

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1926

RIN 1218-AA57

[Docket No. S-207]

Safety Standards for Stairways and Ladders Used in the Construction Industry

AGENCY: Occupational Safety and Health Administration, U.S. Department of Labor.

ACTION: Final rule.

SUMMARY: The Occupational Safety and Health Administration (OSHA) hereby amends its Construction Industry Standards by revising and relocating the existing provisions for stairways and ladders from existing Subpart L—Ladders and Scaffolds and Subpart M—Floors and Wall Openings, and Stairways, into subpart X. This final rule reformats the rules into a more logical grouping of topics. This revision also focuses on the principal hazards involved when working on stairways and ladders and eliminates what OSHA believes to be unnecessary and redundant provisions in the existing standards. The provisions of existing Subpart X—Effective Dates are deleted as they are no longer necessary.

EFFECTIVE DATE: This revision of Subpart X becomes effective January 14, 1991.

ADDRESSES: In compliance with 28 U.S.C. 2112(a), the Agency designates for receipt of petitions for review of the standard, the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, room S-4004, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: Mr. James Foster, U.S. Department of Labor, Occupational Safety and Health Administration, Office of Information and Consumer Affairs Room N3647, 200 Constitution Avenue, NW., Washington, DC 20210, Telephone: (202) 523-8151.

SUPPLEMENTARY INFORMATION:**I. Background**

Congress amended the Contract Work Hours Standards Act (40 U.S.C. 327 *et seq.*) in 1969 by adding a new section 107 (40 U.S.C. 333) to provide employees in the construction industry with a safer work environment and to reduce the frequency and severity of construction accidents and injuries. The amendment, commonly known as the Construction Safety Act (CSA) significantly

strengthened employee protection by authorizing the promulgation of construction safety and health standards for employees of the building trades and construction industry working on federal and federally financed or federally assisted construction projects. Accordingly, the Secretary of Labor issued Safety and Health Regulations for Construction in 29 CFR part 1518 (36 FR 7340, April 17, 1971).

The Occupational Safety and Health Act (the Act) (29 U.S.C. 651 *et seq.*), was enacted by Congress in 1970 and authorized the Secretary of Labor to adopt established federal standards issued under other statutes, including the CSA, as occupational safety and health standards. Accordingly, the Secretary of Labor adopted the Construction Standards, which had been issued under the CSA, as OSHA standards (36 FR 10466, May 29, 1971). The Safety and Health Regulations for Construction were subsequently redesignated as part 1926 (36 FR 25232, December 30, 1971). The standards addressing ladders (§ 1926.450 in subpart L) and stairways (§ 1926.501 in subpart M) were adopted as OSHA standards as part of this process.

Section 6(a) of the Act authorized OSHA to adopt national consensus standards without rulemaking for the first two years after the Act took effect. This enabled the Agency to implement safety and health regulations much faster than would have been possible if OSHA had been required to conduct rulemaking. Many provisions of the existing standards for stairways and ladders were adopted from consensus standards during that period.

The organizations which produce consensus standards expect that compliance will be voluntary, based on agreement among interested parties regarding the need for particular precautions. It is implicit that the primary concern of the standard-producing organizations is to improve the overall safety of a workplace by fostering compliance with the spirit, rather than the letter, of the consensus standards. On the other hand, OSHA standards, including those adopted from consensus standards, impose mandatory burdens, because of the Agency's statutory duty to require protection of employee safety and health. As noted elsewhere in this preamble, OSHA has carefully reviewed the ongoing efforts of nationally recognized standards-producing organizations to update pertinent consensus standards that were initially adopted for stairways and ladders under subparts L and M.

In the course of reviewing information, such as the provisions of revised consensus standards, obtained by the Agency, OSHA became aware of the need to revise subparts L and M, including the provisions for ladders and stairways. In 1977, OSHA determined, after several meetings with the Advisory Committee on Construction Safety and Health (ACCSH) to review the provisions of subparts L and M, that a piecemeal approach to the revision of those provisions would not be acceptable. Therefore, a complete review of subparts L and M was begun. Since that time, ACCSH has reviewed these subparts several times and transcripts of these meetings, including recommendations, have been submitted to the Assistant Secretary. The transcripts are part of the public record (Ex. 1). The Committee's recommendations, and those of other interested parties, have been carefully analyzed in connection with the present rulemaking. Many of the changes in the final standard reflect the recommendations and suggestions of the Advisory Committee and interested persons. Relevant ACCSH comments are discussed below in the Summary and Explanation section. Committee discussions that were inconclusive or did not result in a specific recommendation have also been considered, but are not discussed in depth in this preamble.

On November 25, 1986, OSHA proposed to revise the provisions of subparts L and M of the Construction Industry Standards that regulate ladders and stairways, respectively, and to relocate the revised provisions to subpart X (51 FR 42750). Concurrently, the Agency proposed to revise the standards in subparts L and M that cover scaffolds (51 FR 42680) and fall protection (51 FR 42718), respectively, in construction employment. The proposal established a period, ending February 23, 1987, during which interested parties could submit written comments or request a hearing regarding the proposals.

The period for submitting written comments and hearing requests was extended twice at the request of commenters. On February 26, 1987, OSHA extended that period until June 1, 1987 (52 FR 5790). Then, on June 2, 1987, the Agency announced the extension of the period until August 14, 1987 (52 FR 20616). OSHA received 45 comments in response to proposed subpart X.

After reviewing and evaluating the provisions for ladders and stairways, OSHA believes that certain provisions in the existing standards either are

redundant or ambiguous or are not clearly applied to all situations. Some provisions simply are not feasible in all situations, while others are unnecessarily detailed. To eliminate these problems, this rulemaking has focused on the principal hazards involved when working on stairways and ladders and eliminates provisions that OSHA believes are unnecessary. To the extent possible, the final rule has been written in performance-oriented language, so employers have the flexibility to implement compliance strategies that both protect employees from occupational hazards and minimize disruption of operations.

To make it easier for employers and employees to find specific provisions, this final rule relocates the topics of stairways and ladders from subparts L and M to a revised subpart X titled "Stairways and Ladders." The existing subpart X in part 1926, "Effective Dates," is no longer needed as those effective dates have passed. Therefore, existing subpart X is being deleted and replaced with this new subpart X.

On January 26, 1988, OSHA announced it would convene an informal public hearing beginning on March 22, 1988, to elicit additional input on specific issues related to stairways and ladders, scaffolds, and fall protection. The hearings were conducted on March 22 and 23, 1988, with Administrative Law Judge Joel Williams presiding. At the close of the hearings, Judge Williams set a period, ending May 9, 1988, for the submission of additional comments and information. On August 11, 1989, Judge Williams certified the rulemaking record, including the hearing transcript and all written submissions to the docket, thereby closing the record for this proceeding. OSHA received 45 comments on this subpart in response to its NPRM and 18 comments in response to the hearing notice. A wide range of employees, businesses, trade associations, state governments, and other interested parties contributed to the development of this record. The Agency appreciates these efforts to help develop a rulemaking record that provides a sound basis for the promulgation of the final rule.

Based on its review of the record, OSHA has determined that the revision and reorganization of the regulations for stairways and ladders are necessary to address the significant hazards, such as fall hazards, faced by employees who use stairways and ladders while performing construction work. The Agency has determined that compliance with the provisions of this standard will

best ensure the safety of employees using stairways and ladders.

OSHA believes that the clarified and reformatted language of the final rule will help employers to understand the requirements for stairways and ladders, and will improve safety by minimizing subjective interpretations of the provisions.

II. Hazards Involved

Fall accidents resulting in injuries and fatalities continue to occur at construction sites despite the promulgation of the OSHA Construction Standards in 1971. Examination of available data indicates that these accidents are primarily the result of noncompliance with existing OSHA standards, and that the current standards, in general, properly address the stairway and ladder hazards confronted by construction workers. Nevertheless, upon reviewing compliance problems and public comments received since 1972, OSHA believes that the regulations addressing stairways and ladders need to be updated, reformatted, and clarified to provide employers with appropriate guidance and to make the standards easier to use and understand. OSHA believes that revision of these provisions will significantly increase employer compliance.

Precise accident data for the entire construction industry are not available. However, based upon the 1987 BLS data that have been compiled, OSHA estimates that the annual number of injuries associated with falls from surfaces covered under subpart X is about 24,882.

Although specific accident ratios cannot be projected for the 4.5 million construction workers potentially covered by subpart X, OSHA prepared the following statistical estimates to support proposed subpart X.

- On a yearly basis, OSHA estimated that as many as four fatalities, 5,360 impact injuries, and 1,900 sprain or strain injuries occur on stairways used in construction (summary of Bureau of Labor Statistics data; Exs. 3-15 and 3-16); and

- 65 percent of those injured in stairway accidents require medical treatment (Ex. 3-3, p. 150).

In a Bureau of Labor Statistics study of 1,400 ladder accidents that resulted in injuries (Ex. 3-5), the following findings were made:

- 23 percent of the accidents were in construction;
- 42 percent of those injured were working on the ladder when the accident occurred;

- 66 percent of those injured had not been trained in how to inspect ladders for defects before using them;

- 4 percent of the ladders involved in the accidents did not have uniformly spaced steps;

- 19 percent of the ladders involved in the accidents had one or more defects;

- 39 percent of the ladders involved in the accidents had not been extended three feet above the landing level;

- 53 percent of the non-self-supporting ladders had not been secured or braced at the bottom, and 61 percent had not been secured at the top; and

- 53 percent of the ladders involved in the accidents broke during use.

More recent information prepared for the final regulatory impact analysis (see section IV, below) indicates that a considerable number of accidents still occur. The following summarizes findings made in that analysis:

- On a yearly basis, OSHA estimated that as many as 36 fatalities and 24,882 injuries occurred due to falls from stairways and ladders used in construction.

- On a yearly basis, OSHA estimated that there were 11,570 lost workday injuries and 13,312 non-lost workday injuries due to falls from stairways and ladders used in construction.

Based on its analysis of the above data, and its field experience enforcing construction standards, the Agency has determined that employees using ladders and stairways in construction are exposed to a significant risk of harm. In addition, the above data suggest that compliance with the revised provisions would have prevented accidents more effectively than compliance with the existing standards. Consequently, OSHA believes that the revised standards are necessary to improve employee protection. OSHA has determined that the revised provisions in the final rule provide clearer guidance regarding employers' duties and the appropriate measures for compliance.

For a further discussion of accident rates and significance of risk, see section IV, Regulatory Impact Assessment and Regulatory Flexibility Analysis.

III. Summary and Explanation of the Final Rule

The following discussion, which tracks the final rule paragraph by paragraph, summarizes and explains the significant substantive changes that this final rule makes to the ladder provisions currently in subpart L and the stairway provisions currently in subpart M. The discussion also shows how the final rule differs from the proposed rule and

explains how OSHA determined what the final rule would require. In addition, the Agency received comments on 14 separate specific issues raised in the preamble to the proposed rule and in the hearing notice. These issues are discussed with the appropriate provisions in this preamble.

Section 6(b)(8) of the OSH Act requires OSHA to explain "why a rule promulgated by the Secretary differs substantially from an existing national consensus standard," by publishing "a statement of the reasons why the rule as adopted will better effectuate the purposes of the Act than the national consensus standard." In compliance with that requirement, the Agency has reviewed the standards proposed through this rulemaking with reference to the pertinent consensus standards. OSHA has discussed the relationship between individual regulatory provisions and the corresponding consensus standards in the Summary and Explanation of the final rule. This process was facilitated by the fact that the existing OSHA standards for stairways and ladders, the starting points for development of the proposed rule, are, in effect, the American National Standards Institute (ANSI) consensus standards that were in effect when OSHA was created. Therefore, even allowing for subsequent revisions to the ANSI standards and the Agency's consideration of a widely varied and substantial body of information in the rulemaking record, the requirements of the OSHA final rule would tend to resemble the corresponding provisions of the current ANSI standards. In a case where the Agency has determined that the pertinent ANSI language indicates appropriately what regulation is needed to protect employees from recognized hazards, the Summary and Explanation so indicates. Any case where the Agency has determined that the pertinent ANSI language would not provide appropriate guidance to employers is addressed in the Summary and Explanation.

Subpart X—Stairways and Ladders. As the title states, new subpart X covers the topics of stairways and ladders. The subpart includes provisions for construction, inspection, maintenance, use, fall protection, and the training necessary for employees involved with stairway and ladder construction, use, and repair.

Section 1926.1050 Scope, Application, and Definitions Applicable to This Subpart

Paragraph (a) of § 1926.1050 states the scope and application of subpart X. The subpart applies to all stairways and

ladders found in construction, alteration, repair (including painting and decorating), and demolition workplaces. OSHA notes that additional requirements for ladders used or with scaffolds will be set forth in revised subpart L—Scaffolds, which will be published at a later date. The final rule differs slightly from the proposal in that the references to § 1926.451 (c) and (d) in the proposal have been changed to the more appropriate reference, "subpart L," to clarify the applicable regulation to which OSHA is referring.

OSHA received one comment (Ex. 2-35) on § 1926.1050(a), "Scope." The commenter recommended including "window cleaning" in the scope of subpart X. However, the Agency is not acting on this recommendation because such cleaning operations or services are covered by part 1910, General Industry Safety and Health Standards, not by part 1926, Construction Standards.

Paragraph (b) of § 1926.1050 presents definitions for certain terms used in the standard. Three definitions in this final rulemaking ("cleat," "double-cleat ladder," and "nosing") are the same as those in the existing standard. Except where otherwise indicated, the proposed definitions have elicited no comments and are being promulgated as proposed. Some definitions have been reworded for uniformity with proposed provisions that were revised in the final rule, or for clarity, as noted in the discussion of the terms, below. The following terms have either been added to the final rule or reflect revisions of existing or proposed definitions, as noted.

"Equivalent." This term replaces the existing term "standard strength and construction." It is used in the text of the standard to indicate the circumstances under which OSHA allows alternative means of complying with the standard. The definition states that the employer must demonstrate that an alternative means of compliance will provide a degree of safety that is either equal to or greater than that attained by using a method or item specified in the standard. OSHA's intent is to allow employers to use or design alternate methods or items that provide at least the same level of protection as that afforded by materials of equal strength and construction. There were no comments submitted to the record regarding this term.

"Extension trestle ladder." This word is used to mean a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together. (Ladders that meet the

criteria set out in the pertinent consensus standards would be considered to be covered by this definition). OSHA has added this definition to the final rule to facilitate compliance with § 1926.1053(a)(3)(iii), which sets the allowed range of rung spacing for extension trestle ladders.

"Failure." This word is used in performance-oriented provisions, such as § 1926.1052(c)(5) (which deals with stairrail strength). To ensure that the term would not be interpreted to mean only breakage or a physical separation of component parts, the proposed definition has been revised to make it clear that load the point where the structural members lost their ability to carry loads, is also considered to be failure. This is a change from the proposed wording that "Load refusal is the point where the ultimate strength is exceeded." The change is made to clarify OSHA's intent.

The one comment (Ex. 2-29) OSHA received concerning this definition expressed the view that OSHA should "[f]ind a better definition for 'failure'" because "[l]oad refusal is nebulous at best." The commenter did not explain the basis for this concern or suggest alternative wording. OSHA notes that in some cases failure will be evidenced by breakage or separation of components that can be easily detected through visual inspection. In other cases the ability of a component to hold its rated load will be destroyed without any permanently visible breakage or separation. Such cases include situations where an object, such as a ladder siderail, buckles after it has been loaded to the point of collapse. The siderail will not support the load and will not return to its original shape when the load is removed. Although the siderail could be straightened, the fact that the rail has sustained severe damage and will easily bend again may not be visibly apparent. While such structural members may show no signs of breakage or separation, the prior damage precludes their future use. Given these circumstances, the Agency believes that the definition, as revised, provides the appropriate guidance to employers.

"Fixed ladder." This term refers to a ladder that, unlike a portable ladder, cannot be readily moved or carried because it is an integral part of a building or structure. The term "fixed ladder" was not defined in the proposal. A commenter (Ex. 2-29) and the ACCSH (Tr. 6/10/87, pp 19-23) suggested that OSHA add such a definition. OSHA agrees with the above suggestions and recognizes the need to state clearly the

types of ladders that may be used by construction workers.

The final rule's definition of fixed ladder is based on the definitions for "side-step" fixed ladder and "through" fixed ladder found in the ANSI A14.3-1984 American National Standard for Ladders-Fixed-Safety Requirements (Ex. 3-13). OSHA notes that the existing standard regarding fixed ladders, § 1926.450(a)(5), currently references the 1956 edition of ANSI A14.3 (Ex. 3-10). Thus, the promulgation of this definition simply reflects the Agency's interest in updating ANSI references and incorporating them directly into regulatory text.

"Handrail." The definition states that handrails are rails used to provide employees with a handhold for support. "Handrail" is defined in existing § 1926.502(c) as "a bar or pipe supported on brackets from a wall or partition * * * (to provide) a handhold in case of tripping." The revised definition recognizes there are handrails that are adequate even though they are not wall- or partition-mounted bars or pipes and are not used solely to protect employees if they were to trip. For example, OSHA has determined that the top rail of a stairrail system may serve as a handrail when installed according to new § 1926.1052(c)(7).

"Individual-rung/step ladders" means ladders without a side rail or center rail support. Such ladders are made by mounting individual steps or rungs directly to the side or wall of the structure. In the final rule, the term has been defined to clarify the difference from other types of fixed ladders for the design criteria of the rungs.

"Job-made ladder." Existing § 1926.450(b) presents requirements for "job-made ladders", but only implicitly defines the term. The term appeared in § 1926.1053(b)(5) and Issue #4 of the NPRM, but was not defined in the proposal. Job-made ladders are those built by employees, typically at the jobsite (custom-made) for a particular application, rather than manufactured commercially for general sale. The term is being defined in the final rule in response to a suggestion in a written comment (Ex. 2-29) to add a definition for this type of ladder. OSHA recognizes the need to state clearly what the types of ladders are addressed by particular provisions of this standard. This new definition reflects features listed in paragraph 1.3 of ANSI A14.4-1979, Safety Requirements for Job-made Ladders (Ex. 3-14), and the Agency's understanding of what the term means as used in existing § 1926.450(b).

In addition, another comment (Ex. 2-18) stated that § 1926.1053(a)(5), which

addresses individual-rung ladders, should not apply to job-made ladders. In response to this comment, OSHA has determined that the definition of job-made ladders should exclude individual-rung/step ladders to be consistent with § 1926.1053(b)(5)(ii) of the final rule. Therefore, the Agency is promulgating this definition as part of the final rule.

"Lower levels." This term, not found in the existing OSHA standards, is being added for the sake of clarity and uses examples of the areas to which an employee could fall. The term does not apply to the surface on which the employee is working and from which the employee could fall.

"Maximum intended load." This new term means the total load of all employees, equipment, tools, materials, transmitted loads, and other loads. The term is used in § 1926.1053(a)(1) to state clearly the types of loads that must be considered when building a ladder, and is used in § 1926.1053(b)(3) to limit the amount of load that may be placed on a ladder.

The Agency received one comment (Ex. 2-39) relating to the definition in paragraph (b) for "maximum intended load" proposing that OSHA add a definition for "duty rating." The commenter envisioned using the new term in conjunction with the definition of "maximum intended load," to use with labels and markings on the ladder that give the "ladder's rated capacity." The Agency has determined, however, that the pertinent proposed provisions, including the definition of "maximum intended load," provide the appropriate regulation for ladders, so that it is unnecessary to define or use the term "duty rating." Therefore, OSHA is declining to adopt this suggested definition in the final rule.

"Point of access." This new term means all areas such as doorways, passageways, stairway openings, studded walls, and temporary openings, that are used by employees for work-related passage from one area or level to another. The term is used in § 1926.1051(a) of this subpart to indicate where a stairway or ladder must be provided when there is a break in elevation, and includes permanent and temporary travel ways. This definition, which was not set out in the proposed rule, has been added in response to the ACCSH discussion concerning Issue #2 of the specific issues raised in the proposal (Tr. 6-9-87, pp. 233-243, and 6-10-87, pp. 3-6). It is intended to state clearly what OSHA meant when it proposed § 1926.1051(a).

"Portable ladder." This term refers to a ladder that, unlike a fixed ladder, can readily be moved or carried. This term

was not defined in the proposal. As discussed above, the Agency is adding a definition for "fixed ladder" to § 1926.1050(b) in response to a request from a commenter. OSHA is also adding this definition of "portable ladder" to state clearly the distinction between fixed and portable ladders. This definition is consistent with the definitions of "portable ladder"; that appear in the current editions of the pertinent ANSI standards. (A14.1-1982 and A14.2-1982).

Again, OSHA recognizes a need to clarify the types of ladders that are addressed by specific paragraphs in this subpart and therefore promulgates this definition.

"Riser height." This term replaces "rise," which was defined in existing § 1926.502(g). The existing and proposed definitions were identical. The definition, as promulgated, has been amended to clarify that OSHA intends for employers to take the distance between treads and/or platforms/landings and the next higher tread and/or platform/landing into account when measuring riser height dimensions. For the purpose of this standard, the term "tread" used in the new definition includes platforms and landings. In response to a comment concerning the definition of "tread depth" ("tread width" in the proposed rule), discussed further below, the Agency has also added a matching explanation of a stairstep tread's horizontal dimensional components.

One commenter (Ex. 2-27) suggested that the definition of "open riser" from the draft of the proposed ANSI A12.64 standard covering safety requirements for workplace floor openings, stairs, and railing systems, "should be included as more descriptive." However, the commenter did not provide a rationale for this suggestion. Under the most recent ANSI A12.64 draft, the term "open riser" means the "space between the treads of stairs without upright members." OSHA notes that the term "riser height" is used in a provision of the revised standard, § 1926.1052(a)(3), which concerns itself solely with the uniformity of stairway dimensions. The Agency has not concerned itself with the distinction between risers that are open and those that are not because it is not directly relevant to safety. Therefore, OSHA believes there is no need to explain further or expand the terminology concerning this aspect of the standard and therefore declines to adopt the term "open riser." The new term, "riser height," comes directly from the wording in § 1926.1052(a)(3) of the proposal.

"Side-step fixed ladder." This term describes the kind of fixed ladder from which a person getting off at the top has to step to the side of the ladder to reach the landing. This type of ladder was not defined in the proposed rulemaking for subpart X but was used in § 1926.1053(a)(26) and (28) of the proposal. The definition is based on ANSI A14.3-1984 (Ex. 3-13).

"Single-cleat ladder." The existing definition from § 1926.452(a)(2) is expanded to include ladders with side rails that are joined together with rungs and steps, as well as ladders with side rails that are joined by cleats. The revised definition reflects OSHA's belief that rungs and steps can also be safely used to join side rails. The term single-cleat ladder is retained because that is the term in general use by industry.

"Single-rail ladder." This term describes a type of portable ladder that has only one rail, instead of the two or more rails used on other ladders. This definition, while not in the proposed rule, has been added in response to comments (Exs. 2-12, 2-19 and 2-35) and an ACCSH recommendation (Tr. 6-9-87, p. 243) relating to Issue #3 of the proposal. Under that issue, OSHA requested comment on a possible prohibition of the use of this type of ladder, based on paragraph 5.2.10 of A14.1-1968 (Ex. 3-8), and a reference to that standard in existing § 1926.450(a)(3). The Agency noted that existing § 1926.450(a)(3) effectively bars the use of single-rail ladders and asked whether or not such ladders should continue to be prohibited. Based on the comments received for Issue #3, OSHA is explicitly retaining the prohibition on the use of single-rail ladders, under § 1926.1053(b)(19). The Agency recognizes that the definition of "single-rail ladder" is needed to state clearly the types of ladders that are covered by that prohibition, and therefore promulgates this definition.

"Spiral stairway." This term describes stairways that wind around a vertical pole in a cylindrical space. The term, although not defined in the proposal, was used in two paragraphs in proposed subpart X concerning spiral stairways, §§ 1926.1051(a)(1) and 1926.1052(a)(2). A commenter (Ex. 2-27) noted that OSHA had not proposed a definition for this term. OSHA recognized a need to clarify what type of stairway the Agency was referring to in the two paragraphs from the proposed rule that mentioned spiral stairways. Therefore, the Agency is promulgating this definition in the final rule.

"Stairrail system." This term replaces "stair railing," which was defined in existing § 1926.502(i). "Stair railing" has

apparently been incorrectly understood by some persons as referring only to the top member of the required vertical barrier. The revised definition also clearly incorporates OSHA's determination, reflected in proposed § 1926.1052(c), that the top surface of a stairrail system may also serve as a handrail. The final rule is identical to the proposed rule.

"Step stool (ladder type)." This term describes a self-supporting, foldable, portable ladder, nonadjustable in length, 32 inches or less in overall size, with flat steps and without a pail shelf, designed to be climbed on the ladder top cap as well as all steps. The side rails may continue above the top cap. (Step stools that meet the criteria set out in the pertinent consensus standards would be considered to be covered by this definition.) OSHA has added this definition to the final rule to facilitate compliance with § 1926.1053(a)(3)(iii), which sets the allowed range of rung spacing for step stools.

"Through fixed ladder." This term describes the kind of fixed ladder from which a person getting off at the top has to step between the ladder's side rails to reach the landing. This term, though not defined in the proposed rule, was used in proposed § 1926.1053(a)(18), (26), and (27). A commenter (Ex. 2-14) indicated that, without a definition, this term was unclear. The definition in this final rule is based on the ANSI A14.3-1984 (Ex. 3-13) definition for such ladders.

"Tread depth." This term describes the distance, from front to back, of a horizontal stairstep surface (that is, the area intended to be used to walk on). The language in the final rule is essentially identical with that in existing § 1926.502(n) and in the proposal. The term has been changed from tread "width" to tread "depth," in response to a suggestion in the one comment (Ex. 2-8) OSHA received regarding the definition. The commenter stated that "[i]t is ludicrous to describe a stairway [that is] 60 inches wide, for example, as having a tread width of 10 inches." In response to the comment, OSHA notes that tread depth is measured in the direction of travel.

"Unprotected sides and edges." This term refers to areas where there is no wall or guardrail system 39 inches or more in height, or where there is no stairrail system 36 inches or more in height. This definition is consistent with the term as used in existing § 1926.502(p)(8) (which explains the terms used in existing § 1926.500(g), for guarding low-pitched roof perimeters during built-up roofing work) and in proposed § 1926.500(b) in subpart M-Fall Protection (which expands the

coverage of the existing provision to all surfaces regulated by Subpart M).

The following existing definitions are deleted because they are not used in the new subpart: Existing § 1926.502(h) "stair platform" and existing § 1926.502(i) "stair, stairways."

OSHA has used the term "competent person" in subpart X as it is defined in existing § 1926.32(f). Under that definition, a competent person can recognize hazards, knows how to control them, and has the authority to implement the appropriate hazard control measures. OSHA notes that a competent person will have certain skills, knowledge, and authority depending on the work situation confronted. Therefore, someone may be a competent person for the purpose of compliance with one standard, but not for the purposes of another standard.

The Agency further notes that existing § 1926.20(b)(2) requires employers to have competent persons perform frequent and regular inspections of the job sites, materials, and equipment. The Agency has included the term competent person in the final rule, where justified by the record, to underscore the existing requirement and provide clear guidance to employers.

Section 1926.1051 General Requirements

This section specifies where stairways and ladders are to be provided so that employees have safe means of access between levels.

The introductory text of § 1926.1051(a) requires that wherever there is a personnel point of access with no ramp, runway, sloped embankment, or personnel hoist, and the break in elevation is 19 inches or more, a ladder or stairway must be provided. In the final rule, the words "where there is" have been removed the second time they appeared. The provision, as promulgated, is essentially identical with the pertinent existing and proposed provisions, except that the final rule specifies the minimum break in elevation, 19 inches, at which point a means of access between levels is required. Existing § 1926.450(a)(1), like proposed § 1926.1051(a), requires a means of access at all breaks in elevation. By contrast, OSHA notes that existing § 1926.501(a) requires a stairway, ladder, or ramp only where the structure is two or more floors (20 feet) high. This provision only indicates that ladders are an acceptable means of access to those structures. It does not establish 20 feet as the minimum height at which ladders must be provided. The Agency has maintained consistently that

existing § 1926.450, not existing § 1926.501, establishes requirements for the use of ladders in construction work, and carries this coverage forward in the revised standard. OSHA anticipates that one of the benefits of this rulemaking will be the elimination of any apparent inconsistency between the existing standards.

OSHA requested public comment in Issue #2 of the NPRM regarding the height above which the Agency should require employers to provide a means of access. OSHA noted that one suggestion was to require a ladder, stairway, runway or ramp wherever there is a break in elevation of at least 19 inches, or the equivalent of two standard (9½-inch) steps. The Agency points out that this was derived from table D-1, which appears in existing § 1910.24(e), regarding fixed industrial steps.

Eight commenters responded to the issue. Two (Exs. 2-12 and 2-23) favored the suggested 19-inch provision. Two others (Exs. 2-29 and 2-35) suggested using 24 inches. One commenter (Ex. 2-25) backed a 10-foot limit; and three others (Exs. 2-11, 2-31, and 2-37) wanted the existing standards retained without change. In addition to the eight commenters who responded to Issue #2, two commenters (Exs. 2-1 and 2-24) provided input directed at this paragraph. One of these commenters (Ex. 2-1) suggested using a height of 3 feet, and the other (Ex. 2-24) indicated a preference for 2 feet. The ACCSH recommended a 10-inch height limit as the appropriate point at which to require ladders, stairways, runways, or ramps for general and work points of access, entrances, and exits (Tr. 6/9/87, pp. 233-243 and 6/10/87, pp. 3-6).

The two commenters who offered 24 inches as an alternative did not provide data or details for their choice (one of those two (Ex. 2-35) suggested using two standard steps at breaks in elevation). The three respondents who wanted to retain the existing standards without change indicated that the regulations do not specify a height requirement and thus provide flexibility. However, OSHA disagrees, as § 1926.450(a)(1) requires that a stairway, ramp, runway, or ladder be provided to "all elevations." The ACCSH recommended a 10-inch limit in contrast with 24 inches in terms of providing for emergency escape. In that light, OSHA does not consider the ACCSH recommendation a direct dismissal of the suggested 19-inch limit requirement for a means of access. Once a means of access is provided, the required 9½-inch step height differs only slightly from the ACCSH's suggestion of 10 inches.

OSHA chose 19 inches, the equivalent height of two standard steps, as a middle ground that clarifies, in performance language, the point at which a means of access must be used. The 19-inch height limit provides a fairly easy climb for employees, who will often be carrying some burden or piece of equipment and thus may be unable to readily pull or push themselves up or down a higher elevation break. If further provides for entry and exit in an emergency.

Accordingly, after consideration of these comments and in light of the ACCSH discussion, OSHA is amending § 1926.1051(a) to require a stairway or ladder at all personnel points of access where there is a break in elevation of 19 inches or more and no ramp, runway, sloped embankment or personnel hoist is provided. Also, in the final rule, OSHA has clarified the paragraph to avoid the misconception that the provision addresses two independent criteria for providing a stairway or ladder. The Agency intends for the introductory text of § 1926.1051(a) to apply to personnel points of access where there is both a break in elevation and an absence of other enumerated means of crossing the break.

The Agency, therefore, is promulgating the introductory text of paragraph (a) as amended.

Under paragraph (a)(1) employees shall not use any spiral stairway during construction when such stairway will not be a permanent part of a structure. This requirement is essentially the same as existing § 1926.501(m), except the language has been changed to clarify that a stairway that will be a permanent part of the installation may be used for access.

OSHA received two comments (Exs. 2-8 and 2-27) about proposed paragraph (a)(1). In response to one of these comments (Ex. 2-8), the Agency has amended the standard to remove the proposed exemption allowing the use of temporary spiral stairways where they provide the only practical means of access during construction. The Agency has removed the words "after completion of the structure" and removed the phrase "except where they provide the only practical means of access during construction."

CAL/OSHA (Ex. 2-8) stated that the exception for temporary spiral stairways should be deleted because:

Spiral stairs have an inherent hazard in that the tread depth is not uniform across the whole width of the tread. This makes for hazardous footing, and could lead to injuries due to slipping or missing a tread completely in the process of climbing or descending the stairs.

OSHA notes that, while CAL/OSHA objects only to the use of temporary spiral stairs, the concern raised by the commenter applies to both the permanent and temporary ladders. OSHA has determined that spiral stairways that are permanently installed and that comply with subpart X, especially § 1926.1052, will afford safe means of access for employees. Upon consideration of the CAL/OSHA comment, the Agency agrees that the use of spiral stairways that will not be made a permanent part of the structure should not be permitted. In particular, OSHA has determined that there would always be a mutual alternative means of access available. Therefore, OSHA believes that there are not situations where the exception would be appropriate. In addition, the Agency believes that efforts to comply with the other provisions of subpart X will not control the hazards that concern CAL/OSHA regarding those spiral stairs that will not be a permanent part of the structure. Therefore, OSHA has made the recommended deletion.

In response to the other comment (Ex. 2-27), OSHA is adding a definition of "spiral stairway" under § 1926.1050(b), as discussed above. That comment also pointed out that the proposal did not explicitly cover permanent installation of spiral stairways. OSHA believes that paragraph (a)(1) as changed, provides sufficient guidance.

Therefore, the Agency is promulgating paragraph (a)(1) as amended.

Paragraph (a)(2) requires that when ladders either provide the only means of access for 25 or more employees, or serve simultaneous two-way traffic, either those ladders must be double-cleated or two or more separate ladders must be used. This is based on existing § 1926.450(b)(1), which covers job-made ladders. The existing paragraph provides only for the use of double-cleated ladders. The final rule recognizes the alternative of using two or more ladders. The language of the final rule is identical to that in the proposal.

Paragraphs (a) (3) and (4) are new requirements addressing the necessity to keep points of access open to permit the free passage of employees. These provisions were not in the proposal. OSHA added these provisions to the standard in response to the ACCSH discussion about Issue #2 (Tr. 6/9/87, pp. 233-243), concerning means of access at breaks in elevation, and to ensure that the Agency's intent in proposing paragraph (a) is clearly understood. Under paragraph (a)(3), when buildings or structures have a

single point of access, the access-way shall be kept clear for employee passage or a second point of access shall be provided. This can occur, for example, when a scaffold is erected in a stairway to do finishing work. Such a scaffold would block the exit so another means of access such as a ladder, is necessary. Paragraph (a)(4) further clarifies OSHA's intention to require open access for employee passage in buildings or structures with two or more more points of access.

The ACCSH addressed the need to keep points of access open while the members were discussing the question of what should be considered an appropriate minimum height at which to require a ladder, stairway, runway, or ramp. OSHA believes that the added requirements were implicit in proposed paragraph (a). Indeed, the purpose for which OSHA is requiring stairways and ladders would be defeated if employees were denied free passage through personnel points of access to those stairways and ladders. Accordingly, during the ACCSH review of Issue #2 on June 9, 1987 (Tr. 6/9/87, pp. 233-243), OSHA stated that keeping points of access open was an element of compliance with proposed paragraph (a). The ACCSH, in turn, recommended that OSHA expressly require open access. The Agency agrees that adding explicit regulatory language will provide the clearest guidance to employers. Accordingly, OSHA is promulgating paragraphs (a) (3) and (4) as discussed above.

Paragraph (b) requires employers to provide and install all stairway and ladder fall protection systems required by this subpart and to comply with all other pertinent requirements of this subpart before employees begin the work that necessitates the installation and use of stairways, ladders, and their respective fall protection systems. Compliance with paragraph (b) will ensure that work activities involving the use of stairways and ladders to reach other levels do not begin until the ladder or stairway is safe to use. OSHA has made minor editorial changes in the proposal in response to a comment (Ex. 2-24) that the provisions are too restrictive (noting that ladders are often used to install fall protection equipment) and a comment (Ex. 2-27) requesting clarification. As revised, paragraph (b) distinguishes clearly between the work required to install fall protection systems on stairways and ladders and the work employees perform once those systems have been installed.

OSHA is therefore promulgating paragraph (b) as amended.

Section 1926.1052 Stairways

This section specifies the requirements for all stairways used by construction employees.

Paragraph (a) sets forth the general requirements for the construction of stairways. Paragraph (a)(1) requires stairs that will not be a permanent part of the structure on which construction work is performed to have landings at least 30 inches long and at least 22 inches wide at every 12 feet or less of vertical rise. Except for the provision about the width dimension and where a minor amendment was made for the sake of clarity, the final rule is identical to the proposed rule. This requirement is the same as existing § 1926.501(i), except the existing term "temporary stairs" has been deleted and the phrase "stairways that will not be a permanent part of the structure on which construction work is being performed" has been added to ensure that the requirement is clearly understood. For the final rule, the Agency believes it is appropriate to set out a minimum width for stairways, based on § 1910.24(d) of OSHA's existing general industry standards for fixed industrial stairs. The Agency does not consider this to be a substantive amendment and believes that providing this regulatory language was implicit in the proposal and will give employers necessary guidance.

OSHA did not receive any comments regarding paragraph (a)(1). Therefore, the Agency promulgates § 1926.1052(a)(1) with the changes noted above.

Paragraph (a)(2) requires stairs to be installed at an angle between 30 and 50 degrees from horizontal. This requirement is the same as existing § 1926.501(j) and the proposed rule.

Paragraph (a)(3) requires riser height and tread depth to be uniform, within ¼ inch, for each flight of stairs, including any foundation structure that serves as a tread of the stairway. This is the same requirement as the proposed rule and existing § 1926.501(k), except that the term "tread width" has been changed to "tread depth," and OSHA has clarified, in response to comments discussed below, the extent to which riser height or tread depth can vary from the "uniform dimensions." The change from "width" to "depth" matches the change made in § 1926.1050(b) for the definition of "tread depth," again reflecting a recommendation from CAL/OSHA (Ex. 2-8).

Two commenters (Exs. 2-8 and 2-24) replied to proposed paragraph (a)(3). Neither indicated they disagreed with the standard, but they suggested that the provisions should allow for minor

variations. In particular, CAL/OSHA (Ex. 2-8) suggested that the Agency limit variations to ¼-inch. OSHA agrees that the standard should allow for minor variation from uniformity and has determined that the suggested limit is appropriate. Accordingly, OSHA has added a new sentence spelling out that such variations should not be more than ¼-inch in any stairway system.

Paragraph (a)(4) requires that platforms be provided wherever a door or gate opens onto a stairway, and that the swing of the door not reduce the effective width of the platform to less than 20 inches. This requirement is the same as existing § 1926.500(b)(9) and the proposed rule. OSHA did not receive any comments regarding paragraph (a)(4).

Paragraph (a)(5) requires metal pan landings and metal pan treads to be secured in place before filling. This is based on the requirement to secure only metal pan landings, found in existing § 1926.501(h) and the proposed rule. In response to a comment, the final rule incorporates a requirement that metal pan treads also be secured.

The sole commenter (Ex. 2-8) who addressed paragraph (a)(5) suggested OSHA add the words "and metal pan treads" following "metal pan landings," because of the danger of displacement posed by unsecured metal pan steps. The Agency agrees and has made this change to the paragraph.

Therefore, OSHA is promulgating § 1926.1052(a)(5) as amended.

Paragraph (a)(6) requires all parts of stairways to be free of hazardous projections, such as protruding nails. This requirement is the same as existing § 1926.501(c) and the proposal. No comments were submitted regarding paragraph (a)(6).

Paragraph (a)(7) requires that slippery conditions on stairs be eliminated before stairways can be used to reach other levels. This requirement is similar to existing § 1926.501(e) and the proposed rule, except that the final rule requires the employer to eliminate the hazard before allowing use of the stairway to reach other levels, instead of requiring that the hazard be eliminated as soon as possible.

The one commenter (Ex. 2-1) who addressed proposed paragraph (a)(7) suggested that "as soon as possible" be replaced with the phrase "before the stairways are utilized for general use," because the commenter believed that "the proposal as written would be unenforceable and too restrictive." In response to this comment, the Agency has reworded the provision to provide clearer guidance, as noted above.

Paragraph (b) of § 1926.1052 contains rules relating to temporary treads and landings used on stairways.

Paragraph (b)(1) prohibits foot traffic on stairways with pan stairs that have not received their permanent fillings unless they have been temporarily fitted with wood or other solid material up to the top edge of each pan. This requirement clarifies existing § 1926.501(f). In addition, paragraph (b)(1) requires that such temporary treads and landings must be replaced when they are worn below the level of the top edge of the pan, so that employees are not endangered while using stairs on which permanent treads and landings have not yet been installed. As in the existing standard, temporary treads and landings are not required during construction of the stairway itself.

The one commenter (Ex. 2-33) who addressed this paragraph recommended modifying the paragraph to add language specifying that the full width of the tread opening be filled and that the fill material extend ½ inch above the nosing. The commenter based the ½-inch recommendation on concern that employees may be injured while walking on temporary stairs because the metal pans may have "give," which would expose the metal nosing as a tripping hazard for wet work shoes. OSHA points out that the provisions in paragraph (b)(3) already addresses the requirement for filling the full width and depth of the tread. OSHA has also decided not to adopt the recommendation that the fill material extend ½ inch above the nosing because the Agency believes that the provisions as proposed provide adequate employee protection. In addition, the commenter suggested that the words "wood or other" be added to describe more clearly the type of acceptable solid material that would be usable in a temporary arrangement for the filling. OSHA agrees with this suggestion and has modified the proposed provision accordingly, because the Agency believes that providing an example (wood) of acceptable fill material will help employers comply with the requirements of paragraph (b)(1).

After considering the comments received in response to proposed paragraph (b)(1), OSHA is promulgating paragraph (b)(1) as revised.

Paragraph (b)(2), which is a new provision, requires skeleton metal stairs to be provided with temporary treads and landings prior to any foot traffic if the permanent treads or landings are not to be placed until a later date.

Public comment was requested under Issue #10 of the proposed rule (51 FR

42759) regarding the adequacy of or need for § 1926.1052(b) (1) and (2). Both commenters responding to the issue (Exs. 2-23 and 2-29) expressed approval of the proposed provisions. One of the commenters (Ex. 2-29) also stated that the rule regarding metal pan-type stairways should be written as a performance standard, but did not give any specific information on what revisions were needed. In addition, the ACCSH recommended (Tr. 6/9/87, pp. 268-269) that OSHA prohibit the use of skeleton stairs "until either temporary or permanent treads and landings are installed."

In view of the comments and ACCSH recommendation, OSHA is promulgating paragraph (b)(2) as proposed.

Paragraph (b)(3) requires that treads be made of wood or other solid material, for temporary service on a stairway (i.e., to fill a metal stair pan for temporary use prior to concrete placement) and that the treads be the full width and depth of the stair. The final rule is basically the same as the proposal and existing § 1926.501(g), except that the term "wood treads" has been changed to "treads, made of wood or other solid material" to state clearly that other solid materials can be used. In addition, the Agency has changed the words "full width" to read "installed the full width and depth of the stair," so that the provision reflects OSHA's determination that a stair pan must be filled in completely. Although no commenters directly addressed paragraph (b)(3), OSHA has modified the final rule slightly to be consistent with changes made to paragraphs (b) (1) and (2) of this section and to clarify the regulatory intent. For the reasons discussed above, OSHA is promulgating paragraph (b)(3) as amended.

Two existing provisions pertaining to stairways, paragraphs (d) and (1) of § 1926.501, are not being incorporated into this revision of subpart X because they are redundant with other provisions in the construction standards. Existing § 1926.501(d) requires debris removal on and under stairways. This is already required by existing § 1926.25(a), Housekeeping. Similarly, existing § 1926.501(1), requiring illumination of stairways, simply references existing § 1926.56, Illumination. OSHA received no comments on those proposed deletions. Therefore, the Agency is deleting existing § 1926.501 (d) and (1).

Paragraph (c) of § 1926.1052 sets forth the requirements for stairrails and handrails. It replaces existing § 1926.501(b), which requires stairway railings and guardrails to meet the requirements for stairway railings and

guards and for standard specifications that appear in existing § 1926.500 (f) and (g), respectively. As a minor editorial change in the final rule, OSHA has deleted the phrase "regardless of their height above lower levels" from the introductory text of paragraph (c). OSHA notes that the provisions of the final rule still apply to all stairways regardless of their height above lower levels.

Paragraph (c)(1) requires stairways having four or more risers or rising more than 30 inches (76 cm), whichever is less, to be equipped with one stairrail system along each unprotected side or edge, and with at least one handrail. Proposed paragraph (c)(1) did not provide a 30-inch threshold for installation of stairrail and handrail systems.

As briefly discussed in the definitions section above, a stairrail system is a vertical barrier erected along unprotected sides and edges of a stairway to prevent employees from falling to a lower level. A handrail is a rail used to provide employees a handhold for support while climbing, descending, or resting on a stairway. On many stairways, the top of the stairrail system doubles as the required handrail. The criteria for a stairrail system that also serves as a 55 handrail are set out in paragraph (c)(7), below. If the stairrail is too high or does not provide a proper grasping surface, or if no stairrail is needed because the stairway is enclosed on both sides with walls, then a separate handrail and handrail support must be provided. These requirements are essentially the same as the requirements in existing § 1926.500(e)(1), except that the width-related requirements of the existing rule have been deleted because they are unnecessarily specific and, in any event, do not significantly relate to employee safety.

OSHA did not receive any comments specifically in response to paragraph (c)(1), but three commenters (Exs. 2-12, 2-23, and 2-29) responded to Specific Issue #11, in which OSHA asked whether or not the four-riser threshold for stairrail requirement was appropriate. These three commenters stated that the four-riser threshold was acceptable. The ACCSH discussion of this issue (Tr. 6/10/87, pp. 6-11), while inconclusive, pointed out the need to take variation in riser height into account by setting a minimum height above which stairrails would be required. Based on the ACCSH discussion and OSHA's field experience, the Agency has determined that 30 inches is the appropriate height above

which stairs shall be provided with stairrails. OSHA believes that a threshold height should be set to protect employees from exposure to fall hazards when they use stairs that extend above a minimum height, regardless of the number of risers.

For the reasons discussed above, OSHA is promulgating paragraph (c)(1) as final and incorporating the additional wording described above.

Paragraph (c)(2) requires winding and spiral stairways to be equipped with a handrail offset to prevent employees from walking on those portions of the stairways where the treads are less than 6 inches wide. This is the same requirement as existing § 1926.500(e)(2), except that revised subpart X expands the standard's coverage to include spiral stairways. Spiral stairways have been included under the provision because the problem of too narrow a tread is common to both types of stairways. The final rule unchanged from the proposed rulemaking. No comments were received addressing paragraph (c)(2).

Paragraph (c)(3) regulates stairrail height. OSHA has made some editorial changes for the sake of clarity and has reorganized the proposed provision.

Paragraph (c)(3)(i) requires the height of stairrails installed after the effective date of subpart X to be not less than 36 inches as measured from the upper surface of the stairrail system down to a point on the upper surface of the tread, in line with the face of the riser at the forward edge of the tread.

Paragraph (c)(3)(ii) requires that stairrails installed before the effective date of subpart X have a minimum height of 30 inches and a maximum height of 34 inches, measured the same way as required by paragraph (c)(3)(i) of this section. This provision, which is identical with existing § 1926.500(f)(2), indicates OSHA's recognition that it would be unreasonably burdensome to require that employers retrofit existing stairrails to comply with the revised standard. The Agency notes that employers who replace stairrail systems will be required to comply with paragraph (c)(3)(i). OSHA also observes that the existing specifications for stairrails are identical with the specifications for handrails in existing § 1926.500(f)(4)(ii). OSHA has thus allowed one rail to serve as both a handrail and a stairrail, which will allow employers the flexibility to use a single system to meet both requirements.

A study by the University of Michigan (Ex. 3-6:56) shows that the minimum height for stair railings should be 42 inches, and suggests that even 42 inches may be too low as "the height of the stair railing several steps below the

point where the fall originates is considerably lower than the stair railing height at the point where the fall originates, thus, it appears that a fall during descent may be more likely to project the subject in the direction of this 'lower' railing, and possibly over the railing" (Ex. 3-6:57).

The one commenter responding to proposed paragraph (c)(3) (Ex. 2-27) questioned the rationale for the 36-inch minimum height and stated that the explanation for this requirement needed to be expanded. While the Agency has not adopted the 42-inch minimum height suggested by this study, OSHA's decision to use 36 inches as the minimum height in the final rule reflects its belief that adequate provisions for employee safety require an increased minimum stairrail height. The Agency also points out that this will recognize the limits already established by some existing building codes and allow employers to continue the common practice of combining stairrails and handrails into one railing system.

Paragraph (c)(4) requires midrails, screens, mesh, intermediate vertical members (such as balusters), or equivalent structural members to be placed between the stairway steps and the top of the stairrail system. This is essentially identical to the proposal and essentially the same as existing § 1926.500(f)(2), which requires stairrails to be similar in construction to guardrails. In the final rule, however, the phrase "when there is no wall at least 21 inches (53 cm) high," has been removed from the introductory text of paragraph (c)(4). OSHA has removed the language to avoid any possible conflicting interpretation of paragraphs (c)(4) (i) through (iv) regarding the height at which intermediate rails would be required. The Agency believes this change will clarify its intent without affecting safety, and allow employers flexibility in addressing these provisions.

Paragraph (c)(4)(i) requires midrails to be located midway in height on a stairrail system. This is the same requirement as contained in existing § 1926.500(f)(1). Paragraph (c)(4)(ii) requires screens or mesh, when used, to fill the entire opening between top rails and stairway steps, and paragraph (c)(4)(iii) requires baluster-type members to be no more than 19 inches apart. Paragraph (c)(4)(iv) allows other arrangements of structural members, provided no opening in the system is more than 19 inches wide. These provisions are new requirements as the existing rule only addresses the use of midrails. However, these new rules allow greater flexibility for the

contractor providing fall protection, and are consistent with proposed § 1926.502(b) in the subpart M rulemaking.

No comments were received addressing paragraph (c)(4). Therefore, OSHA is promulgating § 1926.1052(c)(4) as amended.

Paragraph (c)(5) requires handrails and the top rails of stairrail systems to be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top surface, in any downward or outward direction, and at any point along the top edge. This is identical to the proposal and essentially the same requirement as contained in existing § 1926.501(b), which references existing § 1926.500(f). The phrase "with a minimum of deflection" that appears in existing § 1926.500(f)(1)(iv) was not carried forward in the new subpart X rulemaking because the Agency believes that the regulatory focus should be on preventing failure rather than on deflection and because of its belief that deflection should not be automatically equated with failure. In § 1926.1050(b), OSHA has defined the term "failure" to mean "load refusal, breakage, or separation of component parts" and further explained in the same definition that "load refusal is the point where the ultimate strength is exceeded." The Agency also notes that, in some cases, deflection indicates failure while in other cases, rail deflection does not indicate failure (where the rail deflects but still restrains falls).

The one comment (Ex. 2-27) regarding paragraph (c)(5) suggested that "greater clarification would be obtained by deletion of "within 2 inches of the top edge." However, OSHA believes that any clarification attained through deleting this language would be more than offset by a lessening of the employee safety OSHA requires from these railings. Therefore, § 1926.1052(c)(5) is promulgated, unchanged from the proposed rule.

Paragraphs (c) (6) and (7) specify the maximum and minimum height for handrails and stairrails that are to serve as handrails, respectively. Although existing § 1926.500(f) (2) and (4)(ii) both specify 30 and 34 inches as appropriate limits, a study by the University of Michigan (Ex. 3-6:43) indicates that 33 inches is the optimum height for handrails, and that a variance from this height of plus-or-minus 3 inches is appropriate. Paragraph (c)(6) requires that handrails be between 30 inches and 37 inches in height throughout the length of the stairway. OSHA has decided that

providing the adequate employee safety requires an increased handrail height.

There were two comments on paragraph (c)(6). One comment (Ex. 2-29) supported handrail height specifications "within the limits of 30 inches to 42 inches per existing standards." However, as noted above, the existing limits for handrail height are 30 to 34 inches.

The other commenter (Ex. 2-27) who addressed § 1926.1052(c)(6) suggested that either the standard or Appendix A should have a drawing to depict "the recommended handrail height as the degree of angle of the stairway increases." While OSHA declines to include such a drawing at this time, the Agency may consider the use of some such illustrative representation in future rulemaking.

Paragraph (c)(7) allows any stairrail system between 36 and 37 inches in height to double as a handrail. OSHA intends the proposed 37-inch upper limit for handrails to provide a measure of flexibility, allowing a 1-inch tolerance for the height of a stairrail that also serves as a handrail. There were no comments on paragraph (c)(7). OSHA has revised paragraph (c)(7) to indicate clearly that stairrails that comply with its terms may also be used as handrails. This change also reflects the deletion of the reference to paragraph (c)(7) from the note to paragraph (c)(1).

Paragraph (c)(8) requires stairrail systems and handrails to be surfaced so as to prevent clothes from being snagged (which in turn could cause an employee to trip), and to prevent employee injuries resulting from contacting these rails. This is identical to the proposed rule and is the same requirement as existing § 1926.500(f)(1)(vi)(a) and (4)(i).

The one comment (Ex. 2-29) received addressing paragraph (c)(8) stated that the Agency should "[d]elete any reference to 'snagging of clothing' for this has no appropriate reference in standards for stairways or ladders." However, OSHA notes that while this particular requirement is not based directly on the ANSI consensus standards referenced by the existing OSHA standards, the language clearly indicates the degree of smoothness considered necessary under the standard.

Paragraph (c)(9) requires handrails to provide an adequate handhold for anyone using them. This is identical to the proposed rule and is the same requirement as in existing § 1926.500(f)(4)(i). OSHA did not receive any comments regarding paragraph (c)(9).

Paragraph (c)(10) requires that the ends of stairrail systems and handrails

be constructed so as not to constitute projection hazards. This is identical to the proposed rule and is the same requirement as in existing § 1926.500(f)(1)(vi)(d) and (4)(i). OSHA did not receive any comments regarding paragraph (c)(10).

Paragraph (c)(11) requires handrails that will not be a permanent part of the structure being built to be spaced a minimum of 3 inches away from walls, stairrail systems, and other objects. The proposal would have changed the requirement in existing § 1926.500(f)(4)(iii) for a minimum clearance of 3 inches to a minimum clearance of 1½ inches. The proposed change, which OSHA believed would not affect safety, would have brought the construction standards into conformity with the requirements of many local building codes as well as with paragraph 7.6 of ANSI A12.1-1973, Safety Requirements for Floor and Wall Openings, Railings, and Toeboards (Ex. 3-7). However, OSHA recognizes that local building code requirements are not intended to address the types of temporary handrails covered by this OSHA standard. In drafting the final rule, for reasons discussed further below, OSHA has decided to retain the minimum clearance at 3 inches, and to add the phrase "that will not be a permanent part of the structure being built" to clarify that this paragraph is intended to regulate temporary handrails. Therefore, this provision will not conflict with existing building codes or other criteria that apply to permanent structures.

OSHA received six comments (Exs. 2-1, 2-11, 2-24, 2-31, 2-33, and 2-37) directed at the provisions of proposed paragraph (c)(11). All six were of the opinion that 1½ inches was an insufficient amount of clearance for workers who had items, such as gloves or rings, on their hands. Most of these respondents further stated that the existing 3-inch minimum clearance requirement was appropriate. In response to these comments, the Agency has changed the clearance specification back to 3 inches, the same as set out in the existing standard.

Paragraph (c)(12) requires unprotected sides and edges of stairway landings to be provided with guardrail systems. The provision references the criteria for guardrail systems presented in subpart M. Paragraph (c)(12), which carries forward requirements from existing § 1926.500(d) and (f) is intended to state clearly that the guardrail requirements, not the stairrail requirements, apply to landing areas. As a minor editorial change, OSHA has incorporated the explanatory note found after the

proposed paragraph into the text of paragraph (c)(12). No comments were received addressing paragraph (c)(12).

Section 1926.1053 Ladders

This section sets forth requirements for all ladders used for construction work. The existing standard, in paragraphs (a) (3), (4), and (5) of § 1926.450, requires manufactured and fixed ladders to comply with the provisions of pertinent American National Standards Institute safety codes. OSHA referenced those ANSI standards when it promulgated § 1926.450 in 1971, to provide guidance for proper design, manufacture, and maintenance of ladders. While specific ANSI standards were identified, the applicable paragraphs were not specified. To eliminate confusion as to which provisions apply and the need for employers to refer to documents outside part 1926, the applicable provisions of the ANSI standards are being incorporated into the text of subpart X. Those provisions are identified in the following discussion. Where the applicable ANSI provisions have been revised in recent editions, the final rule incorporates the more recent language. In addition, OSHA has consolidated the requirements for ladders, to the extent appropriate, so that employers have consistent guidance, whatever type of ladder they use.

Paragraph (a) sets forth the general requirements for constructing and equipping ladders.

Paragraph (a)(1) sets the minimum loads that ladders shall be capable of supporting without failure. After reviewing the pertinent consensus standards, OSHA proposed to adopt the load requirements of ANSI A14.1-1982 and A14.2-1982 for portable ladders and the load requirements of A14.3-1984 for fixed ladders, respectively. Ladders built and tested in conformance with appendix A will be deemed by OSHA to meet the strength requirements of paragraph (a)(1). This includes extra-heavy-duty type 1A ladders built and tested in accordance with the ANSI standards for portable metal ladders (A14.2) and portable reinforced plastic ladders (A14.5). In paragraphs 7.2.1.1 and 7.2.3 (which cite tables 5 and 9) of A14.2-1982, and paragraphs 8.2.1 and 8.2.3 (which cite tables 10 and 14) of A14.5-1982, ANSI prescribes test loads of 300 lbs. and working loads of 1000 lbs. for these extra-heavy-rated ladders. ANSI requires these types of ladders to have a safety factor of only 3.3. However, OSHA believes ANSI's use of the 3.3 factor instead of 4.0 will not present a problem or result in a

lessening of safety. OSHA notes that a high factor of safety is more important on light duty ladders where the residual strength is more significant. For example, a 200 pound capacity ladder is required by ANSI to actually support 800 pounds. Assuming the ladder is properly used by one employee weighing between 200 and 250 pounds, the residual strength is 550-600 pounds. A heavy duty ladder with a 300 pound capacity, under the same circumstances, would have a 750-800 pound residual strength, if a 3.3 factor of safety is used, and a 950-1000 pound residual capacity if a factor of 4.0 is used. Although ANSI does not set forth its rationale for setting a 3.3 safety factor for heavy duty ladders, OSHA believes that the residual capacity obtained by using 3.3 on heavy duty ladders is sufficient. In addition, OSHA believes that the extensive testing procedures required by the ANSI standards are sufficient to ensure that ladders in use are safe.

Appendix A of the final rule references the current ANSI standards for portable wood ladders, portable metal ladders, portable reinforced plastic ladders, fixed ladders, and job-made ladders (Exs. 3-11 through 3-14 and 3-17). While existing § 1926.450(a) (3), (4), and (5) require compliance with the provisions of the referenced ANSI standards, the revised standard takes a performance-oriented approach. This allows design freedom to employers who desire to engineer their own ladders, while notifying employers that compliance with ANSI would be acceptable. Thus, employers who do not desire to or cannot engineer the systems they use have information on how to obtain equipment which complies with the standard.

The Agency notes that, in keeping with ANSI, the load requirements for portable ladders are framed in terms of a safety factor, while the load requirements for fixed ladders are framed in terms of 250-pound loads plus anticipated loads imposed by weather or other factors. The Agency has determined that the distinctions drawn between portable and fixed ladders by the ANSI committees are appropriate. In particular, OSHA believes that the variety of uses to which portable ladders are put and the wear-and-tear those ladders sustain justify the imposition of a strength factor requirement. The Agency believes that compliance with the safety factor requirement will provide appropriate assurance of safety to employees using portable ladders. On the other hand, the Agency believes the comparatively stable and controlled conditions under

which fixed ladders are used justify the imposition of specific weight requirements, instead of a strength factor requirement.

Job-made ladders do not have minimum strength criteria either in the existing OSHA rules or in the ANSI standard for job-made ladders A14.4-1979 (Ex. 3-14). However, their potential use is the same as that of manufactured portable ladders. Therefore, revised subpart X imposes the same strength requirements on them.

In the final rule, OSHA is relocating proposed paragraph (a)(1)(ii) to paragraph (a)(1)(iii) and is adding new paragraph (a)(1)(ii) immediately following the portable ladders provision. OSHA has inserted this other paragraph to reflect its determination that self-supporting portable ladders, such as stepladders, may be properly placed at angles other than 75½ degrees. The amendment serves to indicate clearly that non-self supporting portable ladders, unlike self-supporting ladders, are subject to the 75½-degree inclination test criterion that was applied to all portable ladders in proposed paragraph (a)(1)(i). The Agency has determined that the provisions, as clarified, are consistent with the pertinent ANSI standards.

Paragraph (a)(1)(i) requires each self-supporting portable ladder to be capable of supporting, without failure, four times the maximum intended load applied or transmitted to that ladder. Extra-heavy-duty self-supporting portable metal or reinforced plastic ladders are required to satisfy a strength factor requirement of 3.3. Ladders built and tested in conformance with the applicable provisions of appendix A are deemed to meet the requirements.

The minimum strength requirement for portable ladders is under paragraph (a)(1)(i) is essentially the same requirement as contained in the existing § 1926.450(a) (3) and (4) references to the A14.1-1968 ANSI standard for portable wood ladders (Ex. 3-8) (paragraph 4.1.2.1), and the A14.2-1956 ANSI standard for portable metal ladders (Ex. 3-9) (paragraph 4.2.1). However, the 200-pound load specified by the ANSI provisions noted above has been deleted in favor of the revised rule's performance-oriented language, which addresses more situations.

In the revised rule, breakage, separation of component parts, or load refusal are used as the failure criteria, as some rung deformation will normally result when such loads are applied, and a deformed rung does not necessarily indicate a ladder that is unsafe for use. OSHA is promulgating this rule so that

employers will determine if a rung is so deformed as the result of use that it meets at least one of the failure criteria.

In Issue #6, OSHA asked for comments about possible methods of measuring a ladder's ability to maintain its designed load capacity once it has been placed in service. Following the ANSI A14.1-1982 standard specifications, the proposal required that ladders have a four-to-one strength capacity. Under this issue, OSHA presented deflection as a possible method of evaluating a ladder's strength capacity and integrity, once the ladder is in use.

Ten commenters responded to Issue #6. Several commenters (Exs. 2-16, 2-23, 2-29, and 2-35) approved of visual inspections as sufficient to ensure ladder strength and integrity. Four commenters (Exs. 2-23, 2-30, 2-35, and 2-39) disapproved of deflection as a strength test. In particular, two commenters expressed concern that the deflection testing would not yield accurate results. Another commenter (Ex. 2-35) stated that "the deflection criteria outlined in proposed OSHA could structurally damage the ladder." Also, a commenter (Ex. 2-39) stated that "Testing for maximum allowable deflection would be difficult to conduct in the field and it might be counterproductive."

Three others (Exs. 2-11, 2-31, and 2-37) noted that the explanation of proposed § 1926.1052(c)(5) (51 FR 42754) regarding handrails and the top rail of stairrail systems, states that "deflection should not be automatically equated with failure." The commenters added that "this same theory should be applied to ladder strength capacity." They further stated that "there is no practicable or workable method of measuring ladder deflections in construction industry job site situations." The ACCSH also disapproved of deflection as a test and added that a "competent person's" inspection should be sufficient (Tr. 6/9/87, pp. 255-257).

In light of these comments, OSHA is not adding provisions to subpart X prescribing a test or method for measuring the integrity of a ladder once it has been placed in service. OSHA notes that existing § 1926.20(b)(2) requires that frequent and regular inspections of job sites, materials, and equipment be made by competent persons. Therefore, the Agency has determined that compliance with the above-noted requirement provides the appropriate assurance that ladders are safe for use.

OSHA received two comments (Exs. 2-24 and 2-33) regarding paragraph (a)(1)(i). One commenter (Ex. 2-33) stated that a 20-foot ladder "should be able to hold four workers." The commenter also emphasized the need for OSHA to consider that workers today are generally supposed to be heavier than they were 20 years ago, an apparent reference to the period intervening since the ANSI standards referenced by the existing standards were adopted. OSHA believes that the use of performance-oriented regulatory language is appropriate to deal with the circumstances encountered at construction worksites, including any increase over time in the size of the employees using ladders. Accordingly, proposed paragraph (a)(1)(i) addressed the need to support the maximum intended load and did not set out any requirements based on a specific ladder length or number or weight of workers. Given that employers will be required to provide ladders that support the workers using them, however many or heavy those workers may be, OSHA believes that § 1926.1053(a)(1)(i) and (ii) address the commenters' concerns.

The other commenter (Ex. 2-24) stated that it supported "the inclusion of the nonmandatory appendix" outlining "specific methods for meeting the standards." As noted in paragraphs (a)(1)(i) through (iii), OSHA deems ladders built in conformance with appendix A to meet the strength requirements of paragraph (a)(1). While the appendix does not describe specific methods for meeting the standards, it lists ANSI safety standards that have requirements for building and testing ladders to determine that they have the minimum strength required by the final rule. OSHA notes that ladders that satisfy the pertinent ANSI requirements are readily available. Therefore, OSHA anticipates that employers will have no difficulty in complying with paragraph (a)(1)(i), using the information in appendix A, as currently worded.

Accordingly, after considering the above-discussed comments, OSHA is promulgating paragraph (a)(1)(i) as amended.

Paragraph (a)(1)(ii) requires each non-self supporting portable ladder to be capable of supporting, without failure, at least four times the maximum intended load applied or transmitted to that ladder when the ladder is placed at an angle of 75½ degrees from the horizon. Extra-heavy-duty non-self-supporting portable metal or reinforced plastic ladders are required to be capable of supporting, without failure, at least 3.3 times the maximum intended load

applied in the same manner for other duty-rated ladders of this same type. Ladders built and tested in conformance with the applicable provisions of appendix A are deemed to meet the requirement. The 75½-degree angle of inclination is consistent with the prescribed angle in the design test requirements for portable ladders set out in paragraph 7.3 of ANSI A14.1-1982 (Ex. 3-11) and paragraph 7.2 of ANSI A14.2-1982 (Ex. 3-12). OSHA believes that setting portable ladders at a 75½-degree pitch from horizontal provides the appropriate assurance that those ladders provide the necessary strength, balance, and resistance to sliding. This is also consistent with paragraph 8.3.3 of both ANSI A14.1-1982 (Ex. 3-11) and A14.2-1982 (Ex. 3-12).

As a matter of clarification, in the final rule, OSHA is adding paragraph (a)(1)(ii) to differentiate between portable ladders that would not be subject to the 75½-degree test criteria and those that would be subject.

Paragraph (a)(1)(iii) requires fixed ladders to be capable of supporting, without failure, at least two loads of 250 pounds each, concentrated between any two consecutive points of attachment, plus other anticipated loads such as those caused by winds and ice buildup. The paragraph also requires that each step and rung be capable of supporting a minimum concentrated load of 250 pounds, applied in the middle of its span. This requirement, which is identical to the proposed rule, is based on ANSI A14.3-1984 (Ex. 3-13), paragraph 4.2.1.1. The Agency notes that the ANSI requirement, which is based on loads of 250 pounds, is consistent with OSHA's belief that 250 pounds is the average design weight of an employee with tools.

The single comment (Ex. 2-39) directed to § 1926.1053(a)(1)(ii) simply expressed a preference for the use of "shall" rather than "will" in the parenthetical explanation at the end of the paragraph, where OSHA states that "(Ladders built in conformance with the applicable provisions of appendix A will be deemed to meet this requirement)." OSHA believes that the requirement, as proposed, provide appropriate guidance. Therefore, the Agency declines to make the suggested change. The commenter also suggested that OSHA delete the parentheses, and this has been done.

Paragraph (a)(2) requires ladder rungs, cleats, and steps to be parallel, level, and uniformly spaced when the ladder is in position for use. This requirement is identical to the proposed rule and is based on the existing § 1926.450(a)(3) reference to the ANSI standard for

portable wood ladders, A14.1-1988 (Ex. 3-8), which addresses this in paragraph 4.2.1.2. This provision is based in part on paragraphs 6.2.1.2 and 6.3.5.8 of A14.1-1982 (Ex. 3-11); paragraphs 5.3, 6.1.4, 6.5.4, and 6.6.4 of ANSI A14.2-1982 (Ex. 3-12); and paragraph 5.1.1 of A14.3-1984 (Ex. 3-13). This requirement is also consistent with existing § 1910.25(c)(2)(i)(b). The requirements in paragraph (a)(2) do not currently apply in their entirety to portable metal or fixed ladders. OSHA believes that such requirements should apply to all ladders to protect all employees who use ladders.

The one comment (Ex. 2-24) that addressed proposed paragraph (a)(2) suggested that the regulation include a definition of "uniformly," to allow for "some minor variation due to difficulties of on-site construction." However, the commenter did not suggest any appropriate limits such as those suggested by commenters addressing stairway uniformity. OSHA recognizes that some employers may experience difficulty with on-site construction of ladders whose rungs are to be uniformly spaced. However, OSHA believes that this provision, which restates, in part, paragraph 6.2.1.2 of A14.1-1982 (Ex. 3-11); paragraph 5.3 of ANSI A14.2-1982 (Ex. 3-12), reflects established good industry practice. Furthermore, the Agency anticipates that employers who use reasonable care will encounter no difficulty in obtaining ladders that comply with paragraph (a)(2).

The Agency is therefore promulgating § 1926.1053(a)(2) without change.

Paragraph (a)(3) sets the rung spacing requirements for ladders. Paragraph (a)(3)(i) requires that rungs, cleats, and steps of portable ladders (except step stools and wood extension trestle ladders) and fixed ladders be spaced not less than 10 inches apart, nor more than 14 inches apart, as measured along the side rail. Paragraph (a)(3)(ii) requires that rungs, cleats, and steps on step stools be spaced not less than 8 inches nor more than 18 inches apart. Paragraph (a)(3)(iii) requires that the steps, rungs and cleats on the base section of wood extension trestle ladders be spaced not less than 8 nor more than 18 inches apart and that steps, rungs and cleats on the extension section of such an extension trestle ladder be spaced not less than 6 inches nor more than 12 inches apart. Proposed paragraph (a)(3) had separate requirements for portable and fixed ladders (proposed (a)(3)(i) set rung spacing between 6 and 12 inches) and individual step or rung ladders (proposed paragraph (a)(3)(ii) set

spacing between 6 and 16½ inches). Currently, spacing limits are specified by the ANSI standards for portable wood ladders, portable metal ladders, and fixed ladders, which are referenced in existing § 1926.450(a), (3), (4), and (5), respectively (Exs. 3-8, 3-9, and 3-10). The new limits are based in part on the most recent editions of the pertinent ANSI standards for the most commonly used types of ladders (Exs. 3-11 through 3-14 and 3-17). The consensus standards, as referenced by the existing standards and as revised, in general, provide rung spacing of 12 inches. The exceptions to the general rule are covered by paragraphs (a)(3) (ii) and (iii) of the final rule. The spacing of step stools is based on paragraphs 6.5.4 and 5.3 of ANSI A14.1-1982 and ANSI 14.2-1982, respectively. The spacing for extension trestle ladders is based on paragraph 6.3.5.8 of ANSI A14.1-1982. OSHA has determined that compliance with those ANSI-based provisions will provide appropriate protection to employees who use the specified ladders.

Paragraph (a)(3) is also based on OSHA's review of the record developed for the revision of the Agency's general industry standards for walking or working surfaces (Docket S-041). For example, a study performed for OSHA by the University of Michigan (Ex. 1) noted that the National Safety Council and the Liberty Mutual Insurance Company recommend 12-inch spacing. The authors, however, concluded that:

Though standard practice would appear to agree with the anthropomorphic and biomechanical concerns in this matter, it is still not believed to be significant evidence to support a regulation which would require all fixed ladders to be at a uniform rung spacing at this time. A range of between 10 and 14 inches would, however, seem reasonable for all new ladders until further research could be conducted.

Therefore, OSHA has revised proposed paragraph (a)(3) to reflect the University of Michigan study, the pertinent consensus standards and the rulemaking record.

Issue #7 of the proposed rule solicited comments on two particular points regarding the specifications for the minimum and maximum vertical spacing between ladder rungs, steps, and cleats (§ 1926.1053(a)(3)), and minimum widths for rungs, steps, and cleats (§ 1926.1053(a)(4)). First, the Agency sought comment on the appropriateness of the proposed limits, requesting that commenters who suggested that the limits be made either more or less specific explain their positions.

Most of the comments on Issue #7 did not make clear which of the paragraphs

they intended to address. Most of the commenters on the issue (Exs. 2-23, 2-33, and 2-39) agreed generally with the suggested limits. In addition, one commenter (Ex. 2-12) stated that "as long as it is standard throughout a project, it does not matter. Our ladders are 12" top of rung to top of rung." Also, one comment (Ex. 2-6) suggested that the requirement for rung spacing should be more performance-oriented so that configurations which provide equivalent protection would be allowed. OSHA has determined that it would not be appropriate to adopt the suggestion (Ex. 2-6) to use more performance-oriented language in paragraph (a)(3) because the Agency believes that the proposed requirements are needed to guide employers. Another commenter (Ex. 2-26) stated that 14-inch rung spacing makes more sense than 12-inch spacing because "Fourteen inch is much easier for the average person to climb." OSHA notes that paragraph (a)(3), as revised, sets the upper end of the allowable range for rung spacing at 14 inches. Therefore, a ladder with the rung spacing suggested by the commenter will be permitted. Another commenter (Ex. 2-22) stated that "from a biomechanical/ergonomic standpoint" there is no reason to deviate from 12-inch rung separation. As discussed above, OSHA believes that allowing rungs to be spaced not less than 10 inches nor more than 14 inches provides appropriate protection for employees.

Under Issue #7, OSHA also asked if the proposed limits should be further consolidated so that there is one set of rules for vertical spacing and one minimum width limit. All of the comments on this question favored further consolidation. Several commenters affiliated with the Associated General Contractors of America (Exs. 2-11, 2-31, 2-37 and 2-38) stated that—

Further consolidation of these limits would permit employer flexibility in providing for the varied ladder situations present in field construction operations. The establishment of realistic and workable minimum limits would be the most appropriate solution.

Two comments (Exs. 2-12 and 2-35) simply stated it was a good idea to establish one set of rules for vertical spacing. One comment (Ex. 2-29) suggested that the uniform spacing should be 6 to 16½ inches.

OSHA believes that paragraph (a)(3), as revised, is responsive to those commenters who suggested that OSHA further consolidate the rung spacing requirements. In particular, paragraph (a)(3)(i) sets the same rung spacing

range for all fixed ladders and for virtually all portable ladders.

Paragraph (a)(4) specifies the minimum rung/step length for portable and fixed ladders. Proposed paragraph (a)(4) has been reformatted and amended, for the sake of clarity, so that paragraph (a)(4)(i) covers fixed ladders and individual-rung/step ladders, and paragraph (a)(4)(ii) covers portable ladders.

Paragraph (a)(4)(i) requires that the minimum clear distance between the side rails of fixed ladders (except individual-rung/step ladders) and the minimum clear distance between the sides of individual-rung/step ladders shall be 16 inches. This provision is based on paragraph 5.1.2 of ANSI A14.3-1984.

Paragraph (a)(4)(ii), which is based on ANSI A14.1-1968 (Ex. 3-8), paragraph 4.2.1.3, and ANSI A14.1-1982 (Ex. 3-11), paragraph 6.3.2.4, requires that the minimum clear distance between the side rails of all portable ladders shall be 11½ inches. This provision differs from that which was proposed and from that which has been applied through the existing § 1926.450(a)(4) reference to A14.2-1956. OSHA had already decided, for the sake of clarity, that the minimum clear distance requirements should be consolidated in proposed paragraph (a)(4). Therefore, when the Agency proposed requirements for all portable wood and metal ladders, OSHA adopted the minimum distance requirement (11½ inches) for the most commonly used portable wood ladders, based on the ANSI provisions cited above, and the minimum distance requirement (12 inches) for the most commonly used portable metal ladders (based on the ANSI standard provisions in paragraphs 3.2.1 and 3.3.2 of ANSI A14.2-1956 (Ex. 3-9) and 6.1.3 and 6.2.1 of A14.2-1982 (Ex. 3-12)). In the course of drafting proposed paragraph (a)(4), OSHA decided that it would no longer require the spread between portable ladder rails to increase along with the ladder's height (generally 1 inch per foot of length) because the Agency determined that it was unreasonably burdensome to comply with the requirements for progressive spread. By contrast, OSHA believes that setting a minimum clear distance between the side rails of all ladders provides the appropriate guidance to employers.

As discussed above, OSHA received a unanimously favorable response when it raised the possibility, in Issue #7, that it would further consolidate the minimum width provisions of proposed paragraph (a)(4). In particular, one comment (Ex. 2-8) stated that OSHA should set 12

inches as the minimum rung length for all portable ladders. Another comment (Ex. 2-22) stated that OSHA should consider setting the minimum ladder width at 15 inches "to allow short-heavy subjects to assume their preferred hand separation." Yet another comment (Ex. 2-33) indicated some concern about the adequacy of the 11½-inch minimum width proposed for portable wood ladders, stating that "11½ inches gives my Triple E's only one inch to spare on a ladder width." On the other hand, the ACCSH unanimously recommended that OSHA further consolidate the proposed rung-width requirements by setting the requirement at 11½ inches (Tr. 6/9/87, pp. 257-262). The ACCSH based its suggestion on its perception that an 11½-inch width would enable an "average person" to get both feet on the same rung.

OSHA has determined, consistent with the recommendation of the ACCSH and the comments received, that 11½ inches is the appropriate minimum clear distance between side rails for all portable ladders. The Agency has chosen 11½ inches instead of other limits for portable ladders because OSHA believes that an 11½ inch minimum clear distance will allow safe passage by employees. Indeed, the Agency believes that setting a higher minimum clear distance for portable ladders would not provide significantly greater protection and would unnecessarily make many existing ladders obsolete. Therefore, the Agency has deleted the proposed rule's required 12-inch-minimum clear length for portable metal ladders and reinforced plastic ladders and removed the word "wood" at the end of the sentence. On the other hand, OSHA has retained the existing 16-inch minimum clear distance for fixed and individual-rung/step ladders, as proposed, because the Agency believes that provision is still appropriate. No comments were directed at the provisions for these ladders.

Accordingly, OSHA is promulgating paragraph (a)(4) as revised.

Paragraph (a)(5) requires individual-rung ladders to be shaped such that employees' feet cannot slide off rung ends. This is identical to the proposed rule and is the same requirement applied through the existing § 1926.450(a)(5) reference to ANSI A14.3-1956 (Ex. 3-10), which contains this provision in paragraph 4.1.5.

OSHA received a comment (Ex. 2-18) expressing the view that ANSI A14.3 was "intended to be applied to manufactured ladders, not to job-made ladders." The comment further stated that the use of job-made ladders

constructed with round steel pipe and other materials lacking skid-resistant properties "has not resulted in any significant injuries." The Agency agrees that the proposed paragraph did not explicitly state that job-made ladders would be excluded from coverage. However, OSHA notes that individual-rung/step ladders, that is, those without side rails, such as may be found in use for manhole access, are not job-made ladders, and the rule does not apply to such ladders. To clarify this point, OSHA is adding language to the definition of job-made ladder in the final rule explaining that, by definition, no job-made ladders are individual-rung/step ladders. Therefore job-made ladders would not be subject to the requirements of paragraph (a)(5) and other provisions that specifically address individual-rung/step ladders.

Paragraph (a)(6) requires employers to minimize slipping hazards on ladders. In the final rule, OSHA has divided paragraph (a)(6) into two parts for the sake of clarity. Paragraph (a)(6)(i) requires that the rungs and steps of fixed metal ladders manufactured more than 60 days after the effective date of revised subpart X be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping. OSHA notes that no such provision is currently applied to fixed ladders and also that ANSI A14.3-1984 does not contain such a requirement. The Agency has determined, however, that such a requirement is necessary for the protection of employees climbing fixed metal ladders.

Paragraph (a)(6)(ii) requires that all portable metal ladders be treated to minimize slipping. This requirement is found in both paragraph 3.1.5 of ANSI A14.2-1956 (Ex. 3-9), which is referenced by existing §1926.450(a)(4), and in the most recent ANSI edition, A14.2-1982, paragraph 5.5 (Ex. 3-12).

An area of concern addressed by the one commenter (Ex. 2-13) who addressed paragraph (a)(6) was that rebuilding or upgrading existing fixed ladders to meet the newly applicable requirements would impose large costs. The commenter stated that "in our estimation, if all existing fixed ladders would have to be rebuilt or otherwise upgraded to meet these requirements, the cost would be staggering." However, the commenter indicated that existing fixed ladder installations that already substantially met the performance requirements of ANSI A14.3, beginning with the 1974 edition, were exempted in the new ANSI standards.

OSHA based paragraph (a)(6) on the previous and existing ANSI provisions

addressing portable metal ladders, as noted above. OSHA recognizes that there may be some employers whose fixed ladders do not have skid-resistant rungs, and that the process of bringing those existing fixed ladders into compliance would be unreasonably burdensome. OSHA believes that most fixed ladders, though not currently subject to slip-resistance requirements under the ANSI provisions (Ex. 2-14) referenced by existing § 1926.450(a)(5), already have the necessary anti-slip features. However, to avoid imposing unreasonable burdens, the Agency has amended the proposal so that paragraph (a)(6)(i) applies only to fixed ladders installed 60 days after the effective date of revised subpart X. This allows those employers who have not already been using ladders that minimize slipping hazards to bring their operations into conformance with the new requirement, as they replace their existing equipment.

As indicated above, the same commenter (Ex. 2-18) submitted the only substantive response to both proposed paragraphs (a)(5) and (6). As regards paragraph (a)(6), the commenter questioned the application of the proposed provisions to job-made ladders. In particular, the commenter stated that the original ANSI A14.2 standards for portable metal ladders and ANSI A14.3 standard for fixed ladders were not intended to cover job-made ladders. The commenter stated that "For years, standard design of job-made ladders has utilized rungs made of round steel pipe, steel bars, wood dowels or wood slats. In our experience, this practice has not resulted in any significant injuries." However, this was the sole response to the provision, and the commenter offered no evidence to substantiate that contention. OSHA's experience in construction safety and enforcement of its standards indicates that compliance with paragraph (a)(6) will provide appropriate protection from slipping hazards associated with ladder use. Based on that determination, the Agency declines to revise the proposed paragraph to distinguish between job-made ladders and other ladders.

Therefore, § 1926.1053(a)(6) incorporates the changes from the proposed rule discussed above and is being promulgated as amended.

Paragraph (a)(7) prohibits the tying together of ladder sections to make a longer ladder, unless the sections are designed for such use. This is identical to the proposed rule and is the same requirement found in paragraphs 5.2.9 of ANSI A14.1-1968 (Ex. 3-8) and 5.3.6 of ANSI A14.2-1956 (Ex. 3-9), which are imposed through the references to ANSI

in existing § 1926.450(a) (3) and (4), respectively. This provision is also consistent with paragraph 8.3.11 of both A14.1-1982 (Ex. 3-11) and A14.2-1982 (Ex. 3-12), the most recent editions of the pertinent ANSI standards. As discussed earlier, part of the Agency's purpose in revising subpart X is to incorporate particular applicable ANSI provisions that were cited as references under existing OSHA regulations. OSHA did not receive any comments regarding paragraph (a)(7).

Paragraph (a)(8) requires that each stepladder be provided with a metal spreader or other locking device to keep the ladder in an open position when being used. This is unchanged from the proposed rule and is the same requirement as in paragraphs 4.2.1.6 of ANSI A14.1-1968 (Ex. 3-8) and 3.3.8 of ANSI A14.2-1956 (Ex. 3-9), which are imposed through the references to ANSI in existing § 1926.450(a) (3) and (4), respectively. This provision is also consistent with paragraph 6.2.1.6 of A14.1-1982 (Ex. 3-11), and paragraphs 6.1.9 and 8.3.13.2 of A14.2-1982 (Ex. 3-12), the most recent editions of the pertinent ANSI standards. No comments were received addressing paragraph (a)(8).

Paragraph (a)(9) requires that a spliced side rail be equivalent in strength to a side rail of the same length made of one piece of the same material. This is the same requirement as existing § 1926.450(b)(7), which covers job-made ladders. OSHA has determined that proper splices are important on all ladders and has framed this provision accordingly. OSHA did not receive any comments regarding paragraph (a)(9).

Paragraph (a)(10) requires that, except when portable ladders are used to gain access to fixed ladders, two or more separate ladders used to reach an elevated work area shall be offset with a platform or landing between the ladders. This requirement is essentially the same as existing § 1926.450(b)(3), which covers job-made ladders, and the proposed rule, which extended the provision to cover most multiple ladder situations, not just those involving job-made ladders. Proposed (a)(10) required that any separate ladders used to reach an elevated work area be offset with a platform or landing between the ladders, because the Agency believed that the protection required by existing § 1926.450(b)(3) for employees using job-made ladders was also needed by employees using manufactured ladders. In the final rule, OSHA is excluding situations where portable ladders are used to access fixed ladders, such as those used for utility towers, billboards,

and other structures where the bottom of a fixed ladder is elevated to limit access. OSHA notes that in such situations, the most practical means of gaining access to the fixed ladder is the use of a hook-on type portable ladder. Therefore, a platform or landing would not be needed. In addition, OSHA has consolidated the guardrail and falling object protection requirements of proposed paragraphs (a) (11) and (12), respectively, into paragraph (a)(10), so that employers who use platforms and landings will have clear and concise guidance on what fall protection and falling object protection is required.

In Issue #4, OSHA requested public comment on whether or not it is appropriate to extend the coverage of existing § 1926.450(b)(3) to all ladders. OSHA received six comments on the issue. None of the comments referred to the proposed requirements for platforms or landings. One commenter (Ex. 2-28) indicated that the existing requirement is "followed when other than job-made ladders are used." One commenter (Ex. 2-12) stated that they "use only job-made ladders." In addition, a commenter (Ex. 2-6), who apparently opposed merging any of the requirements for job-made and manufactured ladders, expressed the view that "job-built ladders do not have minimum strength criteria in the current standard or in the ANSI standards." The other three commenters (Exs. 2-29, 2-33, and 2-35) supported OSHA's proposal to extend the provisions to all ladders. The ACCSH also recommended that the provisions be applied to all ladders (Tr. 6/9/87, pp. 244-253). Therefore, based on the record, including the comments received, OSHA has decided to promulgate paragraph (a)(10) unchanged.

OSHA has determined that the references to subpart M in proposed paragraphs (a)(11) and (a)(12) can be consolidated into paragraph (a)(10), which will simplify paragraph (a). OSHA notes the provisions of proposed paragraphs (a) (11) and (12) are the subject of another rulemaking and that restating them in this subpart would involve duplication of the Agency's efforts in the other rulemaking. In addition, the Agency notes that the revision produces a paragraph (a)(10) that more closely resembles existing § 1926.450(b)(3).

Three commenters (Exs. 2-11, 2-31, and 2-37) stated that proposed paragraph (a)(12) was not the same as existing § 1926.450(b)(3), because the existing standard does not provide a requirement for overhead protection. Also, the commenters indicated they

wanted OSHA to clarify the proposed requirement so that overhead protection is required only "where the hazard of falling objects exists," to conform with the requirement for toeboards in proposed § 1926.502(j)(1). OSHA observes that the terms "overhead protection" and "falling object protection" refer to the same measures, and that compliance with the requirement for toeboards (defined in existing § 1926.452(a)(31)) in existing § 1926.450(b)(3) results in provision of falling object protection. In addition, regarding the request for clarification, OSHA notes that proposed § 1926.502(j)(1) already provides that toeboards are only required where needed to protect employees from falling objects. The Agency, therefore, has determined that further guidance is not needed but has included a reference to these subpart M provisions in this final rule.

After considering the comments received concerning this provision, OSHA is promulgating paragraph (a)(10) as amended and incorporating the provisions that were proposed as paragraphs (a)(11) and (a)(12) into paragraph (a)(10) of the final rule.

Paragraph (a)(11), which was paragraph (a)(13) of the proposed rule, requires ladder surfaces to be free of puncture and laceration hazards. The Agency has determined that it is appropriate to apply this requirement to both manufactured and job-made ladders, because OSHA believes that ladders, whatever their origin, should not pose risks of puncture wounds, lacerations, or snagging. This provision consolidates and is essentially identical to those imposed through the existing § 1926.450(a) (3), (4), and (5) references to ANSI A14.1-1968 (Ex. 3-8), paragraph 3.1.1.1, ANSI A14.2-1956 (Ex. 3-9), paragraph 3.1, and ANSI A14.3-1956 (Ex. 3-10), paragraphs 4.1.4 and 4.2, respectively. This provision is also consistent with ANSI A14.1-1982 (Ex. 3-11) paragraph 5.1.1.1; A14.2-1982 (Ex. 3-12), paragraph 5; and A14.3-1984 (Ex. 3-13), paragraph 4.1.5, the most recent editions of those standards. These paragraphs from ANSI require ladders to be without defects, such as sharp edges, splinters, and burrs.

Two commenters (Exs. 2-16 and 2-29) addressed proposed paragraph (a)(13) (now paragraph (a)(11) of the final rule). In response to the first commenter, the provision has been slightly reworded to add "be" after the word "shall." The other commenter (Ex. 2-29) stated that OSHA should "delete any reference to 'snagging of clothing' for this has no appropriate reference in standards for

stairways and ladders." However, OSHA has determined that the requirement to prevent snagging hazards, while not based directly on the ANSI consensus standards, is appropriate both to protect employees from snagging hazards and to clarify the Agency's intent concerning the degree of smoothness considered necessary under the standard. Therefore, the Agency has retained the requirement in the final rule.

After considering the comments discussed above, OSHA is promulgating paragraph (a)(11), incorporating the minor change noted above.

Paragraph (a)(12), which was proposed as paragraph (a)(14), prohibits wood ladders from being coated with any opaque covering except as necessary for identification or warning labels. This provision is intended to prohibit covering or painting over any splits or cracks in any wood ladder component that might cause the defect to be undetected by a ladder user. This requirement is consistent with the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which addresses this requirement in paragraph 5.1.9. The specific wording of paragraph (a)(12) is based on the most recent editions of the pertinent standards, ANSI A14.1-1982 (Ex. 3-11), paragraph 8.4.6.3, and A14.3-1984 (Ex. 3-13), paragraph 9.3.10. OSHA did not receive any comments regarding proposed paragraph (a)(14) (paragraph (a)(12) of the final rule).

Paragraph (a)(13) (paragraph (a)(15) in the proposed rule) requires a minimum perpendicular clearance of 7 inches between fixed ladder rungs, cleats, and steps, and any obstruction behind the fixed ladder, except in the case of elevator pit ladders. This is essentially the same requirement as contained in the existing § 1926.450(a)(5) reference to ANSI A14.3-1956 (Ex. 3-10), which addresses this in paragraph 5.4. However, in both the proposed and final rule, OSHA has removed the existing provision that allowed for the reduction of minimum clearance to account for unavoidable obstructions. This change is consistent with the most recent edition of the pertinent ANSI A14.3-1984 (Ex. 3-13), paragraph 5.4.2.1. The Agency believes that, in general, the minimum clearance requirement is necessary, regardless of any obstructions, so that employees can get safe footholds on ladders. The final rule differs from the proposal in that, in response to a comment, an exception for elevator pit ladders has been added to the final.

The Agency received one comment (Ex. 2-13) responding to this paragraph (now § 1926.1053(a)(13)). The commenter

requested that OSHA exempt pit ladders mounted to walls inside elevator hoistways from the provisions of the standard because these "ladders are used infrequently for maintenance and then by trained personnel." The commenter added that "There is also a necessity to maintain clearance between the elevator car and the ladder." OSHA has determined that this request is appropriate and notes that elevator hoistways and/or shafts are usually screened or secured from general traffic areas. The Agency considers it reasonable to expect that only those employees who are performing construction work on elevators and elevator areas would have the requisite training and access to the elevator pit ladders. In addition, the Agency observes that paragraph 5.4.2.1 of ANSI A14.3-1984 (Ex. 3-13) specifically excludes elevator pits that comply with the clearance requirements of ANSI A17.1-1981 from its coverage. Therefore, the paragraph has been amended to set the minimum perpendicular clearance for elevator pit ladders at 4½ inches.

As noted above, this revision of subpart X codifies specific ANSI provisions that were cited as references in existing OSHA regulations. For that reason, and based on the rulemaking record, the Agency is promulgating paragraph (a)(13) as revised.

Paragraph (a)(14) (paragraph (a)(16) in the proposed rule) requires a minimum clearance of 30 inches between fixed ladders and any obstruction on the climbing side of the ladder. Where the clearance is less than 30 inches because of unavoidable obstructions, paragraph (a)(15) (redesignated from paragraph (a)(17) in the proposed rule) requires a deflection device to be installed that would guide employees around the obstruction. These requirements are consistent with those imposed through the existing § 1926.450(a)(5) reference to ANSI A14.3-1956 (Ex. 3-10), which addresses these matters in paragraphs 5.1 and 5.7. Paragraphs (a)(14) and (15) are effectively identical to the proposed rule, which reflected the modifications contained in the pertinent provisions in the more recent edition of the consensus standard, ANSI A14.3-1984 (Ex. 3-13), paragraphs 5.4.1.1 and 5.4.1.3, respectively. No comments were received addressing paragraphs (a)(14) and (15) (as renumbered).

Paragraph (a)(16) (paragraph (a)(18) in the proposed rule) specifies minimum and maximum step-across distances at landings for fixed ladders of 7 inches and 12 inches, respectively. The text of the final rule is identical to the proposed paragraph. It is consistent with paragraph 5.6 of ANSI A14.3-1956 (Ex.

3-10), which is referenced in existing § 1926.450(a)(5), except that the existing 2½-inch minimum limit has been replaced by a minimum limit of 7 inches, to be consistent with paragraph (a)(13) in the final rule and with paragraph 5.4.2.2 of the most recent edition of the consensus standard, ANSI A14.3-1984 (Ex. 3-13).

The one commenter (Ex. 2-14) who responded to proposed paragraph (a)(18) (now renumbered as § 1926.1053(a)(16)) pointed out that the term "through fixed ladder" used in the proposal was unclear. To resolve this concern regarding the meaning of the term, the Agency has added a definition for "through fixed ladder" in § 1926.1050(b) of this subpart, as discussed earlier.

Paragraph (a)(17) (paragraph (a)(19) in the proposed rule) requires a minimum of 15 inches of side clearance (from the ladder centerline) for all fixed ladders that do not have cages or wells. This requirement is identical to paragraph 5.20 of ANSI A14.3-1956 (Ex. 3-10), which is applied through the reference to the ANSI standard in existing § 1926.450(a)(5). It is also identical to paragraph 5.4.3 of the most recent edition of the consensus standard, ANSI A14.3-1984 (Ex. 3-13). No comments were received addressing paragraph (a)(17).

Paragraph (a)(18) (paragraph (a)(20) of the proposal) requires fixed ladders to be provided with cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is more than 24 feet above lower levels. This requirement is based in part on the existing § 1926.450(a)(5) reference to ANSI A14.3-1956 (Ex. 3-10), which addresses this concept in paragraph 6.1.2. The provision also reflects the updated and clarified language of A14.3-1984 (Ex. 3-13); paragraph 4.1.2. The final rule also allows the use of self-retracting lifelines as alternative fall protection to wells, cages, and ladder safety devices.

One comment (Ex. 2-35) objected to the inclusion of self-retracting lifelines in the list of devices to be used, stating that "We do not expect it was OSHA's intention to have self-retracting lifelines be utilized when the length of line is less than 24'." OSHA notes that this exact requirement appears in the most recent ANSI standard. The Agency believes that the ANSI provisions are appropriate to protect workers in those circumstances. Furthermore, such lifelines are listed as one of several options the employer can select from, and are not items required on all fixed ladders. The Agency expects that

employers will choose devices from the given list of options that adequately protect employees.

After considering the response to the proposed rule, OSHA is issuing paragraph (a)(18) as final, unchanged from the proposed rule.

Paragraph (a)(19) (paragraph (a)(21) of the proposal) requires that employers who install fixed ladders whose total length of climb is at least 24 feet, equip those ladders with either ladder safety devices, self-retracting lifelines together with rest platforms at intervals not to exceed 150 feet, or a cage or well with ladder sections offset and landing platforms provided at maximum intervals of 50 feet. This provision is based on ANSI A14.3-1984 (Ex. 3-13), paragraph 4.1.2.

OSHA received one comment (Ex. 2-43) addressing paragraph (a)(21) (§ 1926.1053(a)(19) of the final rule). The commenter noted that the paragraph requires rest platforms for fixed ladders at intervals of 150 feet, in apparent contradiction with the requirement that ladder sections not exceed 50 feet in length. OSHA notes that the provisions of paragraph (a)(19) (ii) and (iii) are alternatives between which employers will choose, so they need not be consistent.

After considering the response to the proposed rule, OSHA is promulgating paragraph (a)(19) without change.

Paragraphs (a) (20) and (21) (paragraphs (a) (22) and (23) of the proposed rule, respectively) establish the requirements for fixed ladder cage and well construction. Paragraph (a)(20), which addresses cages for fixed ladders, covers placement and spacing of horizontal bands and vertical bars; internal clearances; keeping the insides clear of projections; and requirements for cage tops and bottoms. Paragraph (a)(21), which addresses wells for fixed ladders, covers ladder encirclement; keeping them free of projections; inside clear widths; and bottom heights. Those provisions are based, in part, on paragraph 6.1 of the ANSI standard that is referenced by existing § 1926.450(a)(5), A14.3-1956 (Ex. 3-10). However, the language in the paragraphs in this rulemaking reflects the updated and clarified language of ANSI A14.3-1984 (Ex. 3-13), paragraphs 6.1 and 6.2. Significant differences between the 1956 and 1984 ANSI documents, and therefore, between the existing and revised rule, are as follows:

- Maximum cage size is increased from 28 to 30 inches to allow easier employee movement;
- Wells are now required to encircle the ladder completely and be free of projections; wells must now have an

inside clear width of at least 30 inches; and

- The bottom access opening shall not be less than 7 feet nor more than 8 feet high.

No comments were received addressing paragraphs (a) (20) and (21) (as redesignated).

Paragraph (a)(22) (paragraph (a)(24) of the proposed rule) sets forth the requirements for ladder safety devices. Those provisions are based, in part, on the reference in existing § 1926.450(a)(5) to ANSI A14.3-1956 (Ex. 3-10), which covers this topic in paragraph 6.5. Those paragraphs also reflect the updated and clarified language of ANSI A14.3-1984 (Ex. 3-13), paragraph 7. Based on the Agency's review of the record, as discussed below, OSHA promulgates paragraph (a)(22) without change.

Paragraph (a)(22)(i) requires that ladder safety devices and related support systems (such as a ladder to which they are attached) be capable of withstanding, without failure, a drop test consisting of an 18-inch (.41 m) drop of a 500-pound (226 kg) weight. This provision is based on ANSI A14.3-1984 (Ex. 3-13), paragraph 7.1.3.

Paragraph (a)(22)(ii) requires the devices to be of a design that permits employees using the system to ascend or descend without continually having to manipulate any part of the system. The requirement is based on paragraph 7.3.1 of ANSI A14.3-1984.

Paragraph (a)(22)(iii) requires that ladder safety devices limit the descending velocity of an employee to 7 feet (2.1 m) per second or less within 2 feet (.61 m) after a fall occurs. In establishing the velocity limit for ladder safety devices, OSHA reviewed a National Bureau of Standards (NBS) report (Ex. 3-18) that suggested a maximum descent rate for descent devices of 15 feet per second for an uninjured employee and 10 feet (3.1 m) per second for an injured employee. Descent devices are used for escapes, with workers traveling down a rope or line without obstructions in the descent path. In adapting the NBS recommendations into regulatory language, OSHA proposed a more conservative velocity limit of 7 feet (2.1 m) per second for ladder safety devices because the Agency believes that an employee descending faster than that could be injured through contact with the ladder during a fall. Seven feet per second represents the speed attained after a free-fall of approximately 1 foot (30.5 cm). OSHA believes that in addition to providing protection from the force of the fall, this limit enables an employee to either regain control on the

ladder or descend at a reasonable and safe speed.

OSHA requested comments and data in Issue #12 of the proposal on whether or not the descent rates suggested by NBS would provide adequate protection. The only comment on this issue came from the ACCSH, which recommended that OSHA adopt the 7 feet-per-second limit (Tr. 6/10/87, pp. 11-13). The one comment (Ex. 2-3) specifically made on § 1926.1053(a)(24) (§ 1926.1053(a)(22) of the final rule) was directed to paragraph (a)(24)(iii), and expressed the belief that these requirements, as specified, would "effectively eliminate all flexible and rigid rail systems in use today." The commenter added that "I believe the intent is to have those units with descent capability only meet the descent per second criteria." OSHA disagrees with this comment. The specified criteria do not prohibit the use of systems that completely stop or arrest the fall of employees. The provision is intended to limit the maximum fall velocity, not the minimum fall velocity. Upon review of the record, including the above-mentioned comment, OSHA believes that the requirements of paragraph (a)(22)(iii) are necessary for protection of employees who use ladder safety devices including those equipped with a descent slide mechanism. However, OSHA requests that interested parties submit any additional information that would be pertinent to this issue. The Agency would take any such information into account and would initiate further regulatory action if that was appropriate.

Paragraph (a)(22)(iv) requires that the maximum length of the connection between the carrier or lifeline and the point of attachment to the body belt not exceed 9 inches (23 cm). This requirement is based on a recommendation contained in Drs. Chaffin and Stobbe's report, "Ergonomic Considerations Related to Selected Fall Prevention Aspects of Scaffolds and Ladders as Presented in OSHA Standard, 29 CFR part 1910, subpart D" (Ex. 3-19), which indicates that this distance is needed to ascend and descend a ladder in a position that is not awkward. No comments were received on this paragraph.

Paragraph (a)(23) (paragraph (a)(25) of the proposed rule) specifies the mounting requirements for ladder safety devices for fixed ladders. The final rule is the same as the proposal except that the introductory text has the additional language "The mounting of" and "for fixed ladders" to clarify its application. Paragraph (a)(23)(i) requires mountings for rigid carriers to be attached at each

end of the carrier, with intermediate mountings spaced along the entire length of the carrier. This is based on ANSI A.14.3-1984 (Ex. 3-13), paragraph 7.3.4. Paragraph (a)(23)(ii) requires that mountings for flexible carriers be attached at each end of the carrier, and that when the system is exposed to wind, cable guides be installed at a minimum spacing of 25 feet (7.6 m) and a maximum spacing of 40 feet (12.2 m) along the entire length of the carrier to prevent wind damage to the system. These are the same requirements as in ANSI A.14.3-1984, paragraph 7.3.5. Paragraph (a)(23)(iii) requires that the design and installation of mountings and cable guides not reduce the design strength of the ladder. This is based on ANSI A14.3-1984, paragraph 7.1.4. OSHA did not receive any comments addressing paragraph (a)(23). Accordingly, OSHA promulgates § 1926.1053(a)(23) as clarified.

Paragraphs (a) (24) through (26) (paragraphs (a) (26) through (28) of the proposed rule), respectively address extensions for side rail ladders.

Paragraph (a)(24) requires that side rails extend 42 inches above the top of the access level or landing platform served by the ladder. This provision is based on paragraph 5.3.2.1 of ANSI A14.3-194 (Ex. 3-13). Existing § 1926.450(a)(9) requires that ladder side rails extend at least "36 inches above the landing." OSHA has increased the minimum extension for fixed ladders to coordinate this requirement and the requirements for guardrails. The extension requirement for portable ladders (still at least 36 inches) appears in paragraph (b)(1), below.

Paragraph (a)(25), which is based on paragraph 5.3.2.2 of ANSI A14.3-1984 (Ex. 3-13), requires that the extension of a through ladder have no steps or rungs, that the extension be flared so the side rails provide between 24 and 30 inches of clearance when ladder safety devices are not provided, and that the extension be flared no more than 36 inches when ladder safety devices are provided. These are the same requirements as in ANSI A14.3-1956 (Ex. 3-10), paragraph 6.3, referenced by existing § 1926.450(a)(5), except the minimum and maximum side rail flare is changed from 18 inches and 24 inches, to 24 inches and 30 inches, respectively, to reflect ANSI A14.3-1984 (Ex. 3-13) and to provide employees with appropriate protection from fall hazards.

Paragraph (a)(26) requires that the side rails and the steps or rungs shall be continuous for side-step fixed ladder extensions. This provision is based on paragraph 5.3.2.3 of ANSI A14.3-1984 (Ex. 3-13). OSHA did not receive any

comments regarding paragraphs (a) (24) through (26).

Paragraph (a)(27) (paragraph (a)(29) of the proposed rule) requires individual-rung ladders, except those covered by manhole covers or hatches, to extend at least 42 inches above access levels or landing platforms or be equipped with either horizontal or vertical grab bars. The final rule differs from the proposal only insofar as the proposal has been revised to state that the extension shall be "at least" 42 inches, rather than exactly 42 inches. This additional language, which was inadvertently omitted from the proposal, is needed to keep the OSHA standard consistent with ANSI A14.3-1984 (Ex. 3-13), paragraph 5.3.3.1, and to avoid imposing unreasonable burdens on employers whose individual-rung/step ladders extend more than 42 inches above access levels or landing platforms. This provision is also consistent with A14.3-1956, paragraph 6.3, which is referenced by existing § 1926.450(a)(5). No comments were received addressing redesignated paragraph (a)(27).

Paragraph (b) sets forth the requirements for safe ladder use by construction employees. The introductory text explains that these requirements apply to all ladders, including job-made ladders except as otherwise indicated. One commenter (Ex. 2-14) suggested a rearrangement of certain provisions, OSHA has determined that the format of the ladder use requirements, as proposed, is appropriate because the regulatory language has been organized so that employers receive clear guidance and the proper emphasis is placed on the ladder use requirements.

Paragraph (b)(1) requires that side rails of portable ladders extend at least 3 feet above the upper level or surface to which the ladder is used to gain access. The requirement further provides that when such extensions are not possible because of the ladder length, the ladder shall be secured at the top to a rigid, nondeflecting support, and employees shall be provided with a grasping device such as a grabrail. This is essentially the same provision as in existing § 1926.450(a)(9), except that the revised rule requires the securing of the ladder and does not limit alternative solutions to grabrails. This provision also differs from existing § 1926.450 (a)(9) in that this provision unlike the existing standard applies only to portable ladders. The side rail extension requirements for fixed ladders appear in paragraph (a)(24), as redesignated, above. The final rule is identical to proposed paragraph (b)(1) except that where the 3-foot extension is not possible, the final rule

requires that the ladder be secured "at its top to a rigid support that will not deflect," while the proposal only required securing the ladder "at the top." In addition, OSHA added the term "portable" to the proposed provision to make it clear that only portable ladders were covered by this paragraph and has inserted a new sentence to clarify that the ladder deflection under load should not, by itself, cause the ladder to slip off its support.

The one commenter (Ex. 2-21) regarding paragraph (b)(1), stated that the proposed paragraph should be clarified to address specifically how much less than 3 feet above the upper landing surface a ladder which complied with paragraph (b)(1) could be. The commenter also stated that OSHA should "set a minimum ladder length necessary to prevent the ladder from slipping from its support due to bending deflection even though the ladder is secured at the top." To address this concern, the Agency has revised proposed paragraph (b)(1) to require that ladders extending less than three feet be secured at the top to a rigid support that will not deflect and that such ladders be of sufficient length that they will not slip from the support due to bending deflection.

Accordingly, the Agency is promulgating paragraph (b)(1) as revised.

Paragraph (b)(2) requires ladders to be free of oil, grease, and other slipping hazards. This requirement, which is identical to the proposed rule, is based on paragraph 8.3.4 of both ANSI A14.1-1982 (Ex. 3-11) and A14.1-1982 (Ex. 3-12) and paragraph 9.2.5 of ANSI A14.3-1984 (Ex. 3-13), the pertinent provisions of the most recent editions of the consensus standards. The provisions of the final rule, unlike the existing provisions in § 1926.450(a) (3), (4), and (5) (which cover only oil and grease), covers all slip hazards. Paragraph (b)(2) is otherwise consistent with the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which in paragraph 5.1.1 requires ladder rungs to be "kept free of grease and oil"; the existing § 1926.450(a)(4) reference to ANSI A14.2-1956 (Ex. 3-9), which requires in paragraph 8 that ladders "be maintained in safe condition;" and the existing 1926.450(a)(5) reference to ANSI A14.3-1956 (Ex. 3-10), which requires in paragraph 5.2.6.4 that ladders be "cleaned of oil, grease, or slippery materials." However, oil and grease are only two of many slip-causing substances and, therefore, paragraph (b)(2) uses broader language. OSHA did

not receive any comments regarding paragraph (b)(2).

Paragraph (b)(3) requires that ladders not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity. This requirement is consistent with paragraph 6.1 of ANSI A14.1-1982 (Ex. 3-11), paragraph 5 of ANSI A14.2-1982 (Ex. 3-12), and paragraph 4.2 of ANSI A14.3-1984 (Ex. 3-13). This paragraph is also consistent with requirements set through the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which addressed portable wood ladders in paragraph 5.2.2. Under the proposed rule, employers were required to ensure that ladders, whether fixed or portable, were not loaded beyond their maximum intended load-carrying capacity, or the rated capacity. OSHA has revised the proposed paragraph in response to a commenter's request for clarification (Ex. 2-29), by changing "their maximum intended load-carrying capacity" to "the maximum intended load for which they were built," and adding the word "manufacturer's" to "rated capacity" in the final rule. OSHA believes that the language changes clarify the provision's intended applicability without altering any material provision of the standard.

After consideration of the above-noted comment on the proposed rule, OSHA is promulgating paragraph (b)(3) as clarified.

Paragraph (b)(4) requires that ladders be used only for the purpose for which they were designed. The final rule is identical to the proposed rule. This provision is based on paragraphs 8.3.1 and 8.4.3 of ANSI A14.1-1982 (Ex. 3-11), paragraph 8.3.1 of ANSI A14.2-1982 (Ex. 3-12), and paragraph 9.1 of ANSI A14.3-1984 (Ex. 3-13). It is also consistent with the requirements applied through the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8). Paragraph 5.2.12 of A14.1-1968 prohibits using ladders as guys, braces, skids, or for other than their intended purpose. This provision is also based on existing § 1926.450(a)(7), which prohibits using ladders in a horizontal position as a scaffold platform, or a runway. OSHA determined that it was appropriate for this requirement to apply to all ladders, not just to portable ladders, because misuse of any ladder can result in employee injury. OSHA did not receive any comments regarding paragraph (b)(4).

Paragraph (b)(5) sets requirements for the angles at which ladders must be positioned. These provisions reflect OSHA determination of how ladders must be positioned so they are stable when climbed. The requirements for

specific types of ladders have been reformatted to appear as separate subparagraphs in the final rule, for the sake of clarity.

Paragraph (b)(5)(i) requires non-self-supporting ladders to be used at an angle such that the horizontal distance between the top support and the foot of the ladder is approximately one-quarter of the working length of the ladder. This provision is based on paragraph 8.3.3 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1982 (Ex. 3-12).

Paragraph (b)(5)(ii) incorporates paragraph 4.4.1 of ANSI A14.4-1979 (Ex. 3-14), Safety Requirements of Job-Made Ladders, which requires that wood job-made ladders with spliced side rails be used at an angle such that the horizontal distance is one eighth the working length of the ladder. In the final rule, the word "ratio" in the second sentence has been replaced with "horizontal distance," to match the terminology of the first sentence. OSHA is making this minor editorial change for the sake of clarity.

Paragraph (b)(5)(iii) requires fixed ladders to be used at a pitch no greater than 90 degrees from the horizontal as measured to the back side of the ladder. This provision is based on paragraph 1.4.3 of the most recent edition of the ANSI standard, A14.3-1984 (Ex. 3-13), and is consistent with the requirement set out in paragraph 7.1 of ANSI A14.3-1956 (Ex. 3-10), which is applied through the reference to ANSI in existing § 1926.450(a)(5). No comments were received addressing paragraph (b)(5). The Agency is therefore promulgating § 1926.1053(b)(5) with the minor revision discussed above.

Paragraphs (b)(6) through (8) replace existing § 1926.450(a)(6), which requires that ladder feet be set on a substantial base, and existing § 1926.450(a)(10), which requires portable ladders that are in use to be tied, blocked, or otherwise secured to prevent their being displaced. The revised rules more clearly identify the hazards to be protected against by requiring employers to secure ladders where the footing is unstable, not level, or slippery, or where the ladder can accidentally be displaced by traffic or workplace activities.

Paragraph (b)(6) requires ladders to be used only on stable and level surfaces unless secured to prevent accidental displacement. This requirement is consistent with existing § 1926.450(a)(6), which requires "a substantial base," and with the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which in paragraphs 5.2.3 and 5.2.5 require a "secure" and "stable" footing for ladders. The requirement that the surface that must be level or the ladders

must be secured is based on ANSI A14.1-1982 (Ex. 3-11), paragraph 8.3.4, and is included because surfaces that are not level may not provide suitable support for unsecured ladders.

OSHA did not receive any public comments addressing paragraph (b)(6). The ACCSH discussed the provisions of this paragraph at considerable length, together with paragraphs (b)(7) through (9) of this same section (Tr. 6/10/87, pp. 28-45), but did not recommend that OSHA make any changes to the language in § 1926.1053(b)(6). Therefore, OSHA is promulgating § 1926.1053(b)(6) as a final rule, without change from the proposed rule.

Paragraph (b)(7) prohibits the use of ladders on slippery surfaces unless they are secured or provided with slip-resistant feet. In the final rule the proposed explanatory note that slip-resistant feet not be used as a substitute for placing, lashing, or holding the ladder has been edited and incorporated into the text of the paragraph. This requirement is based on ANSI A14.1-1982 (Ex. 3-11), paragraph 8.3.4. This provision is also consistent with the requirement applied through the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which addresses slip resistance in paragraph 5.2.20.

OSHA did not receive any public comments addressing paragraph (b)(7). The ACCSH discussed this paragraph along with paragraphs (b)(6) through (9) and recommended that the explanatory note specifying that slip-resistant feet are not a substitute for the various methods of securing ladders on slick or slippery surfaces be merged into the text of the paragraph (Tr. 6/10/87, pp. 43-46). The ACCSH mentioned this provision while discussing the requirements for ladders, but did not make a recommendation (Tr. 6/10/87, p. 42). In Issue X-1 of the notice of informal public hearing (53 FR 2048, Jan. 26, 1988) (Ex. 5), OSHA sought testimony and supporting information regarding the ACCSH recommendation.

OSHA did not receive any testimony regarding either paragraph (b)(7) or Issue X-1. Nonetheless, the Agency agrees with the ACCSH that it is appropriate to incorporate the note as part of the text of the paragraph. OSHA, therefore, promulgates the § 1926.1053(b)(7) note as consolidated, with minor revisions.

Paragraph (b)(8) requires ladders placed in passageways, doorways, or any location where they can be displaced by workplace activities or traffic, to be secured in place, or a barricade system used to keep activities and traffic away from the ladder. This

provision is very similar to existing § 1926.450(a)(8). The only substantive change from the existing rule is the addition of language allowing the ladders to be tied off or otherwise secured. OSHA believes that if a ladder is secured against displacement then no problem exists. The type of tie-off required would vary, depending on the type of activity taking place and the likelihood of ladder displacement.

OSHA did not receive any comments regarding paragraph (b)(8). Therefore, § 1926.1053(b)(8) is promulgated as final, incorporating the above-described editorial change.

Paragraph (b)(9) requires the area around the top and bottom of ladders to be kept clear. This is unchanged from the proposed rule and is the same requirement that is already applied to portable ladders through existing § 1926.450(a)(6). OSHA has determined that it is appropriate for this requirement to cover all ladders.

No comments were received addressing paragraph (b)(9). The ACCSH mentioned this provision while discussing the requirements for ladders, but did not make a recommendation (Tr. 6/10/87, p. 42). OSHA is therefore promulgating § 1926.1053(b)(9) as final, unchanged from the proposed rule.

Paragraph (b)(10) requires the tops of non-self-supporting ladders to be placed such that the two side rails are equally supported, or provided with a single support attachment. The final rule is identical to the proposed rule. This requirement is intended to ensure proper ladder stability and is based on the requirements imposed through the existing § 1926.450(a)(4) reference to ANSI A14.2-1956 (Ex. 3-9), which addresses this in paragraph 5.3.2, and on paragraph 8.3.5 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1982 (Ex. 3-12). OSHA did not receive any comments regarding paragraph (b)(10).

Paragraph (b)(11) provides that ladders shall not be moved, shifted, or extended while occupied. The final rule is unchanged from the proposal. Essentially, this is a new provision, although existing § 1926.450(a)(3) references ANSI A14.1-1968 (Ex. 3-8), which, in paragraph 5.2.17, contains a prohibition against extending a ladder while occupied. The final rule is, effectively, based on paragraph 8.3.15 of both ANSI A14.1-1982 (Ex. 3-11) and A14.2-1982 (Ex. 3-12), which prohibit relocating a ladder while it is occupied, and on paragraph 8.3.13.1 of both 1982 ANSI standards, which prohibit extending a ladder while it is occupied. No comments were received addressing paragraph (b)(11).

Paragraph (b)(12) requires ladders to have nonconductive side rails if those ladders are used where the employee or the ladder could contact exposed energized equipment, except as provided in § 1926.951(c)(1) of Subpart V—Power Transmission and Distribution. This provision is based on paragraphs 8.3.8 and 8.3.21 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1984 (Ex. 3-12). It is also consistent with the requirements of existing § 1926.450(a)(11), which prohibits using portable metal ladders for or near electrical work, except insofar as the existing rule does not reference subpart V and, therefore, potentially conflicts with that standard (see, for example, § 1926.951(c)(1)). This final rule is substantively the same as the proposed rule, except the final rule has been editorially revised to be consistent with the related 29 CFR part 1910 provision contained in the final rule for the Electrical Safety Related Work Practices published August 6, 1990 (55 FR 32019).

The one comment (Ex. 2-44) regarding paragraph (b)(12) suggested that OSHA require protection for employees working on ladders near power lines. The commenter recommended that the Agency adopt the provisions of existing § 1926.451(d)(6) to protect employees working on ladders from electrical hazards. OSHA has determined that compliance with final rule (b)(12) and with § 1926.951(c) will adequately protect employees performing construction work on ladders from powerline hazards. Therefore, OSHA has not made the suggested change. Accordingly, § 1926.1053(b)(12) is promulgated as a final rule, incorporating the above-discussed revision.

Paragraph (b)(13) prohibits using the tops or top step of a stepladder as a step. The final rule is almost identical to the proposed rule, except that the final rule clarifies OSHA's concern that the top step of a step ladder without a cap should not be used for this purpose, either. This provision is based on paragraph 8.3.2 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1982 (Ex. 3-12). The same provision appears in ANSI A14.1-1968 (Ex. 3-8), paragraph 5.2.13, which is applied to portable wood ladders through the existing § 1926.450(a)(3) reference to ANSI. The revised rule, however, applies to all stepladders and not just to wood stepladders.

OSHA received one comment (Ex. 2-16) responding to paragraph (b)(13). The commenter expressed the view that the prohibition on the use of tops of stepladders as steps should be extended to "the top step of stepladders and the

top two steps or rungs of straight ladders." However, the commenter did not provide a rationale for this recommendation, and OSHA believes that such a rule would preclude ladders from being used as access between levels. As noted in the proposed rule, this provision is based on an ANSI standard and referenced by an existing OSHA regulation. On the basis of the one comment received, the Agency does not believe it has sufficient data to support making the recommended change.

After consideration of the comment to paragraph (b)(13), OSHA is promulgating the paragraph as final, without any change from the version found in the proposed rulemaking.

Paragraph (b)(14) prohibits using the cross-balancing on the rear support section of stepladders for climbing unless the rear section is so designed and recommended for such use by the manufacturer by providing steps for climbing on both front and rear sections. This provision is based, in part, on paragraph 8.3.2(2) of ANSI A14.1-1982 (Ex. 3-11) and paragraph 8.3.16 of ANSI A14.2-1982 (Ex. 3-12). It is also consistent with the requirements applied through the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), paragraph 5.2.22, except it applies to all stepladders and not just to wood stepladders. OSHA notes that the current ANSI provisions allow ladder users to step or stand on "rear braces of a self-supporting ladder" if the braces are designed and recommended for that purpose by the manufacturer. OSHA has revised the proposed provision to reflect the wording in the consensus standards in this final rule. No comments were received addressing paragraph (b)(14).

Paragraph (b)(15) requires that ladders be inspected for visible defects by a competent person on a periodic basis, based on use and wear, and after any occurrence that could affect their safe use. This provision is based on paragraph 8.4.1 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1982 (Ex. 3-12) and paragraph 9.3.1 of ANSI A14.3-1984 (Ex. 3-13). It is also consistent with the requirements applied through the references to ANSI A14.1-1968, ANSI A14.2-1956, and ANSI A14.3-1956 in existing § 1926.450(a) (3), (4), and (5), respectively. This provision also clarifies the requirements of existing § 1926.450(a)(2). Proposed paragraph (b)(15) would have required ladders to be inspected for visible defects prior to the first use of each workshift and after any occurrence that could affect their use. This proposed provision was not fully consistent with the requirements

imposed through the references to ANSI in the existing standards. In particular, paragraphs 5.1.10 and 5.2.4 of A14.1-1968 and A14.2-1956, respectively, required "frequent" inspection and paragraph 8 of A14.3-1956 required "regular" inspection. As explained below, the Agency has changed the proposal's wording "prior to the first use of each workshift" to read "on a periodic basis," and has also added the words "by a competent person" after "shall be inspected."

Public comment was requested on the inspection requirement in paragraph (b)(15) in Issue #5 of the proposed rulemaking. In particular, OSHA solicited comments on the specified frequency of inspections. OSHA noted that the proposed requirement for inspection prior to first use in a workshift was suggested, rather than required by the pertinent ANSI standards.

A number of respondents (Exs. 2-11, 2-28, 2-29, 2-30, 2-31 and 2-37) expressed some opposition to the proposed changes in the inspection requirements. One of these commenters (Ex. 2-29) stated that "[t]he existing standard for inspection of ladders is adequate" and that the proposed change is "not necessary."

Other commenters who supported retention of the existing standard (Exs. 2-11, 2-31, and 2-37) stated, in part, that inspection prior to the first use of each workshift would be "restrictive" and "unworkable." They added that "there is little evidence to substantiate that ladder accidents are caused by defective ladders." Another (Ex. 2-30) stated that substantial evidence did "not exist that defective ladders chiefly cause ladder accidents." However, the commenters who stated that defective ladders were not a chief cause of ladder accidents did not provide further data or evidence to substantiate their contentions. One more comment (Ex. 2-28) expressing some opposition to the proposed requirement stated, in part, that the proposed frequency of inspections would be unnecessary as this type of inspection should be conducted before ladder is used in the field.

On the other hand, as discussed above in the Hazards Involved section, a Bureau of Labor Statistics survey (Ex. 3-5) indicates that of the ladders that were involved in the accidents studied, 19 percent had one or more defects, and 53 percent of all non-self-supporting ladders broke during use (51 FR 42751). Notwithstanding the comments discussed above, OSHA is not convinced of the merit of the argument that defective ladders are not a chief

cause of ladder accidents. The record reflects that ladder defects are important factors in many ladder accidents.

Six other commenters (Exs. 2-12, 2-16, 2-23, 2-33, 2-35, and 2-42) basically supported the required frequency of inspections from the proposal. One of these four (Ex. 2-23) considered the proposal "practical," while another (Ex. 2-12) added that inspections should be performed "frequently." Yet another (Ex. 2-16) suggested "prior to each use and formally once a year" as the criteria for the required frequency. One commenter (Ex. 2-35) commended OSHA for providing ANSI inspection procedures, and recommended that OSHA reference the 1982 editions and require that reinforced plastic ladders meet the same inspection procedures. One other commenter (Ex. 2-33) indicated he favored ladder inspection but did not specify a preferred interval for this inspection stating: "The brief time to make sure a ladder is safe is better than the many hours trying to figure out why a ladder failed later on." Also, a commenter (Ex. 2-42) stated that ladders should be inspected on a "regular" basis, as necessary, and that a ladder "moved around a lot or moved often requires inspection more often." In addition, the ACCSH supported the requirement for inspections prior to each use, as found in the proposal (Tr. 6/9/87, pp. 253-255).

Based on the BLS study, the variety of responses from the commenters, the ACCSH recommendation, and the existing OSHA rules and ANSI consensus standard, OSHA finds these inspections to be of considerable importance. However, while the Agency believes that inspection prior to the first use in each workshift can be an important way of ensuring that only safe ladders are used, the record, including the comments, and ANSI do not support a requirement for inspections on a daily basis. OSHA has decided, therefore, to maintain the thrust of the proposal to emphasize the need for ladder inspections, and to allow some flexibility at the same time. Consequently, OSHA is replacing "prior to the first use of each workshift" in the proposed rule with the words "on a periodic basis" in the final, and is thus matching the ANSI terminology for this requirement.

In addition, while responding under Issue #5, some commenters (Exs. 2-11, 2-30, 2-31, and 2-37) indicated that any record retention provision associated with the inspections under this paragraph would be burdensome to employers. OSHA notes, however, that the provision did not require

recordkeeping. The ACCSH recommended that a "competent person" (defined in § 1926.32(f)), representing the employer, should examine ladders covered under the standard (Tr. 6/9/87, p. 266). OSHA agrees with the ACCSH and, accordingly, has added language regarding inspection by a competent person to the standard.

The issue also referred to the applicable ANSI standards, paragraph 8.4.1 of both ANSI A14.1-1982 (Ex. 3-11) and ANSI A14.2-1982 (Ex. 3-12), regarding the nature of inspections required after a ladder has been put into service. One commenter (Ex. 2-28) questioned how such inspections are to be performed, and asked whether they had to remove and lay a ladder down to meet the requirements of paragraph (b)(15). The commenter went on to suggest that "A general visual inspection from the bottom of the ladder and while climbing the ladder conducted before [the] first use would be reasonable." OSHA intends that these inspections can be performed visually from a ladder's base by a competent person, without taking a ladder down.

After considering the comments submitted to the record, the Agency is issuing paragraph (b)(15) as a final rule, incorporating the changes to the final rule discussed above.

Paragraph (b)(16) provides that portable ladders with structural defects be immediately withdrawn from service and marked or tagged to show that they should not be used until repaired. To allow for fixed ladders and to take into account that these ladders likely cannot be readily removed from service until repaired, the proposed rule gave employers the alternative of either tagging defective ladders or removing them from service. This was essentially the same rule as existing § 1926.450(a)(2). One difference, however, was that the existing requirement to check for rung corrosion was being deleted because the requirement is now covered in paragraph (b)(15). The proposal also added an exception allowing tagging for defective ladders that are not immediately removed from service or cannot be removed. The proposed language was intended to make it clear that ladders can be reused after they have been properly repaired. In the final rule, OSHA has made several minor editorial and format changes. Paragraph (b)(16) now applies only to portable ladders. A new paragraph (b)(17) applies to fixed ladders, and proposed paragraph (b)(17) has been renumbered as paragraph (b)(18) of the final rule to

accommodate the new paragraph (b)(17).

The one comment (Ex. 2-29) OSHA received regarding paragraph (b)(16) stated that "Ladders with structural defects shall be immediately withdrawn from service." The commenter further stated that "[r]egulations should not allow alternate action of 'do not use' tag." In consideration of this comment, OSHA has revised and redesignated provisions of the proposed rule to differentiate between fixed ladders, which may not necessarily be physically removed from service, and portable ladders, to which the provision regarding immediate removal from service will apply. Therefore, paragraph (b)(16) now applies only to portable ladders. OSHA intends that portable ladders be marked or tagged and removed from use so they are not inadvertently used before they are repaired. Accordingly, OSHA promulgates paragraph (b)(16), as revised.

In paragraph (b)(17) of the final rule, covering fixed ladders, the language from proposed paragraph (b)(16) explaining that tagging is allowed as an alternative to physical removal of a defective ladder from service has been supplemented by two additional alternatives for fixed ladders. Paragraph (b)(17) has been reformatted to indicate clearly that complying with any one of the three alternatives will satisfy the standard. The final standard states, in paragraph (b)(17)(i), that fixed ladders may also be marked in a manner that readily identifies them as defective, or, in paragraph (b)(17)(iii), blocked to prevent access or use (such as with a plywood attachment that spans several rungs). The language change for the final rule reflects OSHA's determination that employees can be warned not to use a defective ladder by means other than tagging. In recognition of the permanent placement of fixed ladders, which makes it burdensome to physically remove them for repair, OSHA has determined that either tagging, marking, or blocking defective fixed ladders is appropriate. Accordingly, the Agency has shifted the requirements for fixed ladders to paragraph (b)(17) of the final rule.

Therefore, OSHA is promulgating paragraph (b)(17) as final, incorporating the changes to the proposed rule as discussed above.

Paragraph (b)(18) (paragraph (b)(17) of the proposed rule) requires ladder repairs to restore the ladder to a condition meeting the design criteria of the ladder, before the ladder is returned to use. This requirement is part of the ANSI standards (A14.1-1968, A14.2-

1956, A14.3-1956) referenced in existing § 1926.450(a) (3), (4), and (5), and is also covered in the pertinent provisions of the current ANSI standards, require that ladders be kept in "safe condition." OSHA determined that the existing requirements do not clearly state what constitutes a safe condition. Based on its review of the record, the Agency concluded that a repaired ladder must satisfy the same criteria that applied when the ladder was built or manufactured for it to be considered safe for use. This means that if, for example, a Type 1A extra-heavy-duty-rated ladder has a broken rung, the replacement rung also must be capable of satisfying the requirements set out in § 1926.1053(a)(1). The Agency proposed to add paragraph (b)(18) (as renumbered) to indicate what an employer must do before returning a ladder to service after it has been removed from service in compliance with paragraph (b)(16) or (b)(17) of the final rule. OSHA has added the language "before the ladder is returned to use" to paragraph (b)(18) (as renumbered) to clarify the proposed provision. The additional language does not change employers' responsibilities from those set by the proposed standard. It simply makes explicit the Agency's intention to prohibit reuse of ladders which have uncorrected defects. The Agency did not receive any comments addressing this paragraph.

These provisions are being promulgated to reduce the significant risk of harm for employees using ladders and to eliminate the need for employers to refer to documents outside part 1926. OSHA has determined that paragraph (b)(18) provides additional and necessary language to convey its regulatory intent and is, therefore, issuing § 1926.1053(b)(18) as a final rule.

Paragraph (b)(19) prohibits the use of single-rail ladders. Although this prohibition was not set out as § 1926.1053(b)(19) in the proposal, it was addressed in Issue #3 of the proposed rule. OSHA raised the issue based on the existing § 1926.450(a)(3) reference to ANSI A14.1-1968 (Ex. 3-8), which, in paragraph 5.2.10, prohibited the use of wooden single-rail ladders. (This provision is not found in the more recent version of ANSI's standard.) In the issue, OSHA raised the question whether it should continue its prohibition on the use of wooden single-rail ladder or expand it to all types of construction materials, such as metal and plastic. The issue also noted that subsequent editions of ANSI A14.1 have not contained the prohibition. However, paragraph 6 of the most recent edition, A14.1-1982, clearly indicates that the

consensus standard covers only multiple-rail ladders, so the absence of an explicit prohibition does not mean that ANSI now accepts the use of single-rail ladders.

OSHA received three comments directed at Issue #3. Two of the three commenters (Exs. 2-29 and 2-35) backed the prohibition against the use of all single-rail ladders, and the third (Ex. 2-12) stated that his company does not use this kind of ladder. The ACCSH also recommended that OSHA continue to prohibit single-rail ladders (Tr. 6/9/87, p. 243).

Based on the comments received and OSHA's belief that single-rail ladders are inherently difficult to use and hazardous because of their instability, the Agency is promulgating paragraph (b)(19) as final.

Paragraph (b)(20), which originally appeared in Issue X-2 of the hearing notice (53 FR 2054), provides that a person using a ladder to ascend or descend shall be directed to face the ladder. This provision is based on existing § 1910.26(c)(3)(v) of the general industry standards and on input from the ACCSH (Tr. 6/10/87, pp. 13-19), regarding safe methods of climbing ladders. OSHA does not currently apply the general industry standard to construction operations. The language has been renumbered from paragraph (b)(18) (as it was originally designated under the issue) to accommodate other provisions that are being added to the final rule.

OSHA received no input in response to the issue. Based on OSHA's determinations that facing the ladder while climbing, as required in general industry by existing § 1910.26(c)(3)(v), is also necessary to address the Agency and ACCSH concerns for the safety of construction industry employees using ladders, OSHA is promulgating the provision as paragraph (b)(20) in the final rule.

Paragraph (b)(21), which originally appeared as a provision of paragraph (b)(19) in Issue X-2 of the hearing notice (53 FR 2054), requires that each employee use at least one hand to grasp the ladder when progressing up and/or down the ladder. This provision addresses the importance of proper and careful use of ladders in situations when a worker needs to take an item up or down a ladder. Based on former § 1910.25(d)(2)(vi), which was deleted in 1984 because it was written using the word "should" rather than "shall," and was thus unenforceable, paragraph (b)(21) has been renumbered from paragraph (b)(19) (as set out in Issue X-2 of the hearing notice), to accommodate

other provisions being added to the final rule. The former general industry standard had not been applied to construction operations. The other provision of paragraph (b)(19) in Issue X-2, which limited what could be carried by employees climbing a ladder, has been relocated to paragraph (b)(22) of the final rule, for the sake of clarity.

At its meeting of June 10, 1987, the ACCSH discussed safe methods of climbing ladders and the concerns raised by the need to carry materials or equipment up or down a ladder (Tr. 6/10/87, pp. 13-19). The ACCSH recommended that OSHA prohibit employees from carrying loads up a ladder that will prevent the employees from having one hand on the ladder at all times. OSHA adopted this recommendation and added some other points addressed by the ACCSH in their discussion as the basis for paragraph (b)(19) under Issue X-2 of the hearing notice (Ex. 5). Since that time, it has been determined that the provision can be read in a way that allows unsafe climbing. It can be read to mean that only one hand needs to be on (touching) the ladder at all times; that it may be the same hand at all times; and that the one hand may simply slide up the ladder side rail, thus permitting the carrying of objects of any size, weight, or bulk. OSHA decided that the provisions needed to be written to state more clearly the ACCSH's intent, which the Agency believes was to require that one hand grasp the ladder at all times, so that as one hand moves, the other hand maintains contact by grasping the ladder. No comments were received on this issue before the record was closed August 11, 1989.

The Agency notes that the ANSI requirements for the use of portable wood and metal ladders state, in paragraph 8.3.7 of both A14.1-1982 (Ex. 3-11) and A14.2-1982 (Ex. 3-12), respectively, that a "user shall maintain a firm hold on the ladder." OSHA also points out that under section (4) of the ANSI labeling requirements for proper climbing and use of portable ladders, in paragraphs 9.2.2. and 9.2.3 of these same code editions, users are instructed to "maintain a firm grip" and "use both hands in climbing." This language from the ANSI labeling requirements is the wording with which the public and workforce has become familiar through reading the warning/instructional labels that manufacturers affix to their portable ladders. Consequently, OSHA has modified the language recommended by the ACCSH to reflect the ANSI consensus language. However, the Agency has decided not to adopt the

ANSI phrase "use both hands in climbing" because that language might be interpreted to mean that small items could not be carried by hand when an individual is climbing a ladder.

In the final rule, OSHA has clarified its intent by changing the words "at least one hand on the ladder at all times," used in the hearing notice, to read "at least one hand to grasp the ladder when progressing up and/or down the ladder." This rephrasing more clearly reflects the Agency's intention to require employees to grasp the ladder with at least one hand while climbing.

In concurrence with the ACCSH recommendation, OSHA is promulgating paragraph (b)(21) as a final rule, and incorporating the editorial change noted above.

Paragraph (b)(22) requires that an employee climbing a ladder shall not carry any object or load that could cause the employee to lose balance and fall. As noted above, paragraph (b)(22) is based on the provision in paragraph (b)(19) of Issue X-2 that limited what an employee could carry while climbing. This provision addresses the importance of proper and careful use of ladders in situations when a worker needs to take an item up or down a ladder. Based on former § 1910.25(d)(2)(vi), which was deleted in 1984 because it was written using the word "should" rather than "shall" and was thus unenforceable, paragraph (b)(22) has been renumbered from paragraph (b)(19) in Issue X-2 of the hearing notice. The former general industry standard had not been applied to construction operations.

As discussed in relation to paragraph (b)(21), the ACCSH recommended that OSHA limit carrying of loads while climbing ladders (Tr. 6/10/87, pp. 13-19). The Agency has framed paragraph (b)(22) to take the ACCSH concerns into account. Although OSHA believes that small items such as hammers, pliers, measuring tapes, nails, paint brushes, and similar items should be carried in pouches, holster, or belt loops, the language in the final rule would not preclude an employee from carrying such items while climbing a ladder so long as the items don't impede the employee's ability to maintain full control while climbing or descending the ladder. It is OSHA's belief that the employee's focus and attention while climbing up and/or down a ladder should be on making a safe ascent or descent and not on transporting items up and down the ladder. OSHA notes that an employee who needs to take a large or heavy object to a different level by means of a ladder can pull the object up or lower it with a handline.

In concurrence with the ACCSH recommendation and for the reasons described above, OSHA is promulgating paragraph (b)(22) as a final rule.

A number of paragraphs from existing § 1926.450 are being deleted as they are to be replaced by the more performance-oriented provisions of § 1926.1053(a)(1): Existing § 1926.450(b)(2); the first line of paragraph (b)(3); and paragraphs (b) (4), (5), (6), and (8) through (12) of that same section are specification-type requirements for job-made ladders. OSHA has determined that these paragraphs do not adequately address all necessary aspects of job-made ladder construction. In addition, the provisions of existing § 1926.450(b) (6), (10), and (11) were developed for manufactured portable wood ladders and not job-made ladders. The language of the final rule corrects these problems. Contractors who wish to refer to a guide table for the construction of job-made ladders may use their own design tables if they are compatible with § 1926.1053(a)(1), or use the ANSI standard for job-made ladders, A14.4-1979, which is listed in appendix A.

Section 1926.1060 Training

The introductory text states that this section clarifies the requirements of § 1926.21(b)(2). Upon reviewing the record and the provisions of proposed § 1926.1060, the Agency has determined that the training requirements in this section simply clarify the safety training and education requirements in existing § 1926.21. Therefore, OSHA is deleting the proposed language "In addition to the requirements of § 1926.21, Safety training and education, the following training requirements apply to this subpart." In addition, the Agency is deleting the rest of the introductory text to § 1926.1060, which read "However, the provisions of this section may be cited only when a citation is being issued concurrently under the provisions of § 1926.1051, § 1926.1052, or § 1926.1053 of this subpart." OSHA has determined that the sentence is not appropriate regulatory language.

Under the introductory text to paragraph (a), employers are required to provide a training program for each employee who uses ladders or stairways, as necessary. This training is intended to instruct each employee to recognize and minimize the hazards associated with ladder or stairway use.

Paragraph (a)(1) clarifies the types of hazards and lists subject areas to be addressed in the training programs conducted for employees using ladders and stairways. Stairways and ladders are safe only when they are designed,

built, located, maintained, and used properly. This paragraph identifies components of the requisite training, but does not specify the details of the training program. Employers are required to ensure that each employee is trained by a competent person in the following areas, as applicable: The nature of fall hazards in the work area; the correct procedures for providing fall protection; the proper way to build, use, place, and maintain stairways and ladders; the maximum intended loads of the ladders used; and the standards contained in subpart X.

This approach to training provides flexibility for the employer in designing the training program. The proposed paragraph has been amended to require that the training be provided by a "competent person." This provision was added at the recommendation of the ACCSH (Tr. 6/9/87, p. 286). OSHA agrees that the involvement of a competent person in the program provides appropriate assurance that employees will be adequately trained. OSHA has also deleted the words "and instructed" from the introductory text of proposed paragraph (a)(1), for the sake of clarity.

OSHA solicited comments under Issue #8 regarding employee training and retraining on stairway and ladder use. Altogether, the Agency received 16 comments for both Issue #8 and proposed § 1926.1060. In the issue, OSHA asked for data on the costs and effectiveness of training requirements in reducing the risk of injuries or fatalities, and whether more or less specific requirements were appropriate. In addition, commenters were asked to respond with information about currently available safety programs and their adequacy; the safety records of employees who have been trained; the scope and necessary elements of training programs; the relationship of the additional specific provisions in § 1926.1060(a)(2) (redesignated as paragraph (b) in the final rule) with the more general § 1926.21 requirements; the relationship of costs to benefits under this issue area; and possible recordkeeping burdens these provisions might involve.

Costs or burdens attributable to such training or retraining are already imposed through OSHA's regulations in § 1926.21. OSHA notes that § 1926.21(b)(2) requires employers to "instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury." The

Agency's intent in Issue #8 was to get some comment and discussion on whether a specific clarification of the training requirements would be worthwhile, and not to broaden or expand the scope of the training or add a burden to the industry not already imposed by § 1926.21.

The Associated General Contractors of America, Inc. (AGC) (Ex. 2-37) and two of the local chapters (Exs. 2-11 and 2-31) indicated that they had "flexible, cost effective, and practical" training programs already in place. A number of commenters (Exs. 2-6, 2-11, 2-14, 2-23, 2-24, 2-30, 2-31, 2-37, and 2-38) stated that the existing training requirements of § 1926.21 were adequate and should not be expanded as proposed. Most of them (Exs. 2-11, 2-23, 2-24, 2-37, and 2-38) indicated that the existing training requirements were already burdensome given, among other factors, the industry's high employee turnover. OSHA recognizes that employee turnover can substantially increase an employer's training burden. The Agency, however, has determined that the required training and retraining are needed to protect employees from serious hazards. OSHA has framed the training requirements in performance-oriented language, allowing employers the flexibility to establish cost-effective programs and thus to reconcile the need for training with the employers' circumstances.

Some comments (Exs. 2-11, 2-24, 2-30, 2-31, and 2-37) stated that having two training requirements would place employers in "double jeopardy" because, as one comment (Ex. 2-24) explained, employers could receive "two citations for what really is a single violation." However, OSHA has determined that the commenters' are mistaken in their interpretation of the proposal. The Agency notes that in a case where two or more provisions could apply to a single violation the more specific rule always takes precedence over the more general rule. Therefore, only § 1926.1060 would be cited if an employer does not adequately train employees in relation to subpart X.

One comment (Ex. 2-14) stated that placing training requirements in proposed § 1926.1060 was redundant and reduced the effectiveness of the existing standard. That comment also suggested that any change in training requirements should be accomplished through revision of existing § 1926.21.

OSHA notes that § 1926.21(b)(2) requires employers to:

Instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work

environment to control or eliminate any hazards or the exposure to illness or injury.

The Agency believes that the specific training requirements in this final rule are necessary to provide additional information as a supplement to the existing general training requirements that apply to stairways and ladders. The specific requirements are also necessary to indicate what subpart X training programs are expected to cover and how frequently training is to be provided. Rather than take on the complex task of revising a general provision that applies to many different activities, OSHA has included the necessary additional information in revised subpart X, along with the rest of the provisions that relate specifically to stairways and ladders.

Three commenters (Exs. 2-28, 2-29, and 2-39) stated that the training provisions should be more specific. Two of those commenters (Exs. 2-29 and 2-39) submitted information on particular training programs and materials. OSHA has not made the suggested change because the Agency believes that employers are in the best position to select the training program and materials that are appropriate for their operations. The training materials in the record are available for employers who wish to use them in designing their own programs.

Other comments (Exs. 2-13, 2-22, 2-27, 2-28, 2-39, and 2-42) supported the proposed training requirements. One comment (Ex. 2-28) indicated that proposed § 1926.1060 did not appear to impose a recordkeeping burden. Another comment (Ex. 2-43) suggested that OSHA also require training in tying off. Yet another comment (Ex. 2-27) supported "further expansion" of the training requirements. OSHA has not made these suggested changes because the Agency believes that the proposed performance-oriented language allows employers the flexibility necessary to establish programs that appropriately address their circumstances.

Paragraph (b) requires retraining to be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge acquired through compliance with this section. This provision was proposed as § 1926.1060(a)(2), and has been redesignated as paragraph (b) for editorial purposes. To clarify OSHA's intent and allow flexibility regarding the frequency of such retraining, the final rule differs from the proposal in several minor respects: OSHA has removed the words "Training and" from the beginning of the paragraph and has added the phrase "so that each employee maintains the understanding

and knowledge acquired through compliance with this section" at the end of the provision.

OSHA requested public comment on the frequency of retraining in Issue #8 of the NPRM. As noted above, OSHA is aware of the construction industry's generally high level of employee turnover and current training responsibilities. The Agency notes, however, that none of the commenters had recommendations regarding the appropriate frequency of retraining. Therefore, OSHA continues to believe that the most reasonable course is to require retraining as necessary. Accordingly, the Agency is promulgating (b) as amended.

Appendix A to subpart X provides information for employers seeking to comply with the ladder loading and strength requirements of § 1926.1053(a)(1), and lists the applicable ANSI standards that an employer can use to purchase, design, or build ladders that would be considered to meet the OSHA standard. In the final rule, proposed appendix A has been amended for the sake of clarity and to eliminate redundancy.

Specific Issues

In the specific issues section of the proposed rule (51 FR 42758 and 42759, Nov. 25, 1986), OSHA sought public comments on 12 separate issues to identify or raise particular points encompassed by this rulemaking that it felt merited attention. In addition, OSHA sought testimony on two specific issues in the hearing notice (53 FR 2054, Jan. 26, 1988). All but two of these issues have already been discussed above. The provisions addressed in the two remaining issues are discussed below.

OSHA sought comments under Issue #1 on the following concerns affected by the revised subpart: The level of current industry practices meeting the new or revised provisions; the practicality and effectiveness of the suggested changes in preventing or lessening the severity of accidents; any previously undiscussed costs or savings; and any pertinent reports indicating the need for additional changes. In the responses to the proposed rule, OSHA received three comments directed to this issue.

One commenter (Ex. 2-39) stated that while it had no specific injury data, it urged the use of the American National Standards Institute's (ANSI) Bi-Level Fall Victim Report Form for ladders in the A14 Portable Ladder Standard (from the Appendixes to ANSI A14.1-1982 and A14.2-1982) as a way to pinpoint ladder injury problems. OSHA appreciates the suggestion and will consider ways in

which these forms can be used in consultation with the Department's Bureau of Labor Statistics, to enhance data collection efforts.

Two of the three commenters (Exs. 2-23 and 2-28) who responded to Issue #1 indicated that they felt the industry generally complied with the current requirements. One of them (Ex. 2-23) further indicated that the new regulations would add clarity and uniformity.

Issue #9 of the proposed rule (p. 42759) asked for comments regarding the use of specific numerical limits, such as the stairway slope requirement in proposed § 1926.1052(a)(2). OSHA proposed those provisions, which are based on existing rules and consensus standards, to state clearly what the Agency has determined is necessary for workplace safety. OSHA stated its belief that the use of specific limits in certain provisions promotes consistency, while minimizing legal disputes over the intent of a requirement, but also noted this may: Increase costs without increasing safety; discourage technical innovation; prevent the use of safe alternatives; and fail to anticipate the varying needs and situations covered by the standard.

OSHA received nine comments in response to Issue #9. Two commenters (Exs. 2-23 and 2-35) supported the balance of specific numeric limits and performance language that the Agency has set out under the standards. Responses from two more commenters (Exs. 2-6 and 2-12) did not clearly support either approach. The ACCSH recommended continuing the use of specification language as already required in the standard (Tr. 6/9/87, pp. 266-268). On the other hand, one commenter (Ex. 2-29) came out against specification language altogether, and the other four (Exs. 2-11, 2-31, 2-37, and 2-38) favored performance-oriented language, but indicated that adding a non-mandatory appendix as a guideline to applying the standard would be of value to contractors.

OSHA notes that there was some balance of opinion among the nine commenters and the ACCSH recommendation in response to the issue, and no position was backed by a substantial number of proponents. In addition, those commenters who stated their support for performance-oriented language did not specify particular points where specification language was inappropriate. As noted in the proposal, OSHA has drafted the new standard largely using performance language, and the standard includes only such specification language as the Agency

considers necessary for employee safety.

IV. Regulatory Impact Assessment and Regulatory Flexibility Analysis

Introduction

In accordance with Executive Order 12291 (46 FR 13193, Feb. 17, 1981) OSHA has analyzed the economic impact of this final rulemaking. Under the criteria established in Executive Order 12291, the promulgation of this revision of subpart X will be a "minor" action. This rule will not cause a major increase in costs or prices for consumers, individual industries, government agencies or geographic regions, and will not result in significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

Revised subparts L, M, and X cover surfaces and areas that are currently covered under the existing subparts L and M. OSHA has reorganized these subparts in order to construct a more logical ordering of its standards and to facilitate employers in finding the sections appropriate to their concerns.

Affected industries and population at risk. The entire construction industry would be affected by the changes to the existing subparts L and M in view of the extensive use of ladders and stairways in all sectors of the industry. In terms of the two-digit Standard Industrial Classification (SIC) codes, OSHA determined that the revision could potentially affect all firms in SIC 15 (Building Construction—General Contractors and Operative Builders), SIC 16 (Construction Other Than Building Construction—General Contractors), and SIC 17 (Construction—Special Trades Contractors). In 1987, there were approximately 540,000 establishments affected by subparts L and M. The majority of business firms classified under SIC 17 are subcontractors to the general contractors classified under SICs 15 and 16. Rather than classifying these sectors by their two-digit SIC designations, OSHA used the type of finished construction product as the basis for classifying the construction industry into the following four general sectors:

1. Single-family housing.
2. Other residential, (e.g., hotels, apartments).
3. Nonresidential (e.g., commercial and institutional buildings), and
4. Heavy construction (e.g., bridges, utilities).

OSHA estimated that all of the approximately 4.5 million construction workers frequently work on ladders and stairways.

Significance of risk. On the basis of data from the Supplementary Data System (SDS) and Occupational Injury and Illness (OII) reports from the Bureau of Labor Statistics (BLS), OSHA estimates that the annual number of injuries in construction due to falls from ladders and stairways would be 208,260.

In addition, there are approximately 36 fatalities associated with falls from ladders and stairways in construction each year.

Consequently, OSHA concludes that the construction injuries and fatalities due to falls from ladders and stairways present a significant hazard which should be reduced.

Feasibility. OSHA determined that compliance with the revised subpart X will be technologically feasible because it requires the use of readily available technology and equipment, such as sufficiently strong stair rails and ladders.

Benefits. Benefits from this revision to the standard would accrue to those workers who are at risk from hazards associated with practices involving ladders and stairways in the construction industry. OSHA estimates that full compliance with the revised standard would prevent approximately 24 fatalities, 18,757 injuries (of which 8,722 would have been lost workday injuries and 10,035 would have been non-lost workday injuries), and 156,996 lost workdays (see table A). OSHA also determined that full compliance with the existing standard would prevent 21 fatalities, 17,800 injuries (of which 8,277 would have been lost workday injuries and 9,523 would have been non-lost workday injuries), and 148,986 lost workdays. Under conditions of full compliance, therefore, the revised standard would be more protective than the existing standard as three more fatalities would be prevented, 957 more injuries would be prevented (including 445 lost workday injuries and 512 non-lost workday injuries), and 8,010 fewer workdays would be lost.

TABLE A—FATALITIES AND INJURIES PREVENTABLE BY FULL COMPLIANCE WITH THE REVISED AND EXISTING STANDARDS

Nature of accident	Number of accidents prevented		
	Revised standard	Existing standard	Difference
Fatalities	24	21	3
Injuries:			
Lost workday	8,722	8,277	445
Non-lost workday	10,035	9,523	512

TABLE A—FATALITIES AND INJURIES PREVENTABLE BY FULL COMPLIANCE WITH THE REVISED AND EXISTING STANDARDS—Continued

Nature of accident	Number of accidents prevented		
	Revised standard	Existing standard	Difference
Total	18,757	17,800	957
Lost workdays	156,996	148,986	8,010

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

The prevention of accidents involves significant nonmonetizable benefits (such as the avoidance of pain and suffering) but also involves substantial monetizable benefits to workers, industry, and society.

Using a willingness-to-pay methodology, the benefits of injuries prevented by the revised standard would be \$265 million annually. In addition, approximately 24 fatalities per year would be prevented.

Another measure of the benefits of the reduction of accidents is the savings to industry of Workers' Compensation payments. Full compliance with the revised standard could substantially reduce compensation payments, which cover medical costs and part of lost wages; accidents also cause significant costs to industry through lost productivity, administrative costs, and new hiring and training costs.

Full compliance with the revised standard would prevent approximately 3 fatalities and 957 injuries more than would be prevented by full compliance with the existing standard. The corresponding monetizable annual benefits (not including the lives saved) would be from \$6 million to \$14 million more than those under the existing standard.

Costs. Using the baseline of current industry practice, OSHA estimated that the total costs of full compliance with the revised standard would be \$27.61 million annually, and that the annual costs of full compliance with the existing standard would be \$20.11 million.

Thus, the incremental cost increase in going from full compliance with the existing provisions to full compliance with the revised subpart X would amount to \$7.50 million, which is attributable to additional labor time associated with increased training and the use of safe work practices. Table B shows the costs of the revised and existing standards by construction sector.

Cost Effectiveness

Full compliance with the revised standard would provide a safer construction work environment but at a

higher cost than that provided by full compliance with the existing standard. After carefully evaluating both regulatory and nonregulatory alternatives, OSHA has concluded that the revised subpart X standard is the more cost-effective alternative. The revised subpart X standard will increase the number of lives saved and injuries prevented without unnecessarily burdening industry. As a result, the potential annual monetizable benefits to society may be over \$200 million.

OSHA also believes that overall compliance with the provisions of the revised standard is likely to be greater than it has been under the existing standard. This is due to the performance-oriented requirements which increase the flexibility of compliance, and to the training requirements which increase awareness of hazards and compliance with safe work practice requirements. The reorganization and clarification of requirements is also expected to contribute to improved compliance levels.

TABLE B—COMPARISON OF COSTS OF COMPLIANCE WITH THE REVISED SUBPART X AND WITH THE EXISTING SUBPARTS L AND M BY CONSTRUCTION SECTOR BASELINE: CURRENT INDUSTRY PRACTICE

[Dollar amounts in millions]

Sector	Costs of compliance		Net increase for revised standard
	Revised subpart X	Existing subparts L and M	
Single-family housing	\$8.98	\$5.08	\$1.90
Other residential	4.76	3.47	1.29
Nonresidential	9.74	7.09	2.65
Heavy	6.13	4.47	1.66
Total	27.61	20.11	7.50

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

Regulatory flexibility certification. Pursuant to the Regulatory Flexibility Act (Pub. L. 96-353, 84 Stat. 1164 [5 U.S.C. 60 et seq.]), OSHA has made an assessment of the impact of the revised standard and has concluded that it would not have a significant impact upon a substantial number of small entities. The important criterion that governs a Regulatory Flexibility Analysis is whether the revised standard would impose significant costs upon small entities. "Significance" is determined by the impact upon profits, market share, and on the entities' financial viability. In particular, the revised standards' effect upon small entities relative to its effect upon large entities needs to be specifically evaluated. That is, OSHA must determine whether the revision will have a relatively greater negative effect on small entities than upon large

entities, thereby putting small entities at a competitive disadvantage, and if so, whether there are ways to minimize any differentially adverse effects without increasing worker risk.

If the costs of compliance for small firms are relatively minor and are proportional to the size of the firm, then there is no significant differential effect. In those cases involving larger absolute costs, small firms may have greater difficulty in obtaining financing, and in those cases involving economies of scale in compliance, the burden on small firms will be greater than the burden on large firms. The revised subpart X, however, requires minimal capital expenditures. The costs of compliance primarily depend upon the amount of ladder use and stairway footage, which typically depend upon the scale of operation of the entity. In addition, these costs would be a minimal component of the overall costs of the facilities. As a result, small entities would not be put at a competitive disadvantage due to these compliance costs. Thus, OSHA concluded that this revised standard will not have a significant adverse impact upon a substantial number of small entities.

V. Environmental Assessment

Finding of No Significant Impact

This final rule and its major alternatives have 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 (CEQ) (40 CFR part 1500), and OSHA's DOL NEPA Procedures (29 CFR part 11). As a result of this review, the Assistant Secretary for OSHA has determined that the final rule will have no significant environmental impact.

The revisions to 29 CFR 1926.1050-1926.1060, subpart X—Stairways and Ladders, focus on the reduction of accidents or injuries by means of work practices and procedures, proper use and handling of equipment, and training, as well as on changes in language, definition, and format of the standard. These revisions do not impact on air, water, or soil quality, plant or animal life, the use of land, or other aspects of the environment. As such, these revisions are, therefore, categorized as excluded actions according to subpart B, § 11.10, of the DOL NEPA regulations.

IV. Regulatory Impact Assessment and Regulatory Flexibility Analysis.

Introduction

In accordance with Executive Order 12291 (46 FR 13193, Feb. 17, 1981) OSHA

has analyzed the economic impact of this final rulemaking. Under the criteria established in Executive Order 12291, the promulgation of this revision of subpart X will be a "minor" action. This rule will not cause a major increase in costs or prices for consumers, individual industries, government agencies or geographic regions, and will not result in significant adverse effects on

VI. Recordkeeping

There are no collections of information in this final rule. Therefore, approval by OMB under the Paperwork Reduction Act is not necessary. However, public comment was requested in Issue #8 regarding whether the training requirements impose an implicit recordkeeping requirement on employers. The one comment (Ex. 2-28) received on this issue supported OSHA's finding that no recordkeeping burden is imposed by the training provisions of § 1926.1060.

VII. State Plan Standards

The 25 states and territories with their own OSHA-approved occupational safety and health plans must adopt a comparable standard within 6 months of the publication date of the final rule. These states and territories are: Alaska, Arizona, California, Connecticut (for State and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, New York (for state and local government employees only), Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. Until such time as a comparable standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in these states and territories.

VIII. Federalism

The Final Rule has been reviewed in accordance with Executive Order 12612 (52 FR 41685, Oct. 30, 1987) regarding Federalism. The Order requires that agencies, to the extent possible, refrain from limiting State policy options, consult with states prior to taking any actions that would restrict State policy options, and take such actions only when there is clear constitutional authority and the presence of a 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 with respect to which Federal OSHA has promulgated occupational safety and health standards. Under the OSH 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 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).

The Federal standard on construction operations involving stairways and ladders addresses hazards that 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 OSH 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 final rule addresses a clear national problem related to occupational safety and health in the construction 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 address any special conditions within the framework of the Federal Act while ensuring that the state standards are at least as effective as that standard.

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.

List of Subjects in 29 CFR Part 1926

Construction safety, Construction industry, Ladders and scaffolds, Occupational safety and health, Protective equipment, Safety.

Accordingly, pursuant to sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333), Secretary of Labor's Order No. 1-90 (55 FR 9033), and 29 CFR part 1911, 29 CFR part 1926 is amended as set forth below.

Signed at Washington, DC, this 5th day of November, 1990.

Gerard F. Scannell,
Assistant Secretary of Labor.

PART 1926—[AMENDED]

1. The authority citation for subpart L of part 1926 continues to read as follows:

Authority: Section 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); 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), or 9-83 (48 FR 37536) as applicable.

2. The heading for subpart L is revised to read as follows:

Subpart L—Scaffolding

§ 1926.450 [Reserved]

3. Section § 1926.450 is removed and reserved.

§ 1926.452 [Amended]

4. Paragraph (a) of 1926.452 is removed and reserved.

Subpart M—[Amended]

5. The authority citation for subpart M of part 1926 continues to read as follows:

Authority: Sec. 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); 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), or 9-83 (48 FR 37536) * * *.

6. The heading for subpart M is revised to read as follows:

Subpart M—Floor and Wall Openings

§ 1926.500 [Amended]

7. Paragraphs (e) and (f)(2) of § 1926.500 are removed and reserved.

§ 1926.501 [Reserved]

8. Section 1926.501 is removed and reserved.

9. Subpart X of part 1926 is revised to read as follows:

Subpart X—Stairways and Ladders

Sec.

1926.1050 Scope, application, and definitions applicable to this subpart.

1926.1051 General requirements.

1926.1052 Stairways.

1926.1053 Ladders.

1926.1054-1926.1059 [Reserved]

1926.1060 Training requirements.

Appendix A to Subpart X—Ladders

Subpart X—Stairways and Ladders

Authority: Section 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, 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.

§ 1926.1050 Scope, application, and definitions applicable to this subpart.

(a) *Scope and application.* This subpart applies to all stairways and ladders used in construction, alteration, repair (including painting and decorating), and demolition workplaces covered under 29 CFR part 1926, and also sets forth, in specified circumstances, when ladders and stairways are required to be provided. Additional requirements for ladders used on or with scaffolds are contained in Subpart L—Scaffolds.

(b) Definitions.

Cleat means a ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

Double-cleat ladder means a ladder similar in construction to a single-cleat ladder, but with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

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

Extension trestle ladder means a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the structural members lose their ability to carry the loads.

Fixed ladder means a ladder that cannot be readily moved or carried because it is an integral part of a building or structure. A *side-step fixed ladder* is a fixed ladder that requires a person getting off at the top to step to the side of the ladder side rails to reach the landing. A *through fixed ladder* is a

fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

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

Individual-rung/step ladders means ladders without a side rail or center rail support. Such ladders are made by mounting individual steps or rungs directly to the side or wall of the structure.

Job-made ladder means a ladder that is fabricated by employees, typically at the construction site, and is not commercially manufactured. This definition does not apply to any individual-rung/step ladders.

Lower levels means those areas to which an employee can fall from a stairway or ladder. Such areas include ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, material, water, equipment, and similar surfaces. It does not include the surface from which the employee falls.

Maximum intended load means the total load of all employees, equipment, tools, materials, transmitted loads, and other loads anticipated to be applied to a ladder component at any one time.

Nosing means that portion of a tread projecting beyond the face of the riser immediately below.

Point of access means all areas used by employees for work-related passage from one area or level to another. Such open areas include doorways, passageways, stairway openings, studded walls, and various other permanent or temporary openings used for such travel.

Portable ladder means a ladder that can be readily moved or carried.

Riser height means the vertical distance from the top of a tread to the top of the next higher tread or platform/landing or the distance from the top of a platform/landing to the top of the next higher tread or platform/landing.

Side-step fixed ladder. See "Fixed ladder."

Single-cleat ladder means a ladder consisting of a pair of side rails, connected together by cleats, rungs, or steps.

Single-rail ladder means a portable ladder with rungs, cleats, or steps mounted on a single rail instead of the normal two rails used on most other ladders.

Spiral stairway means a series of steps attached to a vertical pole and progressing upward in a winding fashion within a cylindrical space.

Stairrail system means a vertical barrier erected along the unprotected sides and edges of a stairway to prevent

employees from falling to lower levels. The top surface of a stairrail system may also be a "handrail."

Step stool (ladder type) means a self-supporting, foldable, portable ladder, nonadjustable in length, 32 inches or less in overall size, with flat steps and without a pail shelf, designed to be climbed on the ladder top cap as well as all steps. The side rails may continue above the top cap.

Through fixed ladder. See "Fixed ladder."

Tread depth means the horizontal distance from front to back of a tread (excluding nosing, if any).

Unprotected sides and edges means any side or edge (except at entrances to points of access) of a stairway where there is no stairrail system or wall 36 inches (.9 m) or more in height, and any side or edge (except at entrances to points of access) of a stairway landing, or ladder platform where there is no wall or guardrail system 39 inches (1 m) or more in height.

§ 1926.1051 General requirements.

(a) A stairway or ladder shall be provided at all personnel points of access where there is a break in elevation of 19 inches (48 cm) or more, and no ramp, runway, sloped embankment, or personnel hoist is provided.

(1) Employees shall not use any spiral stairways that will not be a permanent part of the structure on which construction work is being performed.

(2) A double-cleated ladder or two or more separate ladders shall be provided when ladders are the only mean of access or exit from a working area for 25 or more employees, or when a ladder is to serve simultaneous two-way traffic.

(3) When a building or structure has only one point of access between levels, that point of access shall be kept clear to permit free passage of employees. When work must be performed or equipment must be used such that free passage at that point of access is restricted, a second point of access shall be provided and used.

(4) When a building or structure has two or more points of access between levels, at least one point of access shall be kept clear to permit free passage of employees.

(b) Employers shall provide and install all stairway and ladder fall protection systems required by this subpart and shall comply with all other pertinent requirements of this subpart before employees begin the work that necessitates the installation and use of stairways, ladders, and their respective fall protection systems.

§ 1926.1052 Stairways.

(a) *General.* The following requirements apply to all stairways as indicated:

(1) Stairways that will not be a permanent part of the structure on which construction work is being performed shall have landings of not less than 30 inches (76 cm) in the direction of travel and extend at least 22 inches (56 cm) in width at every 12 feet (3.7 m) or less of vertical rise.

(2) Stairs shall be installed between 30° and 50° from horizontal.

(3) Riser height and tread depth shall be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stairs. Variations in riser height or tread depth shall not be over ¼-inch (0.6 cm) in any stairway system.

(4) Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches (51 cm).

(5) Metal pan landings and metal pan treads, when used, shall be secured in place before filling with concrete or other material.

(6) All parts of stairways shall be free of hazardous projections, such as protruding nails.

(7) Slippery conditions on stairways shall be eliminated before the stairways are used to reach other levels.

(b) *Temporary service.* The following requirements apply to all stairways as indicated:

(1) Except during stairway construction, foot traffic is prohibited on stairways with pan stairs where the treads and/or landings are to be filled in with concrete or other material at a later date, unless the stairs are temporarily fitted with wood or other solid material at least to the top edge of each pan. Such temporary treads and landings shall be replaced when worn below the level of the top edge of the pan.

(2) Except during stairway construction, foot traffic is prohibited on skeleton metal stairs where permanent treads and/or landings are to be installed at a later date, unless the stairs are fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area.

(3) Treads for temporary service shall be made of wood or other solid material, and shall be installed the full width and depth of the stair.

(c) *Stairrails and handrails.* The following requirements apply to all stairways as indicated:

(1) Stairways having four or more risers or rising more than 30 inches (76 cm), whichever is less, shall be equipped

with at least one handrail and one stairrail system along each unprotected side or edge. However, when the top edge of a stairrail system also serves as a handrail, paragraph (c)(7) of this section applies.

(2) Winding and spiral stairways shall be equipped with a handrail offset sufficiently to prevent walking on those portions of the stairways where the tread width is less than 6 inches (15 cm).

(3) The height of stairrails shall be as follows:

(i) Stairrails installed after March 15, 1991, shall be not less than 36 inches (91.5 cm) from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(ii) Stairrails installed before March 15, 1991, shall be not less than 30 inches (76 cm) nor more than 34 inches (86 cm) from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(4) Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members, shall be provided between the top rail of the stairrail system and the stairway steps.

(i) Midrails, when used, shall be located at a height midway between the top edge of the stairrail system and the stairway steps.

(ii) Screens or mesh, when used, shall extend from the top rail to the stairway step, and along the entire opening between top rail supports.

(iii) When intermediate vertical members, such as balusters, are used between posts, they shall be not more than 19 inches (48 cm) apart.

(iv) Other structural members, when used, shall be installed such that there are no openings in the stairrail system that are more than 19 inches (48 cm) wide.

(5) Handrails and the top rails of stairrail systems shall be capable of withstanding, with failure, a force of at least 200 pounds (890 n) applied within 2 inches (5 cm) of the top edge, in any downward or outward direction, at any point along the top edge.

(6) The height of handrails shall be not more than 37 inches (94 cm) nor less than 30 inches (76 cm) from the upper surface of the handrail to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(7) When the top edge of a stairrail system also serves as a handrail, the height of the top edge shall be not more than 37 inches (94 cm) nor less than 36 inches (91.5 cm) from the upper surface of the stairrail system to the surface of

the tread, in line with the face of the riser at the forward edge of the tread.

(8) Stairrail systems and handrails shall be so surfaced as to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothing.

(9) Handrails shall provide an adequate handhold for employees grasping them to avoid falling.

(10) The ends of stairrail systems and handrails shall be constructed so as not to constitute a projection hazard.

(11) Handrails that will not be a permanent part of the structure being built shall have a minimum clearance of 3 inches (8 cm) between the handrail and walls, stairrail systems, and other objects.

(12) Unprotected sides and edges of stairway landings shall be provided with guardrail systems. Guardrail system criteria are contained in subpart M of this part.

§ 1926.1053 Ladders.

(a) *General.* The following requirements apply to all ladders as indicated, including job-made ladders.

(1) Ladders shall be capable of supporting the following loads without failure:

(i) Each self-supporting portable ladder: At least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. The ability of a ladder to sustain the loads indicated in this paragraph shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction. Ladders built and tested in conformance with the applicable provisions of appendix A of this subpart will be deemed to meet this requirement.

(ii) Each portable ladder that is not self-supporting: At least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladders shall sustain at least 3.3 times the maximum intended load. The ability of a ladder to sustain the loads indicated in this paragraph shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction when the ladder is placed at an angle of 75½ degrees from the horizontal. Ladders built and tested in conformance with the applicable provisions of appendix A will be deemed to meet this requirement.

(iii) Each fixed ladder: At least two loads of 250 pounds (114 kg) each, concentrated between any two consecutive attachments (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), plus anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from the use of ladder safety devices. Each step or rung shall be capable of supporting a single concentrated load of at least 250 pounds (114 kg) applied in the middle of the step or rung. Ladders built in conformance with the applicable provisions of appendix A will be deemed to meet this requirement.

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

(3)(i) Rungs, cleats, and steps of portable ladders (except as provided below) and fixed ladders shall be spaced not less than 10 inches (25 cm) apart, nor more than 14 inches (36 cm) apart, as measured along the ladder's side rails.

(ii) Rungs, cleats, and steps of step stools shall be not less than 8 inches (20 cm) apart, nor more than 12 inches (31 cm) apart, as measured between center lines of the rungs, cleats, and steps.

(iii) Rungs, cleats, and steps of the base section of extension trestle ladders shall be not less than 8 inches (20 cm) nor more than 18 inches (46 cm) apart, as measured between center lines of the rungs, cleats, and steps. The rung spacing on the extension section of the extension trestle ladder shall be not less than 6 inches (15 cm) nor more than 12 inches (31 cm).

(4)(i) The minimum clear distance between the sides of individual-rung/step ladders and the minimum clear distance between the side rails of other fixed ladders shall be 16 inches (41 cm).

(ii) The minimum clear distance between side rails for all portable ladders shall be 11½ inches (29 cm).

(5) The rungs of individual-run/step ladders shall be shaped such that employees' feet cannot slide off the end of the rungs.

(6)(i) The rungs and steps of fixed metal ladders manufactured after January 14, 1991, shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.

(ii) The rungs and steps of portable metal ladders shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.

(7) Ladders shall not be tied or fastened together to provide longer sections unless they are specifically designed for such use.

(8) A metal spreader or locking device shall be provided on each stepladder to hold the front and back sections in an

open position when the ladder is being used.

(9) When splicing is required to obtain a given length of side rail, the resulting side rail must be at least equivalent in strength to a one-piece side rail made of the same material.

(10) Except when portable ladders are used to gain access to fixed ladders (such as those on utility towers, billboards, and other structures where the bottom of the fixed ladder is elevated to limit access), when two or more separate ladders are used to reach an elevated work area, the ladders shall be offset with a platform or landing between the ladders. (The requirements to have guardrail systems with toeboards for falling object and overhead protection on platforms and landings are set forth in subpart M of this part.)

(11) Ladder components shall be surfaced so as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

(12) 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.

(13) The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps, and any obstruction behind the ladder shall be 7 inches (18 cm), except in the case of an elevator pit ladder, for which a minimum perpendicular clearance of 4½ inches (11 cm) is required.

(14) The minimum perpendicular clearance between the center line of fixed ladder rungs, cleats, and steps, and any obstruction on the climbing side of the ladder shall be 30 inches (76 cm), except as provided in paragraph (a)(15) of this section.

(15) When unavoidable obstructions are encountered, the minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, 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.

(16) Through fixed ladders at their point of access/egress shall have a step-across distance of not less than 7 inches (18 cm) nor more than 12 inches (30 cm) as measured from the centerline of the steps or rungs to the nearest edge of the landing area. If the normal step-across distance exceeds 12 inches (30 cm), a landing platform shall be provided to reduce the distance to the specified limit.

(17) Fixed ladders without cages or wells shall have a clear width to the

nearest permanent object of at least 15 inches (38 cm) on each side of the centerline of the ladder.

(18) Fixed ladders shall be provided with cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet (7.3 m) but the top of the ladder is at a distance greater than 24 feet (7.3 m) above lower levels.

(19) Where the total length of a climb equals or exceeds 24 feet (7.3 m), fixed ladders shall be equipped with one of the following:

- (i) Ladder safety devices; or
- (ii) Self-retracting lifelines, and rest platforms at intervals not to exceed 150 feet (45.7 m); or
- (iii) A cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet (15.2 m) in length. Ladder sections shall be offset from adjacent sections, and landing platforms shall be provided at maximum intervals of 50 feet (15.2 m).

(20) Cages for fixed ladders shall conform to all of the following:

- (i) Horizontal bands shall be fastened to the side rails of rail ladders, or directly to the structure, building, or equipment for individual-rung ladders;
- (ii) Vertical bars shall be on the inside of the horizontal bands and shall be fastened to them;
- (iii) Cages shall extend not less than 27 inches (68 cm), or more than 30 inches (76 cm) from the centerline of the step or rung (excluding the flare at the bottom of the cage), and shall not be less than 27 inches (68 cm) in width;
- (iv) The inside of the cage shall be clear of projections;
- (v) Horizontal bands shall be spaced not more than 4 feet (1.2 m) on center vertically; horizontally;
- (vi) Vertical bars shall be spaced at intervals not more than 9½ inches (24 cm) on center;
- (vii) The bottom of the cage shall be at a level not less than 7 feet (2.1 m) nor more than 8 feet (2.4 m) above the point of access to the bottom of the ladder. The bottom of the cage shall be flared not less than 4 inches (10 cm) all around within the distance between the bottom horizontal band and the next higher band;
- (viii) The top of the cage shall be a minimum of 42 inches (1.1 m) above the top of the platform, or the point of access at the top of the ladder, with provision for access to the platform or other point of access.

(21) Wells for fixed ladders shall conform to all of the following:

- (i) They shall completely encircle the ladder;
- (ii) They shall be free of projections;
- (iii) Their inside face on the climbing side of the ladder shall extend not less than 27 inches (68 cm) nor more than 30 inches (76 cm) from the centerline of the step or rung;
- (iv) The inside clear width shall be at least 30 inches (76 cm);
- (v) The bottom of the wall on the access side shall start at a level not less than 7 feet (2.1 m) nor more than 8 feet (2.4 m) above the point of access to the bottom of the ladder.

(22) Ladder safety devices, and related support systems, for fixed ladders shall conform to all of the following:

- (i) They shall be capable of withstanding without failure a drop test consisting of an 18-inch (41 cm) drop of a 500-pound (226 kg) weight;
- (ii) They shall permit the employee using the device to ascend or descend without continually having to hold, push or pull any part of the device, leaving both hands free for climbing;
- (iii) They shall be activated within 2 feet (.61 m) after a fall occurs, and limit the descending velocity of an employee to 7 feet/sec. (2.1 m/sec.) or less;
- (iv) The connection between the carrier or lifeline and the point of attachment to the body belt or harness shall not exceed 9 inches (23 cm) in length.

(23) The mounting of ladder safety devices for fixed ladders shall conform to the following:

- (i) Mountings for rigid carriers shall be attached at each end of the carrier, with intermediate mountings, as necessary, spaced along the entire length of the carrier, to provide the strength necessary to stop employees' falls.
- (ii) Mountings for flexible carriers shall be attached at each end of the carrier. When the system is exposed to wind, cable guides for flexible carriers shall be installed at a minimum spacing of 25 feet (7.6 m) and maximum spacing of 40 feet (12.2 m) along the entire length of the carrier, to prevent wind damage to the system.
- (iii) The design and installation of mountings and cable guides shall not reduce the design strength of the ladder.

(24) The side rails of through or side-step fixed ladders shall extend 42 inches (1.1 m) above the top of the access level or landing platform served by the ladder. For a parapet ladder, the access level shall be the roof if the parapet is cut to permit passage through the parapet; if the parapet is continuous, the access level shall be the top of the parapet.

(25) For through-fixed-ladder extensions, the steps or rungs shall be omitted from the extension and the extension of the side rails shall be flared

to provide not less than 24 inches (61 cm) nor more than 30 inches (76 cm) clearance between side rails. Where ladder safety devices are provided, the maximum clearance between side rails of the extensions shall not exceed 36 inches (91 cm).

(26) For side-step fixed ladders, the side rails and the steps or rungs shall be continuous in the extension.

(27) Individual-rung/step ladders, except those used where their access openings are covered with manhole covers or hatches, shall extend at least 42 inches (1.1 m) above an access level or landing platform either by the continuation of the rung spacings as horizontal grab bars or by providing vertical grab bars that shall have the same lateral spacing as the vertical legs of the rungs.

(b) Use. The following requirements apply to the use of all ladders, including job-made ladders, except as otherwise indicated:

(1) When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 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, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

(2) Ladders shall be maintained free of oil, grease, and other slipping hazards.

(3) Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

(4) Ladders shall be used only for the purpose for which they were designed.

(5)(i) 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-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).

(ii) Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.

(iii) Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.

(6) Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.

(7) Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.

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

(9) The area around the top and bottom of ladders shall be kept clear.

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

(11) Ladders shall not be moved, shifted, or extended while occupied.

(12) Ladders shall have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized electrical equipment, except as provided in § 1926.951(c)(1) of this part.

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

(14) Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

(15) Ladders shall be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect their safe use.

(16) Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps,

broken or split rails, corroded components, or other faulty or defective components, shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with "Do Not Use" or similar language, and shall be withdrawn from service until repaired.

(17) Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, or corroded components, shall be withdrawn from service until repaired. The requirement to withdraw a defective ladder from service is satisfied if the ladder is either:

- (i) Immediately tagged with "Do Not Use" or similar language,
- (ii) Marked in a manner that readily identifies it as defective;
- (iii) Or blocked (such as with a plywood attachment that spans several rungs).

(18) Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

(19) Single-rail ladders shall not be used.

(20) When ascending or descending a ladder, the user shall face the ladder.

(21) Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.

(22) An employee shall not carry any object or load that could cause the employee to lose balance and fall.

§§ 1926.1054-1926.1059 [Reserved]

§ 1926.1060 Training requirements.

The following training provisions clarify the requirements of § 1926.21(b)(2), regarding the hazards addressed in subpart X.

(a) The employer shall provide a training program for each employee using ladders and stairways, as necessary. The program shall enable each employee to recognize hazards related to ladders and stairways, and shall train each employee in the

procedures to be followed to minimize these hazards.

(1) The employer shall ensure that each employee has been trained by a competent person in the following areas, as applicable:

- (i) The nature of fall hazards in the work area;
 - (ii) The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
 - (iii) The proper construction, use, placement, and care in handling of all stairways and ladders;
 - (iv) The maximum intended load-carrying capacities of ladders used; and
 - (v) The standards contained in this subpart.
- (b) Retraining shall be provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance with this section.

Appendix A to Subpart X—Ladders

This appendix serves as a non-mandatory guideline to assist employers in complying with the ladder loading and strength requirements of § 1926.1053(a)(1). A ladder designed and built in accordance with the applicable national consensus standards, as set forth below, will be considered to meet the requirements of § 1926.1053(a)(1):

- Manufactured portable wood ladders: American National Standards Institute (ANSI) A14.1-1982—American National Standard for Ladders-Portable Wood-Safety Requirements.
- Manufactured portable metal ladders: ANSI A14.2-1982—American National Standard for Ladders—Portable Metal-Safety Requirements.
- Manufactured fixed ladders: ANSI A14.3-1984—American National Standard for Ladders-Fixed-Safety Requirements.
- Job-made ladders: ANSI A14.4-1979—Safety Requirements for Job-Made Ladders.
- Plastic ladders: ANSI A14.5-1982—American National Standard for Ladders-Portable Reinforced Plastic-Safety Requirements.

[FR Doc. 90-26520 filed 11-13-90; 8:45 am]

BILLING CODE 4510-26-M