii) Authorized employees shall be trained to recognize and avoid the

hazards involved with work around the pit area;

(iii) Floor marking in colors contrasting to that of the surrounding area shall be applied, or rope, wire or chain with support stanchions meeting the requirements of § 1910.28(d), or a combination of these, shall be placed at a distance of at least six feet (1.8 m) from the edges of the pits; and

(iv) Caution signs stating "Restricted area," "Authorized employees only," or a similar legend, and meeting the requirements of § 1910.145 of this part shall be used to limit entry into the area to authorized employees.

(2) *Slaughtering facilities platforms.* Where the placement of guardrails would cause carcasses being processed under Federal meat inspection regulations to contact working surfaces, the perimeter protection requirements in § 1910.27 do not apply, but the following requirements do apply:

(i) Access to the platform is limited to authorized employees only.

(ii) Toeboards meeting the requirements in § 1910.28(b)(7) or equivalent similar means shall be provided at these work locations to prevent employees from sliding off or falling off the exposed perimeter.

(iii) All of the other sides of platforms shall be guarded as required by § 1910.27 by a fall protection system meeting the requirements of § 1910.28.

(iv) Employees working on the unprotected side of a slaughtering platform shall be trained to recognize and avoid hazards, such as slippery surfaces, that are involved with their work and to understand the importance of the toeboard or other available protective devices.

(3) *Loading racks.* (i) The working side of loading rack platforms which are used for access to tank cars, tank trucks, or similar equipment, need not have fall protection meeting the requirements of § 1910.28.

(ii) All of the other sides of the loading rack shall be guarded as required by § 1910.27 by a fall protection system meeting the requirements of § 1910.28.

(iii) All runways shall be at least 18 inches (46 cm) wide.

(iv) Employees who may be exposed to fall hazards shall be trained to recognize and avoid hazards associated with this type of work.

(4) *Loading docks and teeming tables.* (i) Employers are not required to install guardrail systems on the working side of platforms such as loading docks and teeming tables, where the employer can demonstrate that the presence of guardrails would prevent the performance of work.

(ii) All of the other sides of the loading docks and teeming tables shall be guarded as required by § 1910.27 by a fall protection system meeting the requirements of § 1910.28.

(iii) Employers shall ensure that employees that may be exposed to fall hazards, are trained to recognize and avoid the hazards associated with this type of work such as, but not limited to, hot surfaces and securing trailers.

(5) *Qualified climbers.* As provided in § 1910.23(a)(2), ladders and step bolts on triangulation, telecommunication, electrical power towers and poles and similar structures, including stacks and chimneys, need not have ladder safety devices, cages or wells if only qualified climbers are permitted to use these ladders or step bolts. Such qualified climbers shall meet the following requirements:

(i) Qualified climbers shall be physically capable

(demonstrated through observations of actual climbing activities or by a physical examination) of performing the duties which may be assigned to them;

(ii) Qualified climbers shall have successfully completed a training or apprenticeship program that covered hands-on training for the safe climbing of ladders or step bolts and shall be retrained as necessary to ensure the necessary skills are maintained;

(iii) The employer shall ensure through performance observations, and formal classroom or on-the-job training that the qualified climber has the skill to safely perform the climbing;

(iv) Qualified climbers shall have climbing duties as one of their routine work activities; and

(v) Qualified climbers, when reaching their work position, shall be protected by a fall protection system meeting the requirements of § 1910.28.

Appendix A to Subpart D—Compliance Guidelines

Note: The following appendix to subpart D serves as a nonmandatory guideline to assist employers and employees in complying with these sections and to provide other helpful information. This appendix neither adds to nor detracts from the obligations contained in the OSHA standards.

Section 1910.22 General requirements

1. *Surface conditions.* The purpose of this section is to provide information to assist employers and employees to assure that walking and working surfaces are maintained free of hazards such as physical obstructions, debris, protruding nails or other fasteners or similar conditions, that could cause employees to slip, trip or fall.

Some hazards, such as snow, water, or ice, which by reason of recent weather or work operations may be present on workplace surfaces, present a slippery surface problem

to employers. When these conditions cannot be eliminated completely, the employer can use alternatives such as slip-resistant footwear or handrails or stair rails to aid employees in maintaining their balance on the hazardous surfaces. Normally, slippery surfaces would occur only where snowfalls or freezing weather are of such frequency to make continued clearing or shoveling of workplace parking lots and sidewalks impractical, or where continuous use of water for washing down walking and working surfaces results in constantly slippery surfaces.

An effective housekeeping program may be used to minimize fall hazards where slippery surfaces are due to temporary or intermittent conditions. Absorbents can be used to clean up a spill where oily materials or corrosive liquids are accidentally spilled onto the floor.

2. *Slip-resistance.* A reasonable measure of slip-resistance is static coefficient of friction (COF). A COF of 0.5, which is based upon studies by the University of Michigan and reported in "Work Surface Friction: Definitions, Laboratory and Field Measurements, and a Comprehensive Bibliography," is recommended as a guide to achieve proper slip-resistance. A COF of 0.5 is not intended to be an absolute standard value. A higher COF may be necessary for certain work tasks, such as carrying objects, pushing or pulling objects, or walking up or down ramps.

Slip-resistance can vary from surface to surface, or even on the same surface, depending upon surface conditions and employee footwear. Slip-resistant flooring material such as textured, serrated, or punched surfaces and steel grating may offer additional slip-resistance. These types of floor surfaces should be installed in work areas that are generally slippery because of wet, oily, or dirty operations. Slip-resistant type footwear may also be useful in reducing slipping hazards.

3. *Mobile equipment.* Mobile equipment operated in walkways or passageways creates a hazard to employees similar to any vehicular traffic. Appropriate warnings should be utilized to alert employees that mobile equipment is being used. Warning signs or mirrors can be used at intersections of walkways or passageways. Flashing lights or audible devices can be mounted on vehicles to warn employees of the presence of vehicles.

Adequate clearance must be provided to permit safe use of walkways, passageways, and aisles by employees when mobile equipment is parked in walkways, passageways, or aisles, and left unattended. Attended means that the operator is within 25 feet (7.5 m) of the vehicle and can see it [see § 1920.178(m)(5)(ii)]. Normally, adequate clearance can be considered as a one-way free passage of 18 inches (46 cm) or greater. However, consideration should be given to the number of employees using the passage; whether traffic will be in both directions; and whether the passageway is part of a means of emergency egress. (See Subpart E—Means of Egress for specific requirements.)

4. *Application of loads.* Floor loading limitations would be of greatest concern to

those employers engaged in the warehousing or storage of goods and materials. Surfaces that should receive special attention so as not to be overloaded include ramps, lifting platforms, dockboards, scaffolds and ladders.

It is important that employees involved in materials handling be made aware of the loading limitations of any surface upon which they may work or walk. Floor loading of a work surface will vary according to the nature of the work performed. For example, a work surface used as an office would not need the continued control of floor loading that would be necessary if the space was used as a warehouse.

5. *Training.* Employees who are expected to inspect, maintain, and/or repair surfaces must be trained in the skills needed to perform their duties. They should also be aware of the strength of the materials with which they are working, and the load bearing capabilities of the equipment or surfaces they are expected to maintain.

Section 1910.23 Ladders

1. *Use of ladders.* Employees should be trained and retrained as necessary to use ladders in the manner for which the ladders were designed to be used. The majority of ladder accidents are apparently due to improper use, placement or selection. The reading and understanding of the hazard warnings and safety use instruction markings that are attached to recently manufactured portable ladders that meet the ANSI standards would be helpful in promoting employee safety.

A general guideline for proper ladder placement for nonself-supported portable ladders is to place the ladder so that the climber's hands would just touch the ladder when the arms are fully extended, and horizontal while the climber is standing straight facing the ladder with the climber's toes touching the side rails at the base of the ladder.

Employers should make sure that extensions placed on ladder siderails for leveling ladders during placement are installed so that the connectors are secured to the siderails and do not affect their strength. If the ladder is to be used for an extended period of time, it should be secured to the building or structure to prevent its accidental displacement. Employees should

also be made aware that the use of individual sections of multisectional ladders as single ladders, and the use of self-supporting ladders in the non-self-supporting mode (e.g., a step ladder folded up and leaned against a wall) is not a safe practice since the ladders are not designed for this use and may slip. Extension ladders need to be equipped with positive locking devices to lock the ladder at the desired climbing length before they may be used.

Employees should not climb ladders while carrying objects in their hands. They should maintain a firm hold on the rungs or siderails and have the necessary objects attached to their belt via straps or loops or have the objects hoisted up by the use of a line once they have reached their work position.

Section 1910.24 Step Bolts and Manhole Steps

1. *Step bolts.* Step bolts are bolts connected to poles, towers, or similar structures for use in ascending or descending to different levels. They are normally installed in an alternating pattern on opposite sides of the structural member to be climbed. They are seldom installed directly on opposite sides from one another, except to establish a standing or rest position, although this is an acceptable method of installation.

An effective maintenance program is required to assure the adequacy of step bolts. For example, over a period of extended use, bolts may become bent or otherwise damaged and thus be unsafe to use. Bolts should be checked to assure that they remain in proper position. Since step bolts also serve as hand grips during climbing, they should be kept free of puncture or laceration hazards. It is also important to check the point of anchorage to the structure. Often, due to changing climatic conditions, anchorage nuts may loosen, or fatigue cracks may appear. These are early signs of premature failure of a bolt, and they must not be ignored. These unsafe conditions should be corrected quickly by repair or replacement.

2. *Manhole steps.* Because of the varied environmental conditions found below ground in manhole structures, special consideration should be given to the type and strength of the materials used to manufacture the step, in order to ensure good service life.

Employees climbing through conical sections of manholes may have to climb in positions not normally used because of the design of the conical section. For example, the standards for ladders prohibit climbing ladders where the climbing side of the ladder exceeds 90 degrees from the horizontal. However, in conical sections, the design of the section may be such that climbing at angles exceeding 90 degrees may be necessary for a short distance. If ladder or step offsets or extensions cannot be installed to provide a straight climb, employees should be made aware of the hazards of climbing on the conical sections.

Rungs and steps should be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the likelihood of slipping.

Section 1910.25 Stairs

Numerous hazards can cause an employee to trip, slip, or fall on stairs. Good housekeeping principles should be followed at all times. Unnecessary obstructions, debris, tools or other loose objects should be kept out of the stairway.

Where carpeting is used on stairs, special attention should be given to the pattern or design on the carpet because some carpet/rug patterns make it difficult to detect the leading edges of the stair tread. It may be necessary to highlight the leading edge of the stair with a different textured material.

If any repairs are necessary, and the work requires the use of tools and materials which would create a hazard, the stairs should be closed to employees until the repairs are made.

There should be adequate lighting on stairways when stairs are in use. Lighting should be maintained and a periodic inspection of stairs should be conducted to assure adequate lighting.

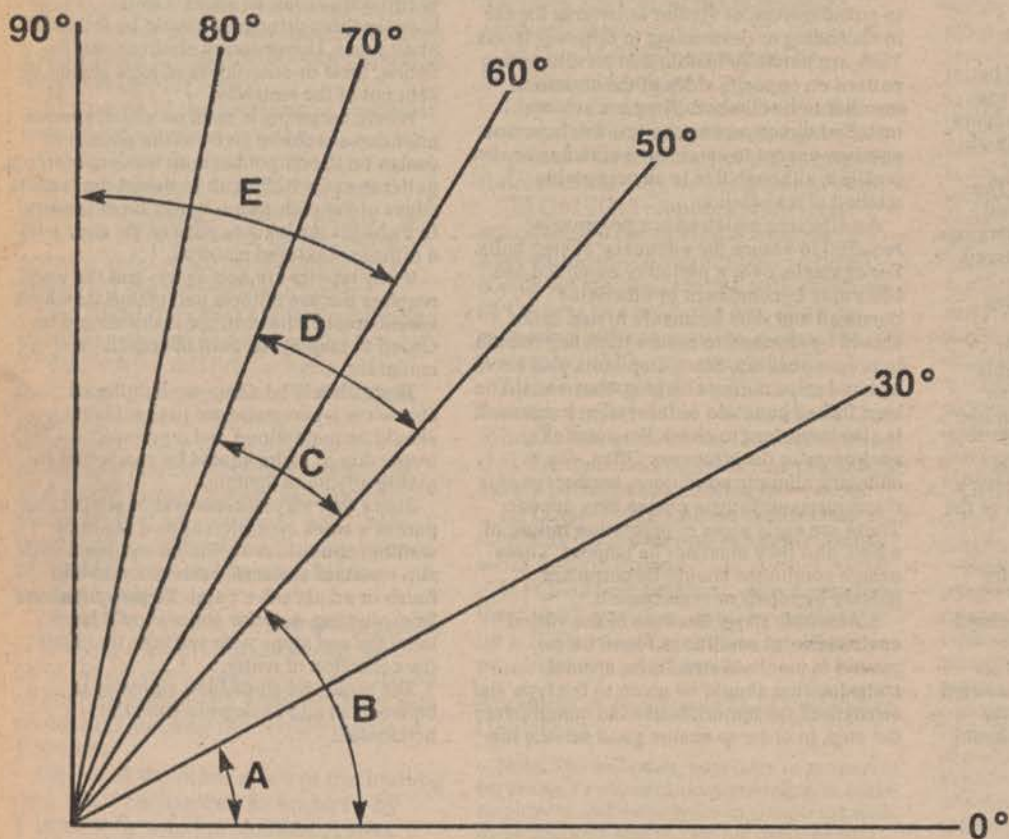
Stairs that may become wet or slippery as part of a work operation or as a result of weather conditions should be equipped with slip-resistant surfaces, such as a non-slip finish or an abrasive paint. To prevent shoes from slipping, exterior stairs should have landings and steps with surfaces that limit the collection of water.

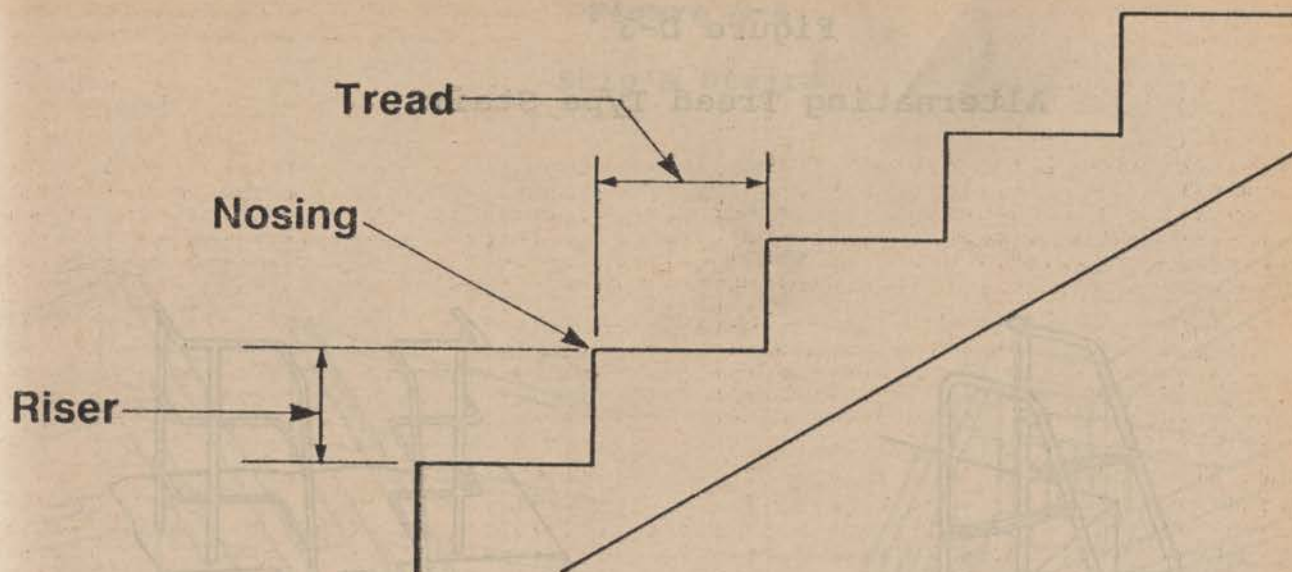
The preferred slope for a stairway is between 30 and 35 degrees from the horizontal.

Figure D-1

Recommended Angles for Stairs, Ramps and Ladders

A -- Ramps	30° or less
B -- Typical Fixed Stair	50° or less
C -- Ship Stairs	50° to 70°
D -- Alternating Tread Stairs	50° to 70°
E -- Ladders	60° to 90°





Dimensions of Typical Fixed Stair Steps:

Minimum Tread Width 22 in (55.9 cm)

Minimum Tread Depth 8 in (20.3 cm)

Riser Height 6½ in to 9½ in (16.5 cm to 24.1 cm)

Figure D-3

Alternating Tread Type Stairs

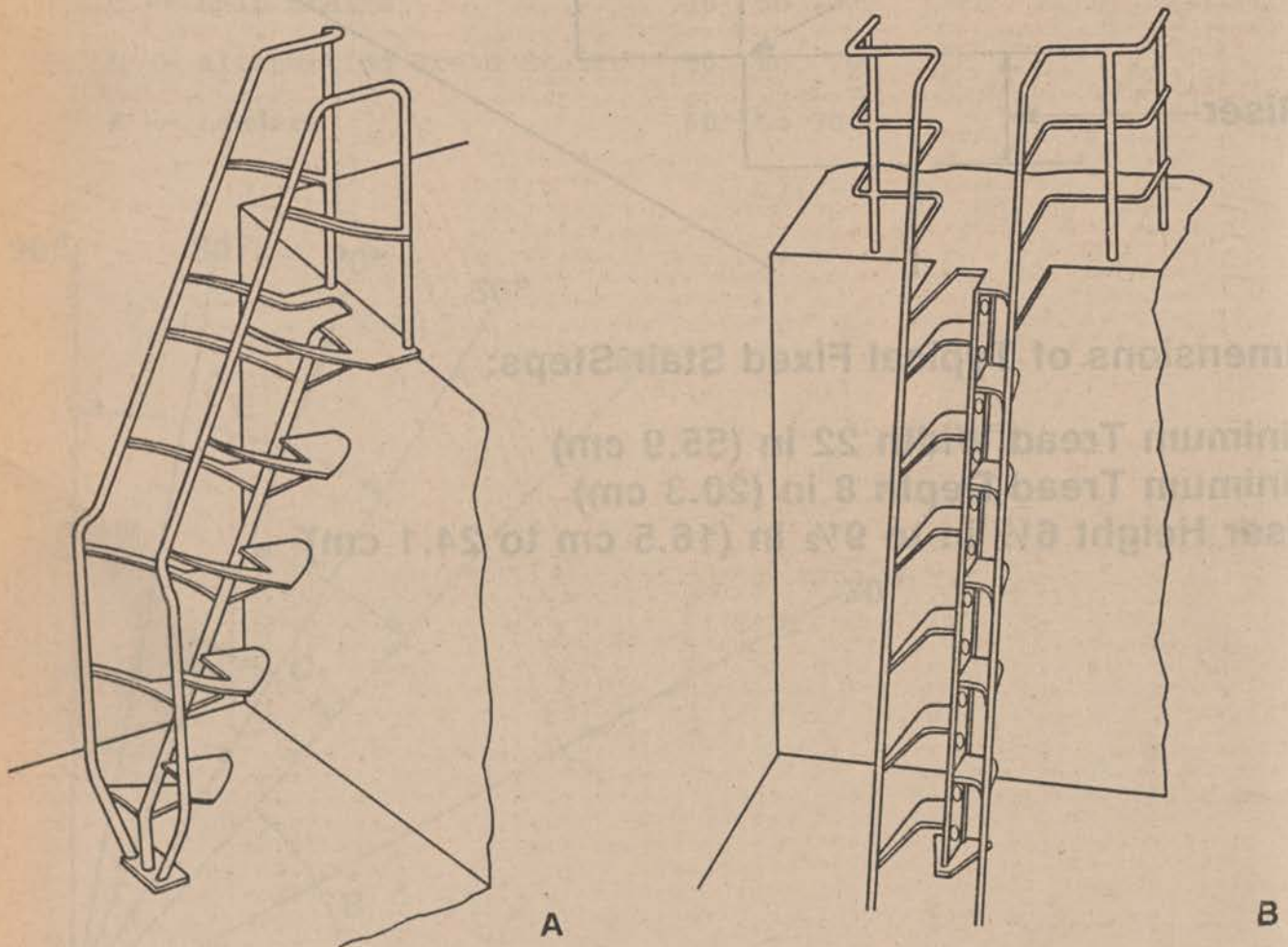
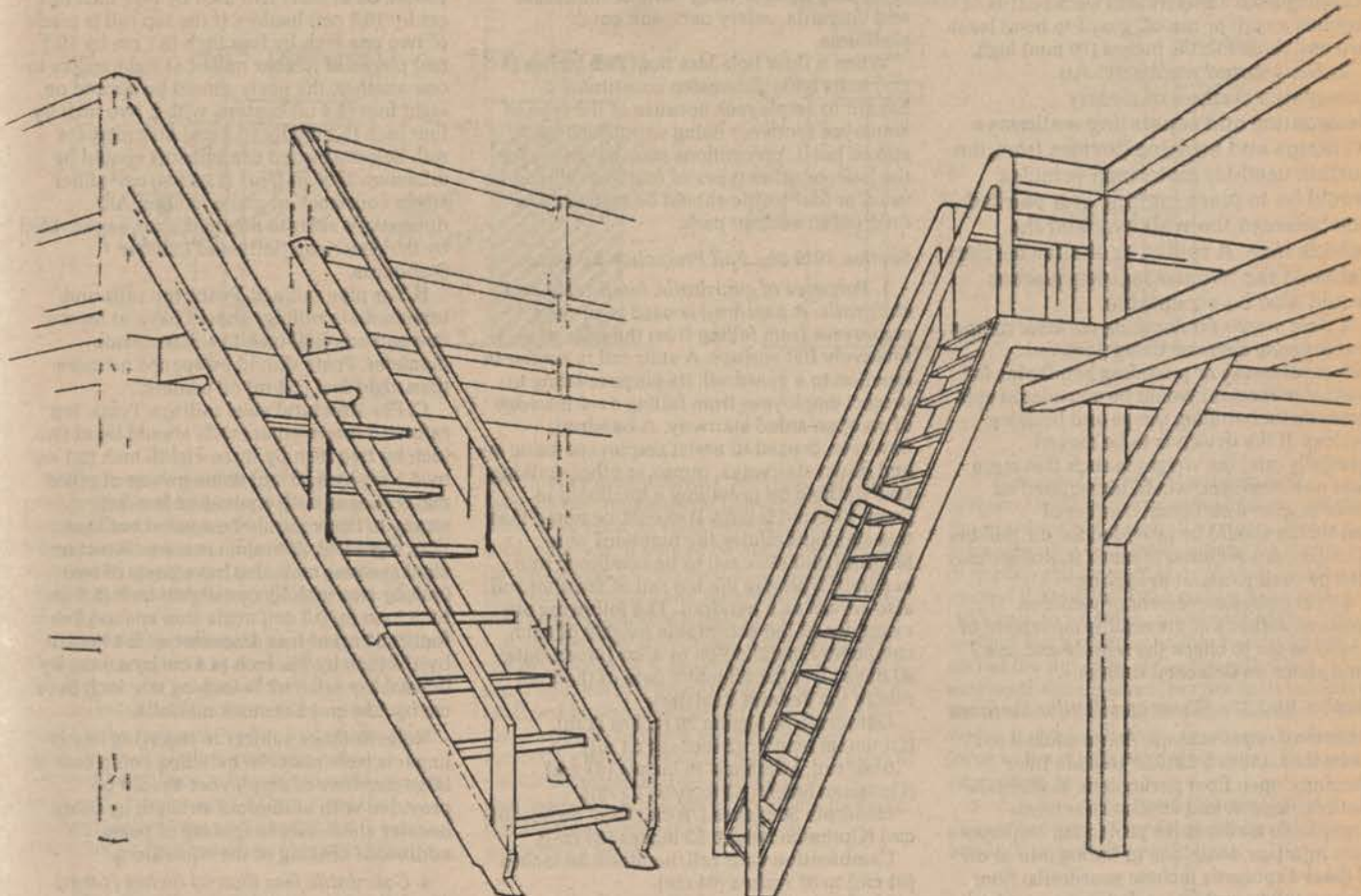


Figure D-4
Ship's Stairs



ILLING CODE 4510-26-C

Section 1910.26 Ramps and Bridging Devices

1. *Preventing vehicles from running off the edge of ramps and bridging devices.* An acceptable method of preventing vehicles from running off the edges of ramps and bridging devices is to attach a curb or a run-off guard to the edge. ASME/ANSI MH14.1, "Loading Dock Levelers and Dockboards," requires a curb or run-off guard to be at least two and three-fourths inches (70 mm) high.

2. *Designated walkway.* An acceptable method of clearly designating and separating walkways on ramps and bridging devices from the portion used for motorized vehicles would be to place curbing or a painted line between the walkway and the vehicle lane. A railing or similar barrier between the two passageways areas would also be acceptable.

3. *Safe means for handling portable ramps, and bridging devices.* Using powered industrial trucks or providing handholds for manual movement would be considered safe methods for handling ramps and bridging devices. If the device is to be moved manually, and the weight is such that more than one employee would be required to move it, then a sufficient number of handholds should be provided for the number of employees required to move it. Rollers may also be used to assist in moving.

4. *Preventing movement of vehicles.* Positive methods of preventing movement of a vehicle are to chock the wheels and use sand shoes on detached trailers.

Section 1910.27 Floors and Similar Surfaces

General requirements. Areas considered hazardous under § 1910.27 include floor openings, open floor perimeters, skylights, platform ledges, and similar structures. Acceptable methods for protecting employees from injury or death due to falling into or off of these exposures include guardrails, floor covers, safety gratings, safety nets, and body belts or harnesses used with lanyards. The employer is encouraged to utilize whatever device suits a specific hazard and which also meets the performance goal of fall prevention. Surfaces with slopes greater than 10 degrees from the horizontal need to be given special consideration when selecting

the means of protecting employees from slips, trips, or falls. Factors that should be considered include the increased likelihood of a fall, the added momentum of the fall due to the effect of gravity, and the potential for an employee to fall or roll through the means of protection.

Acceptable means of protection for steep roofs may include body belts or harnesses and lanyards, safety nets, and catch platforms.

When a floor hole less than two inches (5 cm) in its least dimension constitutes a hazard to employees because of the type of employee footwear being worn, such as spiked heels, precautions such as covers for the hole, or other types of footwear should be used, or foot traffic should be restricted or diverted to another path.

Section 1910.28 Fall Protection Systems

1. *Purposes of guardrails, hand-rails, and stair rails.* A guardrail is used to protect employees from falling from the edge of a relatively flat surface. A stair rail is similar in function to a guardrail, its purpose being to protect employees from falling over the edge of an open-sided stairway. A handrail, however, is used to assist employees going up and down stairways, ramps or other walking and working by providing a handhold to grasp to avoid falling. It should be noted that this standard allows the functions of a handrail and stair rail to be combined into one unit, whereby the top rail of the stair rail also serves as a handrail. The following are examples of the acceptable heights of each component installed on or after (insert date 60 days after the effective date of the final rule in the Federal Register):

Guardrail: Minimum 39 inches (1 m).
(Optimum height: 42 inches (1.1 m)).
Stair rail: Minimum 36 inches (91 cm).
(Optimum height: 42 inches (1.1 m)).
Handrail: 30 inches (76 cm) to 37 inches (94 cm) (Optimum height: 33 inches (84 cm)).
Combination stair rail/handrail: 36 inches (91 cm) to 37 inches (94 cm).

Ideally (but not required by this standard) an open-sided stairway should have a 42 inch (1.1 m) stair rail, with a 33 inch (84 cm) handrail mounted on it.

2. *Examples of acceptable guardrail components.* The guardrail criteria contained in § 1910.28 is performance-oriented, and provides the employer with many options in

materials to use in designing and installing a guardrail system. The following are several examples of guardrail systems considered acceptable by OSHA:

A. For wood railings: The posts should be of at least two inch by four inch (5.1 cm by 10.2 cm) lumber spaced not to exceed eight feet (2.4 m); the top and intermediate rails should be at least two inch by four inch (5.1 cm by 10.2 cm) lumber. If the top rail is made of two one inch by four inch (5.1 cm by 10.2 cm) pieces of lumber nailed at right angles to one another, the posts should be spaced on eight foot (2.4 m) centers, with a two inch by four inch (5.1 cm by 10.2 cm) intermediate rail. Selected wood components should be minimum 1500 lb-f/in² (1.03 kN/cm²) fiber stress construction grade lumber. All dimensions refer to nominal sizes as provided by the American Softwood Lumber Standards.

B. For pipe railings: Posts, top rails and intermediate railings should have at least a one and one-half inch (3.8 cm) outside diameter. Posts should be spaced no more than eight feet (2.4 m) on centers.

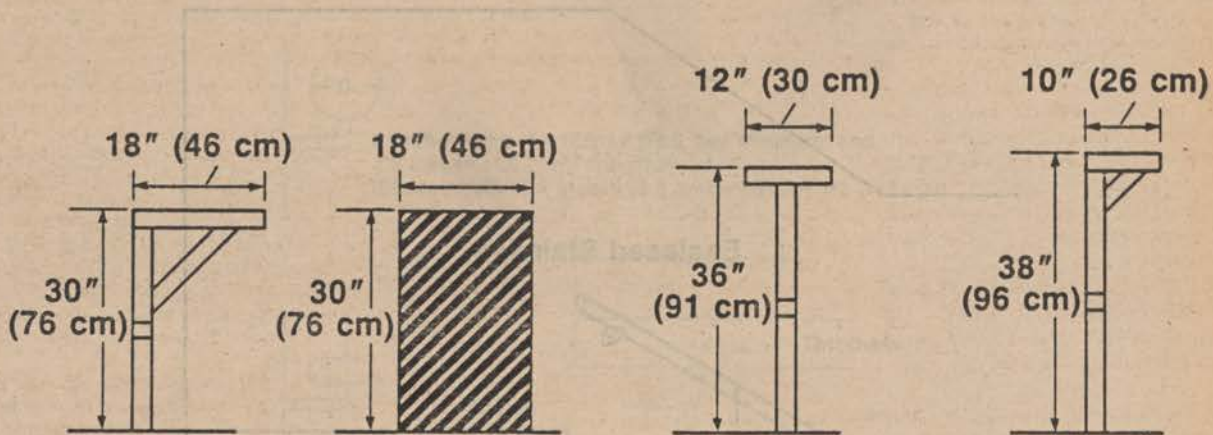
C. For structural steel railings: Posts, top rails and intermediate rails should be of two inch by two inch by three-eighths inch (5.1 cm by 5.1 cm by 0.95 cm) angle iron or of other metal shapes with equivalent bending strength. Posts should be spaced not more than eight feet (2.4 m) on centers. Structural steel systems may also have posts of two inch by two inch by one-eighth inch (5.1 cm by 5.1 cm by 0.3 cm) angle iron spaced five foot (1.52 m) or less on center with 1 3/4 inch by 1 3/4 inch by 3/16 inch (4.4 cm by 4.4 cm by 0.5 cm) top rail and 1/4 inch by one inch (0.64 cm by 2.54 cm) bar stock midrails.

Note: Railings subject to receiving heavy impacts from material handling equipment or large numbers of employees should be provided with additional strength by using heavier stock, closer spacing of posts, additional bracing or the equivalent.

4. *Guardrails less than 39 inches (1.0 m).* The following are examples of acceptable guardrail systems where the height of the top edge of the guardrail may be reduced to as low as 30 inches (76 cm). Such alternatives could be used in hot-dip galvanizing operations or similar situations where employees need to work with hand tools over the guardrail system.

Figure D-5

Acceptable guardrail height/depth dimensions



5. *Openings in guardrails.* Openings in guardrails should be small enough to limit the spacing between guardrail members in any one direction to 19 inches (48 cm) or less. A 19 inch (48 cm) diameter ball or sphere can be used to measure spacing of irregularly shaped openings.

In the case of non-rigid guardrail systems, the opening criteria is considered met if the dimensions are proper while the system is not under load. If the size of the openings needs to be reduced, higher toeboards, wider midrails, multiple intermediate rails, perpendicular bars, x-bracing, panels, screen mesh, etc., can be used if they meet the strength, deflection, and permanent deformation requirements. This standard

does not require midrails, provided the 19 inch (48 cm) requirement is met by some other way such as solid barriers, pickets, screening, etc. It should be noted that smaller openings may be required in areas used by the general public, and local building codes may require lesser dimensions.

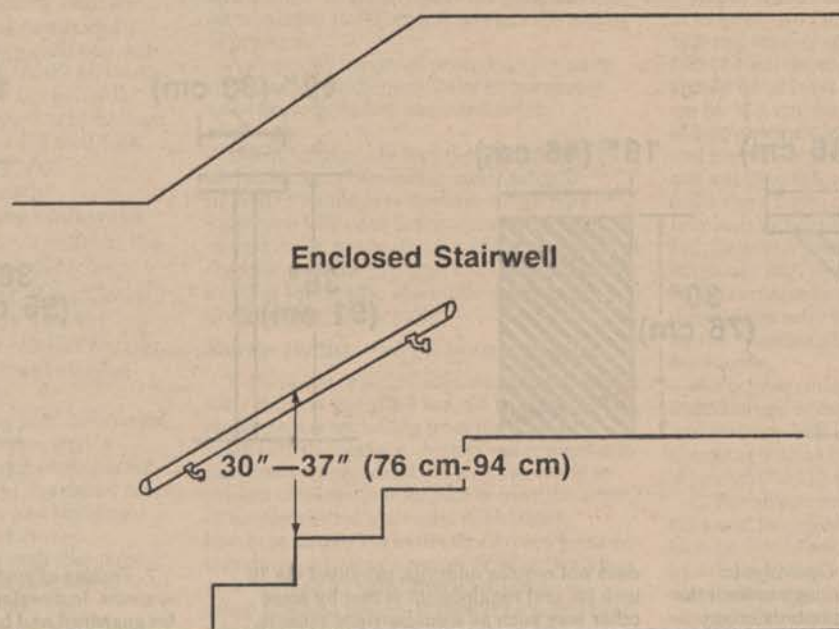
6. *Surfaces of guardrails.* An acceptable top rail would be a smooth surface such as a pipe, with normal pipe fittings or a smoothly surfaced lumber component. Examples of unacceptable top rails would be rough surfaced lumber, small diameter wire, steel or plastic banding, and guardrails with protruding objects such as splinters, nails, or bolts—all of which could injure an employee's hand.

7. *Testing of guardrail and handrail systems.* In developing and performing tests for guardrail and handrail systems, it is recommended that the test force be applied to the top rail or midrail over an area not to exceed four inches (10.1 cm) by four inches (10.1 cm). In addition, the center of the applied force must be within two inches (5.1 cm) of the top edge of the top rail. The employer should exercise care in determining the most critical locations and directions in which to apply the force (such as a horizontal force at the midpoint of the top rail between supporting posts).

8. *Handrail height requirements.* (a) A diagram of how to measure the height of a handrail is as follows:

Figure D-6

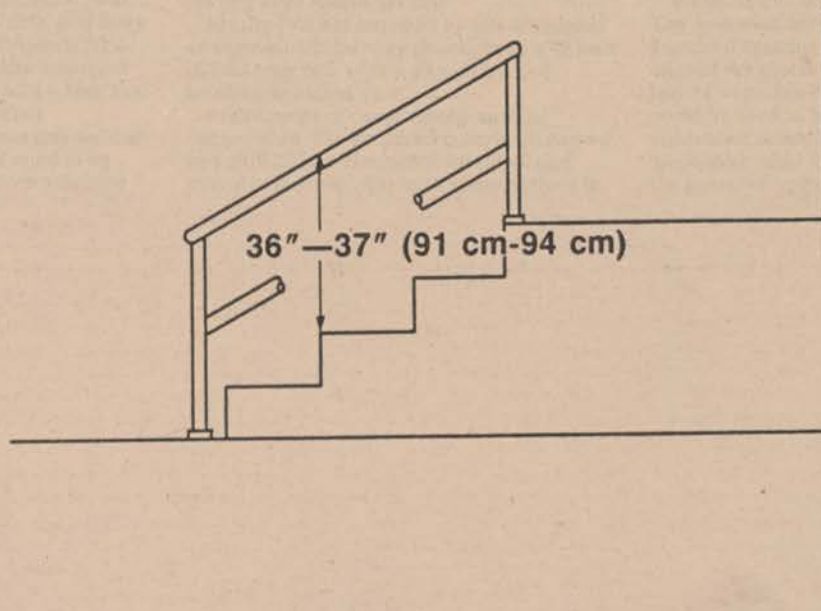
Typical Handrail Use



(b) An example of the top member of a stair railing which also serves as the handrail is shown below.

Figure D-7

Combination Handrail and Stair Rail



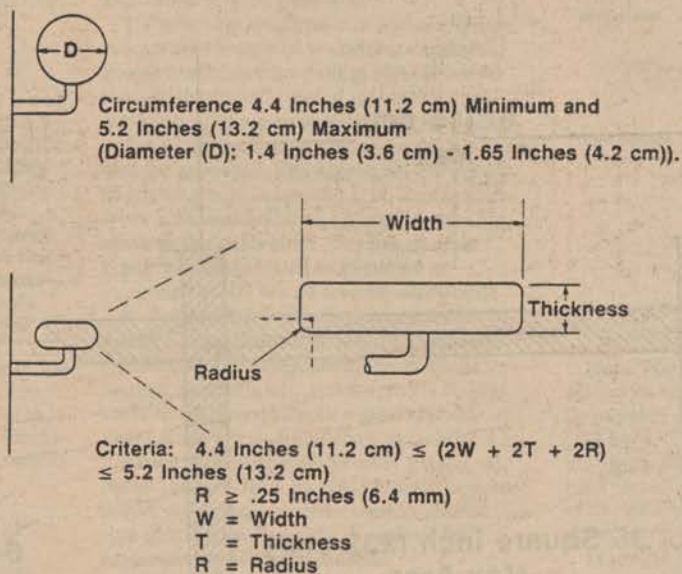
9. *Handrail grip dimensions.* It is recommended that newly installed handrails be shaped and designed so that employees

may use their hand grip to their best advantage. These designs permit the fingers to curl around the handrail to provide a

firmer grip. The following are examples of acceptable handrail dimensions used to maximize an employee's grip.

Figure D-8

Recommended handrail grip dimension



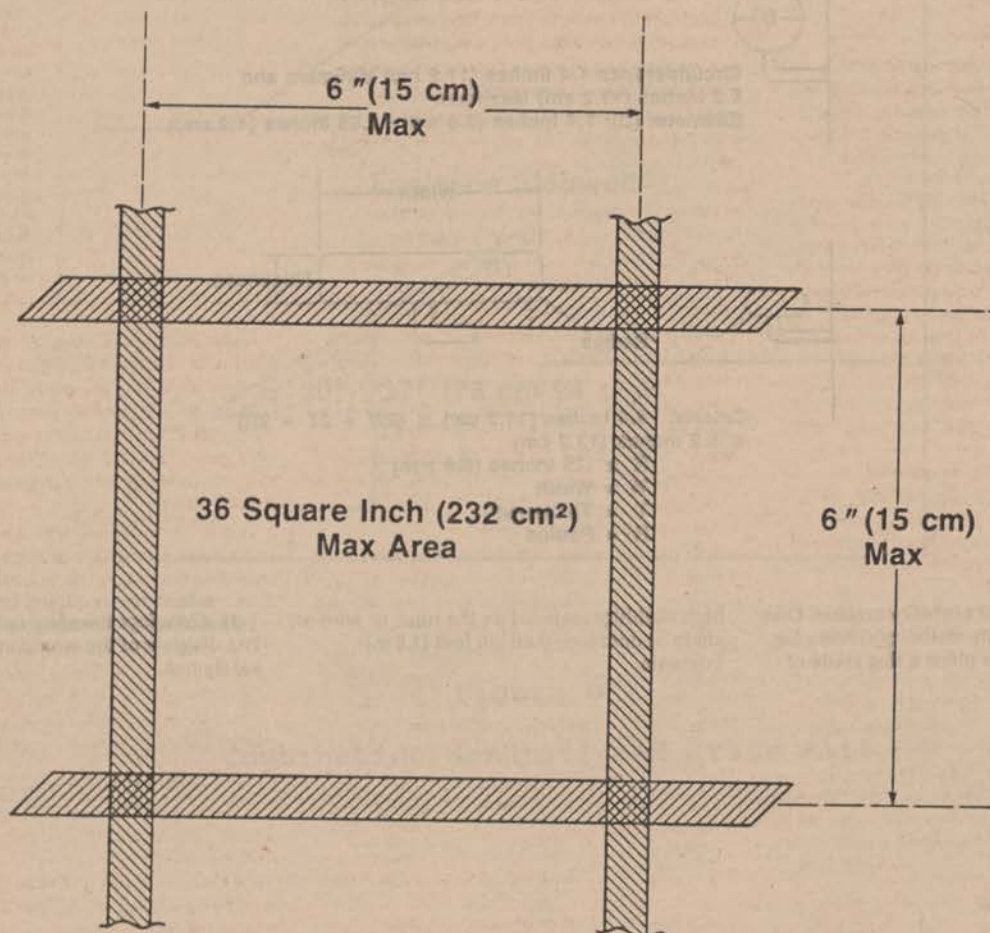
10. *Designated area visibility criteria.* One method for meeting the visibility criteria for designated areas is to place a flag made of

high visibility material on the rope, or wire or chain at not more than six foot (1.8 m) intervals.

11. *Openings in safety nets.* The following is a diagram of the maximum opening in a safety net.

Figure D-9

Acceptable Safety Net Webbing (Openings)



12. *Safety net construction.* Unduly rigid material should not be used in the construction of safety nets. The use of such material could cause injuries due to the shock of a sudden stop. Elastic type materials such as nylon should be used instead of materials such as manila rope or wire rope.

13. *Safety net testing.* Most safety net designs are tested by the manufacturer. These tests are conducted on sample net panels in accordance with ANSI A10.11, "American National Standard Minimum Requirements for Safety Nets." Such testing

assures the user of a suitable product. Since nets are installed in a wide variety of configurations, and provisions for proper attachments to the structure must be decided upon for each job site, each safety net installation should be tested at the work site. Such testing, as provided by the standard, consists of dropping a 400 pound (180 kg) bag of sand, 30 ± 2 inches (76 ± 5 cm) in diameter into the net from the highest work level to be protected by the net. Consideration should be given to testing the most critical portion of the net installation. In some cases a test at

the job site may not be feasible, or it may expose employees and/or the general public to danger. In these cases the net installation must be certified to be safe by a qualified person.

Section 1910.29 Wall openings.

Wall openings are required to be protected to prevent employees from falling into or through the wall openings, and to prevent tools or other materials from falling onto employees below. Examples of acceptable systems for guarding are screens, barriers,

rails, guardrail systems, and half doors. These guards may be removable or hinged if access to the wall opening is necessary.

Windows on a stairway, landing, floor, platform, balcony, and other location could also be guarded by slats, grill work or other types of protection. Glass walls are not considered wall openings.

Section 1910.30 Scaffolds.

1. *General overview.* Section 1910.30 is not intended to require the building of scaffolds either in a specific manner or using a specific material. Scaffolds used in general industry are also used in the construction industry, and since they are essentially the same scaffolds, the requirements for similar types of scaffolds are essentially the same for the two industries. Therefore, if scaffolds meet the general industry standards they would meet the construction standards, and vice versa. Only the more common types of scaffolds that are used in general industry are specifically regulated by § 1910.30. If a particular type of scaffold is not covered in § 1910.30, the applicable requirements for the scaffold in 29 CFR part 1926, subpart L, are to be followed.

2. *Overhead protection.* Overhead protection can range from the wearing of hardhats by employees to full overhead planking, depending on the type of objects that can fall onto employees working on scaffolds.

3. *Lumber sizes.* Unless otherwise noted, stated lumber sizes are nominal. Nominal sizes refer to lumber sizes prior to dressing, as well as after dressing, even though the actual size of a piece of dressed lumber is less than its rough cut size. An example of nominal size would be a 2×4 inch (51×102 mm) piece of lumber. Traditionally, the lumber would be rough cut to 2×4 inches (51×102 mm). After dressing, the actual size is appropriately 1½×3½ inches (38×89 mm). Both the rough 2×4 inches (51×102 mm) and the dressed 1½×3½ inches (38×89 mm) lumber would be considered a nominal 2×4 inches (51×102 mm) size. Lumber References to lumber are not meant to limit the employer to the use of wood. The use of any material of equal or greater strength and durability is acceptable.

4. *Suspension rope.* Suspension ropes need to be visually inspected each day or each shift before use, and also when the rope has not been in use for prolonged periods, or after exposure to detrimental elements such as open flames, hot work, and corrosive chemicals. Proper service such as washing and treating rope after being exposed to adverse conditions, lubricating wire rope, and removing defective sections of rope, may be necessary to keep the rope in safe operating condition. Examples of defective rope include rope where there is severe localized abrasion or scraping; where there is evidence of heat damage; where there is a loss of more than one-third of the original diameter of the outside individual wires; or where there is kinking, crushing, bird caging, or other damage resulting in distortion of the rope structure.

5. *Nails used on scaffolds.* Nails used to construct scaffolds, should be driven full length, and should not be subjected to straight pulls.

6. Snow and ice removal.

OSHA recommends that employees involved in removing snow and ice from scaffolds be protected from falls with body belts or harnesses and lanyards even though guardrails may be provided.

7. Protecting employees below scaffolds.

Acceptable means of protecting employees below scaffolds from falling objects would include the installation of toeboards or the installation of a screen extending along the entire platform opening between the platform and the guardrail. The screen should consist of No. 19 gauge or heavier U.S. Standard wire, with one-half inch (1.2 cm) or smaller mesh or the equivalent. The use of other types of material such as plywood or expanded metal would also be acceptable.

8. *Tables.* The tables in this appendix relative to scaffolds are based on all load carrying timber members of the scaffold being a minimum of 1,500 lb-ft/in² (1.03 kN/cm²) stress or construction grade lumber. All dimensions are nominal sizes as provided in the American Softwood Lumber Standards, dated January 1970. Except where otherwise noted, only rough or undressed lumber of the size specified will satisfy the minimum requirements of this standard.

9. *Wood planking.* All wood planking selected for scaffold plank use should be graded by rules established by the recognized independent inspection agency for the species of wood used. The maximum permissible spans for 2×10 inch (nominal) or 2×9 inch (rough) solid sawn wood planks should be as shown in the following table:

Maximum intended load (lb/ft ²)	Maximum permissible span using full thickness undressed lumber (ft)	Maximum permissible span using nominal thickness lumber (ft)
25 (122 kg/m ²)	10 (3 m)	8 (2.4 m)
50 (244 kg/m ²)	8 (2.4 m)	6 (1.8 m)
75 (366 kg/m ²)	6 (1.8 m)	

The minimum permissible span for 1½×9 inch (3.2×22.9 cm) or wider wood plank of full thickness with a maximum intended load of 50 lb/ft² (244 kg/m²) should not exceed four feet (1.2 m).

10. Fabricated planks and platforms.

Fabricated planks and platforms may be used in lieu of solid sawn wood planks. Maximum spans for such units should be as recommended by the manufacturer based on the maximum intended load being calculated as follows:

Rated load capacity	Maximum intended load
Light-duty	25 lb/ft ² (122 kg/m ²) applied uniformly over the entire span area.
Medium-duty	50 lb/ft ² (244 kg/m ²) applied uniformly over the entire span area.
Heavy-duty	75 lb/ft ² (366 kg/m ²) applied uniformly over the entire span area.

Rated load capacity	Maximum intended load
One-person	250 pounds (113 kg) placed at the center of the span [total 250 pounds (113 kg)].
Two-person	250 pounds (113 kg) placed 18 inches (46 cm) to the left and right of the center of the span [total 500 pounds (227 kg)].
Three-person	250 pounds (113 kg) placed at the center of the span and 250 pounds (113 kg) placed 18 inches (46 cm) to the left and right of center of the span [total 750 pounds (340 kg)].

Note: Platform units used to make scaffold platforms intended for light-duty use should be capable of supporting at least 25 lb/ft² (122 kg/m²) applied uniformly over the entire unit-span area, or a 250 pound (114 kg) point load placed on the unit at the center of the span, whichever load produces the greater shear force.

11. *Plank-type platform.* An example of an acceptable plank-type scaffold platform would be a platform composed of not less than nominal two × eight inch (7.6×20 cm) unspliced planks, properly cleated together on the underside, starting six inches (15.2 cm) from each end. Intervals between each cleat should not exceed four feet (1.2 m).

12. *Access.* Acceptable safe access to scaffold platforms could include one or more of the following:

(i) Ladders conforming to the requirements of § 1910.23. The ladders should not be placed in a manner to endanger employees on the scaffold.

(ii) Hook-on or attachable metal ladders specifically designed for use in conjunction with manufactured types of scaffolds.

(iii) Direct access from adjacent scaffolds, structures or personal hoists.

(iv) Ramps or runways and appropriate fall protection systems where applicable.

(v) Internal prefabricated scaffold rungs specifically designed by the manufacturer for use as a ladder.

(vi) Step or stair-type accessories such as ladder stands specifically designed for use with scaffolds.

13. *Counterweights.* The counterweights for suspension scaffolds should be solid, dead weight objects designed so that they will not lose their mass. Examples that may be used are: concrete blocks, steel plates or other non-flowable material.

14. *Body harnesses.* OSHA recommends that full body harnesses be used by employees instead of body belts. When subjected to an actual drop, the body harness distributes the shock more evenly over the body than does the body belt.

15. *Supplementary platform support lines.* Supplementary platform support lines may be used as points of attachments for personal fall protection systems on suspension scaffolds since they act as backups for the primary support lines. In effect, the

supplementary platform support lines serve as lifelines for the employees and do not make it necessary to require additional lifelines.

16. *Securing two-point suspension scaffolds.* In addition to direct connection to structures or buildings (except window cleaners' anchors) acceptable ways to prevent scaffold sway would include the use of angulated roping or static lines. Angulated roping is a system of platform suspension in which the upper wire rope sheaves or suspension points are closer to the plane of the structure or building face than the corresponding attachment points on the platform, thus causing the platform to press against the face of the structure or building. Static lines are independent lines secured at their top and bottom ends which are closer to the plane of the structure or building face than the outermost edge of the platform. By drawing the static lines taut, the platform is pushed against the face of the structure or building.

17. *Boatswains' chairs.* An acceptable size and strength for a boatswains' chair would be one made out of one inch (2.5 cm) or thicker wood with a 9 by 17 inch (22.9 by 43.2 cm) seat reinforced by cleats, and with bridle ropes passing through the seat and cleats and crossing diagonally beneath the seat. Seats smaller than 9 by 17 inches (22.9 by 43.2 cm) may be used when access to the work area or the work area itself necessitates a smaller boatswains' chair. Chairs may be made of materials other than wood provided they provide at least the same amount of safety as the wood chairs.

18. *Boatswains' chair rope.* An acceptable rope to be used with a boatswains' chair would be one-half inch (1.2 cm) nylon or polyester rope. Manila rope is not recommended because of its low strength, and susceptibility to deterioration that is difficult to detect by inspection.

Section 1910.31 Mobile work platforms, ladder stands, and powered industrial truck platforms

1. *Mobile work platforms and ladder stands.* Although not required by this standard, it is recommended that the employer insist on test data or a certification from manufacturers to assure that the mobile work platforms and ladder stands which the employer purchases meet the requirements of this standard.

2. *Safe operating instructions.* It is recommended that mobile elevating work platforms have instructions for safe operation displayed in a permanent and visible location, with at least the following information:

- (i) Warnings, cautions, or restrictions for safe operation.
- (ii) Make, model, serial number, and manufacturer's name and address.
- (iii) Rated work load.
- (iv) Maximum platform height.
- (v) Normal voltage rating of the batteries if battery powered, or line voltage if A.C. powered.
- (vi) Alternate statement of configurations and rated capacities, if applicable.
- (vii) The level of electrical insulation of the work platform, if any.

3. *Standing and climbing on mobile work platforms.* Only systems that are specifically designed by a qualified person to be used with devices to increase working heights should be used when additional height is necessary. It is also recommended that when employees are climbing or descending work platforms, both hands be free to aid in climbing. Tools should be worn on a work belt or hoisted up and down by a line after the worker reaches the work position.

4. *Increasing platform heights.* Acceptable means, other than outriggers, that allow increasing the platform height of mobile ladder stands and platforms could include securing the units with chains or ropes to stabilize the units from tipping. The chains or ropes would have to have sufficient strength to hold the unit and the weight of the employee(s) as well as any other object that may be placed on it.

Section 1910.32 Special surfaces

1. *Training.* Training is an important factor for employee safety on all special work surfaces. As a minimum, the employer should institute a training program for employees to recognize and avoid the special hazards involved with the particular surface. Training should be conducted to give the employee a better understanding of the actual working conditions and hazards related to the specific hazard. Retraining may be necessary if an employee has been away from one of these activities for a prolonged period of time.

2. *Repair pits and assembly pits.* Repair pits and assembly pits are not only applicable to cars, trucks, and buses, but are also applicable to locomotives, subway and railroad cars and other operations where employees enter a pit and work on overhead objects. The use of a combination of floor markings and stanchions may be used around the exposed edges of the pits provided the overall system is continuous. Warning signs, if used to restrict entry to the pit area, do not necessarily need to be posted at the pit but may be posted in conspicuous locations around the pit area.

3. *Slaughtering facilities.* Acceptable alternative fall protection systems that can be used in slaughtering facilities instead of toeboards to prevent employee's from falling off the open side of the work platform would include the use of safety belts or harnesses and lanyards meeting the requirements of subpart I.

4. *Working sides of loading racks, loading docks, teeming tables, and similar locations.* Even though the working sides of loading racks, loading docks, teeming tables, and similar locations are exempt from the requirements of § 1910.27, it is recommended that safety belts or harnesses, or other fall protection be used whenever possible.

5. *Qualified climbers.* The qualified climber's physical condition should be such that climbing exercise will not impair health and safety. This ability can be determined by physical performance tests. A physical examination by a physician who is aware of the duties that the employee is expected to perform is acceptable. Successful completion of a training program for the type of structures that are to be climbed will also be considered as proof of the climber's physical capabilities.

It is recommended as a minimum that the training program for qualified climbers consist of classroom training and climbing training. The classroom training should consist of information on the structural characteristics, the types and significance of using safety equipment and the procedures for safe climbing. It should also include discussions of the risks involved with climbing structures and the activities to be performed on the structure, as well as discussions of emergency procedures, accident causes, and factors such as bad weather that tend to increase the risks involved in climbing.

Climbing training should consist of classroom type instruction followed by the individual observing an experienced climber performing one or more climbs on the type of structure for which the individual is being trained to climb. Actual climbing during training should be initiated under close supervision and with the use of redundant safety equipment. The rate of reduction in supervision and the use of safety equipment will be a matter of subjective judgment by the trainer. Climbers should only be permitted to work without fall protection once the employee has demonstrated the necessary ability and skill in climbing structures without fall protection.

Appendix B to Subpart D—National Consensus Standards

Note: The following appendix to subpart D serves as a nonmandatory guideline to assist employers and employees in complying with these sections and to provide other helpful information. This appendix neither adds to nor detracts from the obligations contained in the OSHA standards.

The following table lists the current national consensus standards which contain information and guidelines that would be considered acceptable in complying with the requirements in the specific sections of subpart D, to the extent that they do not conflict with the standard.

Subpart D	National Consensus Standard
§ 1910.23	ANSI A14.1, American National Standard for Safety Requirements for Portable Wood Ladders. ANSI A14.2, American National Standard for Safety Requirements for Portable Metal Ladders. ANSI A14.3, American National Standard for Safety Requirements for Fixed Ladders. ANSI A14.4, American National Standard for Safety Requirements for Job-Made Ladders. ANSI A14.5, American National Standard for Safety Requirements for Portable Reinforced Plastic Ladders.
§ 1910.24	ASTM C478, American Society for Testing and Materials Specifications for Precast Reinforced Concrete Manhole Sections.

Subpart D	National Consensus Standard
	ASTM A394, American Society for Testing and Materials Specifications for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
§ 1910.25	ANSI A64.1, American National Standard for Requirements for Fixed Industrial Stairs.
	ANSI/IES RP7, American National Standard Practice for Industrial Lighting.
§ 1910.26	ANSI MH14.1, American National Standard for Industrial Loading Dock Levelers and Dockboards.
§ 1910.27	ANSI A58.1, American National Standard for Minimum Design Loads for Buildings and Other Structures.
	ANSI A12.1, American National Standard for Safety Requirements for Floor and Wall Openings, Railings, and Toeboards.
§ 1910.28	ANSI A10.11, American National Standard for Construction and Demolition Operations—Personnel and Debris Nets.
	ANSI A10.14, American National Standard for Requirements for Safety Belts, Harnesses, Lanyards, Lifelines, and Drop Lines for Construction and Industrial Use.
	ANSI A12.1, American National Standard for Safety Requirements for Floor and Wall Openings, Railings, and Toeboards.
	ANSI A39.1, American National Standard for Safety Requirements for Window Cleaning.
§ 1910.29	ANSI A12.1, American National Standard for Safety Requirements for Floor and Wall Openings, Railings, and Toeboards.
§ 1910.30	ANSI A92.1, American National Standard for Manually Propelled Mobile Ladder Stands and Scaffolds (Towers).
	ANSI A10.8, American National Standard for Safety Requirements for Scaffolds.
§ 1910.31	ANSI A92.3, American National Standard for Manually Propelled Elevating Work Platforms.
	ANSI A92.1, American National Standard for Manually Propelled Mobile Ladder Stands.
§ 1910.32	None.

Appendix C to Subpart D—References for Further Information

Note: The following appendix to subpart D serves as a nonmandatory guideline to assist employers and employees in complying with these sections and to provide other helpful information. This appendix neither adds to nor detracts from the obligations contained in the OSHA standards.

The following references provide information which may be helpful in understanding and implementing these standards.

I. General References

A. "Accident Prevention Manual for Industrial Operations"; National Safety Council, 444 North Michigan Avenue, Chicago, Illinois 60611.

B. "The BOCA Basic Building Code"; Building Officials and Code Administrators, Inc., 1313 East 60th Street, Chicago, Illinois 60637.

C. "Southern Standard Building Code"; Southern Building Code Congress, 1116 Brown-Marx Building, Birmingham, Alabama 35203.

D. "Uniform Building Code Standards, Volume 1"; International Conference of Building Officials, 50 South Los Robles, Pasadena, California 91101.

E. "A History of Walkway Slip-Resistance Research at the National Bureau of Standards"; Special Publication 565; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

F. "A New Portable Tester for the Evaluation of the Slip-Resistance of Walkway Surfaces"; Technical Note 953; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

G. Miller, James et al. "Work Surface Friction: Definitions, Laboratory and Field Measurements, and a Comprehensive Bibliography"; The University of Michigan, Ann Arbor, Michigan 48109. (NTIS *PB 83-243634, PE 83-243626, PB 84-175926).

H. Chaffin, Don B. et al. "An Ergonomic Basis for Recommendations Pertaining to Specific Sections of OSHA Standard, 29 CFR Part 1910, Subpart D—Walking and Working Surfaces"; The University of Michigan, Ann Arbor, Michigan 48109.

I. "Accident Facts—1987 Edition"; National Safety Council, 444 North Michigan Avenue, Chicago, Illinois 60611.

J. Snyder, Richard G. "Occupational Falls"; The University of Michigan, Ann Arbor, Michigan 48109.

K. "Occupational Fatalities Related to Roofs, Ceilings and Floors as Found in Reports of OSHA Fatality/Catastrophe Investigations"; U.S. Department of Labor, Office of Statistical Studies and Analysis, 200 Constitution Avenue NW., Washington, DC 20210.

L. Ayoub, M. and Gary M. Bakken. "An Ergonomic Analysis of Selected Sections in Subpart D, Walking/Working Surfaces"; Texas Tech University, Lubbock, Texas 79409.

M. "An Overview of Floor-Slip-Resistance Research With Annotated Bibliography." Technical Note 895; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

N. "Occupational Fatalities Related to Miscellaneous Working Surfaces as Found in Reports of OSHA Fatality/Catastrophe Investigations"; U.S. Department of Labor, Office of Statistical Studies and Analysis, 200 Constitution Avenue NW., Washington, DC 20210.

O. "A Bibliography of Coefficient of Friction Literature Relating to Slip Type Accidents"; Department of Industrial and Operations Engineering, College of Engineering, University of Michigan, Ann Arbor, Michigan 48104.

P. "Falls From Elevations Resulting in Injuries"; U.S. Department of Labor, Bureau of Labor Statistics, National Technical

Information Service, Springfield, Virginia 22151.

II. Ladder References

A. Chaffin, Don B. and Terrence J. Stobbe. "Ergonomic Considerations Related to Selected Fall Prevention Aspects of Scaffolds and Ladders as Presented in OSHA Standard, 29 CFR Part 1910, Subpart D"; The University of Michigan, Ann Arbor, Michigan 48104.

B. "Occupational Fatalities Related to Ladders as Found in Reports of OSHA Fatality/Catastrophe Investigations"; U.S. Department of Labor, Office of Statistical Studies and Analysis, 200 Constitution Avenue NW., Washington, DC 20210.

C. "Survey of Ladder Accidents Resulting in Injuries"; U.S. Department of Labor, Bureau of Labor Statistics, National Technical Information Service, Springfield, Virginia 22151.

D. "Five Rules for Ladder Safety"; National Safety Council, 444 North Michigan Avenue, Chicago, Illinois 60611.

E. "A Consumer's Guide to the Safe Ladder Selection Care and Use"; U.S. Consumer Product Safety Commission, Washington, DC 20207.

F. "Portable Ladders"; Data Sheet 1-665—Rev. 82; National Safety Council, 444 North Michigan Avenue, Chicago, Illinois 60611.

G. "Safety Instructions for the Person Who Climbs to Work, the Care and Use of Fiberglass Ladders"; R. D. Warner Co., Inc., P.O. Box 580, Greenville, Pennsylvania 16125.

III. Stair References

A. Archea, John et al. "Guidelines for Stair Safety"; NBS Building of Science Series 120, National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

B. Carson, D. H. et al. "Safety on Stairs"; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

C. Nelson, Gary S. "Engineering-Human Factors Interface in Stairway Treadrider Design"; Texas A&M University of Texas Agricultural Extension Service, College Station, Texas 77843.

IV. Scaffold References

A. "Occupational Fatalities Related to Ladders as Found in Reports of OSHA Fatality/Catastrophe Investigations"; U.S. Department of Labor, Office of Statistical Studies and Analysis, 200 Constitution Avenue NW., Washington, DC 20210.

B. "Analysis of Scaffolding Accident Records and Related Employee Casualties"; NBSIR 79-1955; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151. (NTIS *PB 80-161466).

C. "Scaffold Accidents Resulting in Injuries"; U.S. Department of Labor, Bureau of Labor Statistics, Washington, DC 20210.

D. "Ergonomics Considerations Related to Selected Fall Prevention Aspects of Scaffolds and Ladders as Presented in OSHA Standard, 29 CFR Part 1910, Subpart D"; The University of Michigan, Ann Arbor, Michigan 48104.

E. "Selected Occupational Fatalities Related to Powered, Two-Point Suspension Scaffolds/Powered Platforms as Found in

Reports of OSHA Fatality/Catastrophe Investigations"; U.S. Department of Labor, Office of Statistical Studies and Analysis, 200 Constitution Avenue NW., Washington, DC 20210.

V. Fall Protection References

A. "A Study of Personal Fall-Safety Equipment", NBSIR 76-1146; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

B. "Guardrails for the Prevention of Occupational Accidents", NBSIR 76-1132; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

C. *Investigation of Guardrails for the Protection of Employees from Occupational Hazards*, NBSIR 76-1139; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

D. *A Model Performance Standard for Guardrails*, NBSIR 76-1131; National Bureau of Standards, National Technical Information Service, Springfield, Virginia 22151.

* National Technical Information Services (NTIS) Port Royal Rd., Springfield, Virginia 22151. Phone: (703) 487-4650.

3. The authority citation for subpart F of part 1910 is proposed to be revised as follows:

Authority: Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059) 9-83 (48 FR 35736) or 1-90 (55 FR 9033), as applicable.

Sections 1910.67 and 1910.68 also issued under 29 CFR part 1911.

4. In § 1910.67, paragraph (c)(2)(v) would be revised to read as follows:

§ 1910.67 Vehicle-mounted elevating and platforms.

* * * * *

(c) * * *

(2) * * *

(v) A personal fall protection system which complies with subpart I of this part shall be worn and attached to the boom or basket when working from an aerial lift.

* * * * *

5. In § 1910.68, paragraph (b)(4), (b)(8)(ii) and (b)(12) would be revised to read as follows:

§ 1910.68 Manlifts.

* * * * *

(b) * * *

(4) *References to other codes and subparts.* The following codes, and subparts of this part, are applicable to this section. Safety Code for Mechanical Power Transmission Apparatus ANSI B15.1-1953 (R 1958) and subpart O; subpart S; and subpart D.

* * * * *

(8) * * *

(ii) *Construction.* The rails shall be standard guardrails with toeboards

meeting the provisions in subpart D of this part.

* * * * *

(12) *Emergency exit ladder.* A fixed metal ladder accessible from both the "up" and "down" run of the manlift shall be provided for the entire travel of the manlift. Such escape ladders shall comply with subpart D of this part.

* * * * *

6. The authority citation for subpart N of part 1910 is proposed to be revised as follows:

Authority: Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), or 1-90 (55 FR 9033), as applicable.

Section 1910.179 also issued under 29 CFR part 1911.

7. In § 1910.179, paragraph (c)(2) would be revised to read as follows:

§ 1910.179 Overhead and gantry cranes.

* * * * *

(c) * * *

(2) *Access to crane.* Access to the car and/or bridge walkway shall be by a conveniently placed fixed ladder, stairs, or platform requiring no step over any gap exceeding 12 inches (30.5 cm). Fixed ladders shall be in conformance with subpart D of this part.

* * * * *

8. The authority citation for subpart R of part 1910 is proposed to be revised as follows:

Authority: Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059) 9-83 (48 FR 35736) or 1-90 (55 FR 9033), as applicable.

Sections 1910.261, 1910.265, and 1910.268, also issued under 29 CFR part 1911.

9. In § 1910.261, paragraphs (a)(3)(ii), (a)(3)(iv), (a)(3)(v) and (a)(3)(vi) would be removed.

10. Paragraphs (b)(3), (c)(3)(i), (c)(15)(ii), (e)(4), (g)(2)(iii), (g)(8) (g)(13)(i), (h)(1), (j)(4)(ii), (j)(4)(iv), (j)(5)(i), (k)(6), (k)(13)(i) and (k)(15) of § 1910.261 would be revised to read as follows:

§ 1910.261 Pulp, paper and paperboard mills.

* * * * *

(b) * * *

(3) *Floors and platforms.* Floors, platforms, and work surfaces shall be maintained in accordance with subpart D of this part.

* * * * *

(c) * * *

(3) * * *

(i) Ladders and gangplanks with railings to boat docks shall comply with

subpart D of this part, and shall be securely fastened in place.

* * * * *

(15) * * *

(ii) Where conveyors cross passageways or roadways, a horizontal platform shall be provided under the conveyor, extended out from the sides of the conveyor a distance equal to one and one-half times the length of the wood handled. The platform shall extend the width of the road plus two feet (.61 m) on each side, and shall be kept free of wood and rubbish. The edge of the platform shall be provided with toeboards or other protection to prevent wood from falling, in accordance with subpart D of this part.

* * * * *

(e) * * *

(4) *Runway to the jack ladder.* The runway from the pond or unloading dock to the table shall be protected with standard handrails and toeboards. Inclined portions shall have cleats or equivalent nonslip surfacing, and shall be in accordance with subpart D of this part. Protective equipment shall be provided for persons working over water.

* * * * *

(g) * * *

(2) * * *

(iii) The worker shall be provided with eye protection, a supplied air respirator and a personal fall protection system meeting the requirements of subpart I of this part during inspection, repairs or maintenance of acid towers. The line shall be extended to an attendant stationed outside the tower opening.

* * * * *

(8) *Chip and sawdust bins.* Steam or compressed-air lances, or other devices, shall be used for breaking down the arches caused by jamming in chip lofts. No workers shall be permitted to enter a bin unless provided with an attached personal fall protection system meeting the requirements of subpart I of this part, and with an attendant stationed at the bin.

* * * * *

(13)(i) Blow-pit openings preferably shall be on the side of the pit instead of on the top. Openings shall be as small as possible when located on top, and shall be provided with railings, in accordance with subpart D of this part.

* * * * *

(h) * * * (1) *Bleaching engines.*

Bleaching engines, except the Bellmer type, shall be completely covered on the top, with the exception of one small opening large enough to allow filling, but too small to admit an employee.

Platforms leading from one engine to another shall have standard guardrails in accordance with subpart D of this part.

(j) * * *

(4) * * *

(ii) Guardrails shall be provided around beaters where tub tops are less than 42 inches (1.06 m) from the floor, in accordance with paragraph (b)(3) of this section and subpart D of this part.

(iv) When beaters are fed from the floor above, the chute opening, if less than 42 inches (1.06 m) from the floor, shall be provided with a guardrail system meeting the requirements of subpart D of this part or other equivalent enclosures. Openings for manual feeding shall be sufficient only for entry of stock, and shall be provided with at least two permanently secured crossrails or other fall protection systems that meet the requirements of subpart D of this part.

(5) * * *

(i) All pulpers having the top or any other opening of a vessel less than 42 inches (1.06 m) from the floor or work platform shall have such openings guarded by guardrail systems meeting the requirements of subpart D of this part or other equivalent enclosures. For manual changing, openings shall be sufficient only to permit the entry of stock, and shall be provided with at least two permanently secured crossrails, or other fall protection systems meeting the requirements of subpart D of this part.

(k) * * *

(6) *Steps.* Steps of uniform rise and tread with nonslip surfaces shall be provided at each press, conforming to subpart D of this part.

(13) * * *

(i) A guardrail complying with subpart D of this part shall be provided at broke holes.

(15) *Steps.* Steps or ladders complying with subpart D of this part and tread with nonslip surfaces shall be provided at each calendar stack. Handrails and hand grips complying with subpart D of this part shall be provided at each calendar stack.

8. In § 1910.265, paragraphs (c)(3)(i), (c)(4)(v), (c)(5)(i), (c)(10), (d)(2)(ii)(g) and (f)(6) would be revised to read as follows:

§ 1910.265 Sawmills.

* * * * *

(c) * * *

(3) * * *

(i) *Floor and wall openings.* All floor and wall openings shall be protected as prescribed in subpart D of this part.

* * * * *

(4) * * *

(v) *Elevated platforms.* Where elevated platforms are used routinely on a daily basis, they shall be equipped with stairways or fixed ladders, conforming to subpart D of this part.

* * * * *

(5) * * *

(i) *Construction.* Stairways shall be constructed in accordance with subpart D of this part.

* * * * *

(10) *Ladders.* Ladders shall be installed and maintained as specified in subpart D of this part.

* * * * *

(d) * * *

(2) * * *

(ii) * * *

(g) Guardrails, walkways, and standard handrails shall be installed in accordance with subpart D of this part.

* * * * *

(f) * * *

(6) *Ladders.* A fixed ladder complying with the requirements of subpart D of this part or other adequate means shall be provided to permit access to the roof. Where controls and machinery are mounted on the roof, a permanent stairway with standard handrail shall be installed in accordance with the requirements of subpart D of this part.

* * * * *

9. In § 1910.268, paragraph (g)(1) would be revised, paragraph (g)(2) would be removed, and paragraph (h) would be revised to read as follows:

§ 1910.268 Telecommunications.

* * * * *

(g) *Personal climbing equipment.*—(1) *General.* Body belts and pole straps shall be provided and the employer shall ensure their use when work is performed at positions more than four feet (1.2 m) above the ground, on poles, and on towers, except as provided in paragraphs (n)(7) and (n)(8) of this section. Personal fall protection systems shall meet the applicable requirements set forth in subpart I of this part. The employer shall ensure that all climbing equipment is inspected prior to each day's use to determine that it is in safe working condition. Production samples of personal fall protection systems shall be certified by the manufacturer or a qualified person as having been tested in accordance with and as meeting the

requirements of subpart I of this part as applicable.

* * * * *

(h) *Ladders.* Ladders, step bolts, and manhole steps shall meet the applicable requirements of subpart D of this part with the following exceptions:

(1) Portable wood ladders shall not be painted, but may be coated with a translucent non-conductive coating.

(2) Rolling ladders used in telecommunication centers shall have a minimum inside width between siderails of at least eight inches (20.3 cm).

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29 CFR Part 1910

[Docket No. S-057]

RIN 1218-AA48

Personal Protective Equipment (Fall Protection Systems)

AGENCY: Occupational Safety and Health Administration (OSHA), Labor.

ACTION: Notice of proposed rulemaking.

SUMMARY: OSHA is proposing to amend 29 CFR part 1910, subpart I—Personal Protective Equipment, by adding criteria pertaining to personal fall protection systems, including fall arrest systems (lifelines and lanyards, body belts and harnesses, deceleration devices, etc.); work positioning systems (lineman's body belts and pole straps, window cleaner's belts, etc.); travel restricting systems (tether lines, etc.); and fall protection systems for climbing (ladder safety devices, etc.). In another related notice of proposed rulemaking, OSHA proposes to amend the existing standards in 29 CFR part 1910, subpart D—Walking and Working Surfaces to require and allow the use of personal fall protection systems which meet these new criteria. These two proposed rulemakings, because of their interdependency with regard to personal fall protection systems, are being proposed concurrently. OSHA believes that the use of proper fall protection systems can protect employees from injury and death due to falls to different elevations. Existing standards in subpart D—Walking and Working Surfaces refer to or require the use of such systems, but provide little or no information to identify what criteria these systems must meet in order to provide employee safety. This proposal will clarify what criteria is acceptable.