

Sunshine Act Meetings

Federal Register

Vol. 53, No. 148

Tuesday, August 2, 1988

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: 53 FR 27103, Monday, July 18, 1988.

PREVIOUSLY ANNOUNCED TIME AND DATE OF MEETING: 2:00 p.m. (eastern time) Tuesday, July 26, 1988.

CHANGE IN THE MEETING: The meeting has been cancelled.

CONTACT PERSON FOR MORE INFORMATION: Frances M. Hart, Executive Officer, Executive Secretariat, (202) 634-6748.

Date: July 25, 1988.

Frances M. Hart,

Executive Officer, Executive Secretariat.

[FR Doc. 88-17394 Filed 7-29-88; 9:40 am]

BILLING CODE 6750-06-M

FEDERAL MINE SAFETY AND HEALTH REVIEW COMMISSION

July 28, 1988.

TIME AND DATE: 10:00 a.m., Thursday, August 4, 1988.

PLACE: Room 600, 1730 K Street NW., Washington, DC.

STATUS: Open.

MATTERS TO BE CONSIDERED: The Commission will consider and act upon the following:

1. *U.S. Steel Mining Co., Inc.*, Docket Nos. PENN 87-37, etc. (Issues include whether the Administrative Law Judge erred in concluding that the operator violated 30 CFR 75.601, dealing with identification of disconnecting devices.)

Any person intending to attend this meeting who requires special accessibility features and/or auxiliary aids, such as sign language interpreters, must inform the Commission in advance of those needs. Subject to 29 CFR 2706.150(a)(3) and 2706.160(d).

CONTACT PERSON FOR MORE INFORMATION: Jean Ellen, (202) 653-5629 or (202) 566-2673 for TDD Relay.

Jean H. Ellen,
Agenda Clerk.

[FR Doc. 88-17443 Filed 7-29-88; 1:42 pm]

BILLING CODE 6735-01-M

NUCLEAR REGULATORY COMMISSION:

DATE: Weeks of August 1, 8, 15, and 22, 1988.

PLACE: Commissioners' Conference Room, 11555 Rockville Pike, Rockville, Maryland.

STATUS: Open and Closed.

MATTERS TO BE CONSIDERED:

Week of August 1

Wednesday, August 3

2:00 p.m.
Briefing by NUMARC on Plant Maintenance (Public Meeting)

Thursday, August 4

2:00 p.m.
Briefing on the Status of Sequoyah 1 (Public Meeting)

3:30 p.m.
Affirmation/Discussion and Vote (Public Meeting)
a. Revision of the ECCS Rule Contained in Appendix K and § 50.46 of 10 CFR 50 (Final Rule)
b. Allocation Between Commission and Illinois of Regulatory Authority Over West Chicago Waste Materials
c. Licensing Board Decision on Senior Reactor Operator License for David W. Held

Friday, August 5

10:00 a.m.
Briefing on Status of Efforts to Enhance Safety of Users of By-Product Materials (Public Meeting)

2:00 p.m.
Briefing on Individual Plant Examinations Generic Letter (Public Meeting)

Week of August 8—Tentative

Tuesday, August 9

10:00 a.m.
Briefing on Status of Agreements with OSHA, EPA and FEMA Concerning Jurisdiction Over Non-Radiological Hazards (Public Meeting)

2:00 p.m.
Briefing on Key Licensing Issues Associated with DOE Sponsored Advanced Reactor Designs (Public Meeting)

Wednesday, August 10

10:00 a.m.
Briefing on Current Status of Nuclear Materials Transportation (Public Meeting)

Thursday, August 11

10:00 a.m.
Briefing on Status, Results, and Implementation of B&W Reassessment (Public Meeting)

2:00 p.m.
Briefing on Standardization of Advanced Reactor Designs (Public Meeting)

3:30 p.m.

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

Week of August 15—Tentative

Monday, August 15

2:00 p.m.

Briefing on Center for Nuclear Waste Regulatory Analysis (CNWRA) (Public Meeting)

Tuesday, August 16

2:00 p.m.

Briefing on Maintenance Workshop (Public Meeting)

3:30 p.m.

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

Week of August 22—Tentative

There are no meetings scheduled for the Week of August 22.

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

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

CONTACT PERSON FOR MORE INFORMATION: William Hill (301) 492-1661.

William M. Hill, Jr.,
Office of the Secretary,
July 28, 1988.

[FR Doc. 88-17463 Filed 7-29-88; 3:13 pm]

BILLING CODE 7590-01-M

SECURITIES AND EXCHANGE COMMISSION

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: (To be published).

STATUS: Closed meeting.

PLACE: 450 5th Street, NW., Washington, DC.

DATE PREVIOUSLY ANNOUNCED: July 26, 1988.

CHANGE IN THE MEETING: Additional item.

The following additional item will be considered at a closed meeting scheduled for Tuesday, August 2, 1988, at 10:00 a.m.:

Opinion.

Commissioner Cox, as duty officer, determined that Commission business required the above changed.

At times changes in Commission priorities require alterations in the scheduling of meeting items. For further information and to ascertain what, if any, matters have been added, deleted or postponed, please contact: Patrick Daugherty at (202) 272-3077.

Jonathan G. Katz,

Secretary.

July 27, 1988.

[FR Doc. 88-17383 Filed 7-29-88; 8:47 am]

BILLING CODE 8010-01-M

Corrections

Federal Register

Vol. 53, No. 148

Tuesday, August 2, 1988

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

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 761

[OPTS-62053A; FLR 3369-2]

Polychlorinated Biphenyls; Exclusions, Exemptions and Use Authorizations

Correction

In rule document 88-14291 beginning on page 24206 in the issue of Monday,

June 27, 1988, make the following correction:

On page 24212, in the third column, in the second complete paragraph, in the 17th line, after "(A)," insert "(B)."

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[CO-0030-08-4332-09]

Proposed Change in Wilderness Suitability Recommendation; Colorado

Correction

In notice document 88-16264 appearing on page 27403 in the issue of Wednesday, July 20, 1988, make the following correction:

In the second column, under **DATE:**, in

the second line, "August 9, 1988" should read "August 19, 1988".

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[NV-930-08-4212-22]

Filing of Plats of Survey; Nevada

Correction

In notice document 88-15774 beginning on page 26680 in the issue of Thursday, July 14, 1988, make the following corrections:

On page 26681, in the third column, under T. 12 N., R. 68 E., in Sec. 15, "SE $\frac{1}{4}$ S $\frac{1}{4}$ " should read "SE $\frac{1}{4}$ SE $\frac{1}{4}$ ". Also, in Sec. 23, in the second line, "W $\frac{1}{2}$ NE $\frac{1}{4}$ " should read "W $\frac{1}{2}$ NW $\frac{1}{4}$ ".

BILLING CODE 1505-01-D

REGULATIONS

Tuesday
August 2, 1988

Part II

Department of Labor

**Occupational Safety and Health
Administration**

**29 CFR Part 1926
Crane or Derrick Suspended Personnel
Platforms; Final Rule**

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1926

[Docket No. S-409]

Crane or Derrick Suspended Personnel Platforms

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 Standards for Cranes and Derricks, 29 CFR 1926.550, by adding a new paragraph (g) to prohibit the use of cranes or derricks to hoist personnel except in the situation where no safe alternative is possible, and as long as the requirements for such hoisting set out in paragraph (g) are satisfied. OSHA initiated this rulemaking action to establish clearly the conditions under which employees on personnel platforms may be hoisted by cranes or derricks, and to insure that this information is readily available to employers. The intended effect of this regulation is to increase safety for workers.

EFFECTIVE DATE: October 3, 1988.

FOR FURTHER INFORMATION CONTACT: Mr. James Foster, Occupational Safety and Health Administration, Office of Information and Consumer Affairs, Room N-3637, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210, Telephone: (202) 523-8148.

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 providing occupational safety and health standards for employees of the building trades and construction industry in Federal and federally financed or federally assisted construction projects.

The Occupational Safety and Health Act of 1970 (29 U.S.C. 650 *et seq.*), expanded coverage to virtually all employments, 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 adopted the construction standards issued under the CSA as OSHA standards on May 29, 1971 (36 FR 10466) and redesignated these rules as 29 CFR Part 1926 on December 30, 1971 (36 FR 25232). The standard entitled "Cranes and Derricks," § 1926.550, was adopted as an OSHA standard in Subpart N of Part 1926 as part of this process.

Paragraph (b)(2) of § 1926.550 requires employers to ensure that their crawler, locomotive and truck crane operations meet the applicable requirements in the American National Standards Institute (ANSI) standard B30.5-1968, "Safety Code for Crawler, Locomotive and Truck Cranes." Section 5-3.2.3(e) of ANSI B30.5-1968 provides that "the operator shall hoist, lower, swing, or travel while anyone is on the load or hook." Section 5-3.2.1.4(r) of the most recent ANSI edition (1982) retains the ban on riding a bare hook or a load of material.

A similar requirement appears in section 6-3.3.3 of ANSI B30.6-1984, "Safety Code for Derricks," which requires that "the operator shall not hoist, lower, or swing while anyone is on the load or hook."

Ever since OSHA first adopted the CSA standards, the construction industry has expressed concern as to the application of the above-described provisions, particularly with regard to whether they should be interpreted to prohibit the hoisting of personnel platforms, sometimes also known as man baskets or man-skip boxes, by cranes and derricks. OSHA's approach to this question can best be understood by examining the chronology of this rulemaking.

In 1972, a group of Florida contractors requested that OSHA clarify the meaning of the § 1926.550(b)(2) ban on "riding the hook." OSHA responded that, where there were no other practical alternative means of transporting employees, no citations would be issued under § 1926.550(b)(2) provided that employers took specified measures to safeguard hoisted employees (Ex. 2-1).

In 1973, OSHA received an ANSI B30 Committee interpretation of ANSI B30.5, section 5-3.2.3(e). ANSI interpreted the section as referring to the hoisting of employees on the hook itself or on normal material loads, such as beams, girders or concrete buckets. The committee further stated its view that a specially designed scale box or other guarded platform for personnel that was attached to the crane hook was

permissible under controlled conditions (Ex. 2-2).

Also in 1973, the Boeing Corporation applied to OSHA for a variance from the application of § 1926.550(b)(2) to its personnel hoisting operations. OSHA determined that Boeing did not need a variance because Boeing's specially designed suspended work platform was not a "load." OSHA further stated that riding and working on these platforms while using a lifebelt-lifeline system did not constitute riding the hook (Ex. 2-3).

In December 1973, the Advisory Committee on Construction Safety and Health (ACCSH) appointed an informal subgroup to examine this issue, to evaluate the need for regulatory action, and to make recommendations to the full committee.

On July 30-31, 1974, the ACCSH subgroup held a public meeting in which interested parties were invited to participate (Ex. 2-4). The ACCSH subgroup reviewed the comments received, along with data developed by the subgroup, and prepared recommendations for consideration by the full committee. On October 30-31, 1974, the Advisory Committee voted to recommend that OSHA initiate rulemaking to regulate employee hoisting operations. (Ex. 2-5).

Since 1975, OSHA has issued four interpretations which provided guidelines for the use of crane suspended work platforms (Exs. 2-6, 2-7, 2-8 and 2-9). On October 8, 1981, the provisions of these guidelines were incorporated into OSHA Instruction STD 1-11.2A. (Ex. 2-10). That instruction, in turn, was replaced by OSHA Instruction STD 1-11.2B on August 8, 1983 (Ex. 2-11).

Despite the issuance of these guidelines, there have been persistent questions about the required equipment and procedures, and a rising toll of fatalities and injuries among hoisted employees. In particular, OSHA is concerned that those guidelines, since they are generally available only to compliance officers, are not known to employers who might be hoisting personnel. Therefore, employers might learn about the approved procedures only after an inspection or accident investigation has taken place.

OSHA determined that these administrative interpretations of § 1926.550(b) have not provided adequate guidance for employers or protection for workers. OSHA initiated this rulemaking action to establish clearly the conditions under which employees on personnel platforms may be hoisted by cranes or derricks, and to

insure that this information is readily available to employers.

Accordingly, OSHA developed a draft proposed rule, which incorporated the best available information on feasible equipment and work practices, language from an adopted but then unpublished revision of ANSI B30.5, and a draft ANSI A10.28 "Crane or Derrick Suspended Work Platforms," which had not yet been adopted by ANSI (Exs. 2-14 and 2-15). The draft OSHA proposal was discussed by ACCSH on May 23 and 24, 1983 (Ex. 2-12). The recommendations of ACCSH were substantially the same as those received by OSHA in 1974, and are discussed in the preamble in conjunction with the appropriate provisions. In addition to the ACCSH review, OSHA distributed drafts of the proposal to interested parties. The Agency received 30 comments, which diverged substantially regarding the limits to be placed on personnel hoisting. On October 31, 1983, ANSI formally issued its revised B30.5, in which section 5-3.2.2 provided guidelines for personnel hoisting.

On February 17, 1984, OSHA issued a notice of proposed rulemaking (NPR) (49 FR 6280). The Agency proposed adding a new paragraph (g), regulating the use of crane or derrick hoisted personnel platforms, to 29 CFR 1926.550, "Cranes and derricks." The NPR established a sixty day period, which ended April 17, 1984, for submission of written comments. The comments received raised a number of important issues and included a hearing request. As discussed below, commenters were particularly concerned with the proposed scope and application of the standard, equipment safety factors, anti-two-blocking precautions and testing requirements.

On June 20, 1984, OSHA announced that it would convene an informal public hearing on September 11, 1984, and extended the period for submitting testimony, documentary evidence and additional comments until August 10, 1984 (49 FR 25248). On July 26, 1984, the Agency rescheduled the hearings to begin on September 18, 1984 (49 FR 30077). The hearings were held on September 18-19, 1984, with Administrative Law Judge Leonard N. Lawrence presiding. At the close of the hearings, Judge Lawrence set a period, ending November 7, 1984, for the submission of additional comments and information. On January 25, 1985, Judge Lawrence certified the hearing transcript and related submissions, closing the record for this proceeding.

OSHA received 92 comments in response to its NPR and hearing notices. A wide range of employees, businesses, labor unions, trade associations, state

governments and other interested parties contributed to the development of this record. OSHA appreciates the efforts interested parties have made to help develop a rulemaking record which would provide a sound basis for the promulgation of a final rule.

Based on its review of the record, OSHA has determined that hoisting with crane or derrick suspended personnel platforms constitutes a significant hazard to hoisted employees, and that it will not be permitted unless conventional means of transporting employees are not feasible, or unless they present greater hazards. OSHA has determined that compliance with the provisions of this standard will provide the best available protection for hoisted personnel, in those limited situations where personnel hoisting is necessary.

Employees who are hoisted in crane or derrick suspended personnel platforms are exposed to several serious hazards, including being spilled from the platform or having the platform dropped while they are on board. These hazards, whether caused by mechanical failures or human errors, can result in fatalities and crippling injuries to the hoisted personnel. Those same hazards would simply cause inconvenience and monetary loss when construction materials are spilled or dropped.

As the accident reports presented below indicate, many things can go wrong in a personnel hoisting operation. For example, "two-blocking," one of the most serious and commonly experienced hazards, occurs when a crane operator who is adjusting the elevation of a platform or the length of the crane boom causes the load block on the load line to contact the boom tip, thereby severing the load line and dropping the platform to the ground. Employees can also be injured or killed when a crane tips due to inadequate stabilization; when they ride the hook or a material load attached to a hook; when employers improperly select, assemble and maintain their cranes, derricks and personnel platforms; when the position of the platform or its occupants shifts suddenly; and when the platform is overloaded. Overloading, in particular, results when a crane attempts to hoist a weight which exceeds either the stated capacity of the crane or the crane capacity as limited by worksite conditions.

OSHA determined, in the course of preparing the regulatory analysis for this rulemaking, that accidents resulting from the use of cranes or derricks to hoist personnel result in approximately 63 injuries annually. Of those injuries, approximately 15 are fatal, and at least seven result in total disability.

OSHA believes that the primary cause of non-compliance is the lack of clear regulatory language in Subpart N of 29 CFR Part 1926. In particular, existing § 1926.550(b)(2) provides no direct regulatory guidance. It simply incorporates ANSI B30.5-1968 by reference. Therefore, under the current regulations, employers are expected to obtain and read an ANSI document which, as stated above, has been superseded, and determine from it the procedures for personnel hoisting. In view of this situation, it is easy to see why, despite OSHA's adoption of the ANSI ban on riding the load, so many employees continue to ride the load and are killed or injured each year while doing so. Because of this problem of outdated ANSI Standards, OSHA has avoided the use of incorporation by reference whenever possible in recent years, and has attempted to include all relevant provisions within the regulatory text.

The text of the current directive, the proposed rule and the final rule are very similar. OSHA has found, however, that many employers are unaware of or simply do not follow the interpretations and guidelines in OSHA's directive on § 1926.550(b). Therefore, in order to protect employees who must be hoisted on personnel platforms, the Agency is promulgating this standard to eliminate any uncertainty about what is required. OSHA expects that employers will comply with the requirements of paragraph (g) of § 1926.550, and that compliance will prevent most of the fatalities and injuries which have been experienced under the existing standard. In addition, OSHA anticipates that compliance with this new standard will reduce the number of injuries and fatalities among employees who might otherwise be assigned to construct, use, and disassemble scaffolds, or other "conventional" means of access, in workplace situations which would expose these employees to greater hazards than would be involved with the use of crane or derrick suspended platforms.

OSHA has determined, through its regulatory impact analysis, that the number of employees exposed to the hazards of personnel hoisting is relatively small. However, the injuries which can result from accidents occurring during personnel hoisting are usually very severe. A review of some hoisting accidents illustrates the magnitude of the danger to which employees are exposed.

An accident in Cheyenne, Wyoming (1973) resulted in two deaths when a telescoping boom severed the load line.

Those deaths would have been averted if the employees in the platform had been wearing safety belts and lanyards attached to a lifeline secured to the boom tip, or if the crane had been equipped with a positive acting anti-two-blocking device. The operator, while experienced in operating cranes, was not familiar with the specific machine being used, nor with the hoisting operation during which the accident occurred. OSHA has found that even crane operators who are well acquainted with telescoping boom cranes have had problems when working with this equipment in new locations and in unfamiliar surroundings.

In Kansas City (1972), a structural framework carrying five men and a significant amount of material and equipment fell to the ground when an outrigger of the crane failed. The total weight was reported to be only half the rated capacity of the crane when boomed out to the work location, but the outrigger broke loose from its mounting and the boom collapsed before it reached the intended radius. Failures of this nature point out the need for exact knowledge of crane or derrick stability, and the need for careful inspection and testing of such machinery prior to its use for hoisting employees.

In Chicago (1981), five employees were killed and a sixth employee was seriously injured when a job-built personnel basket fell 100 feet. The employees were being hoisted by a mobile crane to a work station atop a tower crane being assembled on the site. The metal framework at the top of the cage, to which the hoisting rope was attached, separated, causing the platform and its occupants to fall. The implementation of the specific design criteria and inspection and testing requirements in the final rule should prevent such accidents caused by structural failure.

In Tampa, Florida (1983), four men on a personnel platform were killed in an accident at Tampa Stadium when they were being raised by a crane to a work station 135 feet above the ground at the top of the stadium. When the platform reached 130 feet, the boom of the crane fell and the men in the platform fell with it. The Agency believes the implementation of inspection and testing requirements should prevent these types of accidents.

OSHA has carefully developed and reviewed the record for this rulemaking to ensure that the standard, as promulgated, is based on substantial evidence. OSHA has determined, based on the record, that crane and derrick personnel hoisting poses significant

risks for affected employees, even when employers comply with the final rule, and, therefore, prohibits personnel hoisting except where there is no feasible safe alternative. The new provisions in paragraph (g) of § 1926.550 provide criteria for equipment and work practices that will enable those employers who have no safe alternative means of transporting employees to or supporting them at their workplace, to hoist personnel as safely as possible.

OSHA has determined that personnel hoisting operations for which there is no safe alternative and which comply with paragraph (g) will protect workers from the kind of accidents that resulted in most of the fatalities and crippling injuries which occurred under the existing crane and derrick regulations; from most of the fatalities and injuries which occurred when employees inappropriately used scaffolds or other "conventional" means of access; and from virtually all of the fatalities and injuries which have occurred when employees rode the hook or load. The Agency believes that although compliance with these regulations will lessen the potential for fatalities and serious injuries, it will not totally eliminate accidents related to the use of crane or derrick suspended personnel platforms. The Agency concludes that this type of operation is inherently dangerous and must only be used as a last resort. OSHA notes that three states (Maryland, Washington and California) with stringent personnel platform regulations were reported by JACA (Ex. 5-2, p. 4-13) as having had no personnel platform accidents for at least five years. While the Agency believes this sample is too small to represent or predict national experience, OSHA observes that the three state standards in question would tend to minimize accidents because of the tight limits on the circumstances where personnel platforms may be used.

II. Summary and Explanation of the Final Rule

OSHA requested comments on ten specific issues in the preamble of the proposed standard (49 FR 6282-6284). All these issues are addressed in conjunction with the appropriate provisions of this final rule.

Paragraph (g)(1) presents the scope and application of the final rule. OSHA identified this subject as a matter of special concern in Issue 1 in the preamble of the proposal. This paragraph has been revised extensively in order to simplify the language and clarify OSHA's regulatory intent. Several changes were made in response

to public comment or as clarifications, as discussed below.

As a matter of clarification, the Agency has revised this provision to indicate that paragraph (g) covers not only the hoisting of the personnel platform, but the design, construction, testing, use and maintenance of the personnel platform as well. OSHA recognizes that several paragraphs of this final rule do, indeed, regulate other matters related to personnel platforms and that this was not explicitly stated in the proposed rule. Additionally, OSHA has added a definitions section to paragraph (g)(1) which incorporates some of the definitions which were provided as "Notes" in the proposal. Other definitions in this paragraph are new and reflect changes in terminology which OSHA feels will most clearly express its regulatory intent. Finally, some notes which functioned as definitions in the proposed rule have been incorporated directly into the affected provisions. This reformatting reflects OSHA's recognition that the definition of terms used in the standard is more appropriately placed within the text of the regulation instead of in explanatory notes, and will provide clearer guidance to employers.

In its proposal, OSHA presented a list of cranes which it believed might be used for personnel hoisting. OSHA received many comments, like that of the Granite Construction Company (Ex. 3-50), which stated that the listing of particular machines in proposed paragraph (g)(1) was unnecessarily lengthy and machine-specific. Indeed, several commenters pointed out that, by being so specific, OSHA could create loopholes for specific cranes not listed. For example, the State of California (Ex. 3-33) asserted that OSHA's proposed language did not cover electric cranes, such as hammerhead-type tower cranes. In addition, Unit Crane & Shovel Corporation (Unit Crane) (Ex. 3-47) listed five cranes not mentioned in the proposed rule and recommended that the rule cover all cranes which could be used for personnel hoisting. Unit Crane also recommended that the proposed specification of "friction or hydraulic" be replaced by the word "all." The Associated General Contractors of America (AGC), in turn, testified (Tr. 164) that "Reference to specific types of equipment will result in overly broad coverage which * * * will regulate operations outside of those areas of concern. The AGC, therefore, recommends that the standard apply only to the hoisting of personnel platforms on the load line of cranes and derricks."

The list of cranes and derricks was intended to illustrate what types of equipment are covered, rather than to limit the scope of the standard. OSHA recognizes that the list gave a misleading impression of the intended scope and that the scope can be set forth without using a list. Therefore, based on the comments received, OSHA has revised paragraph (g)(1) to cover all cranes and derricks used to hoist personnel platforms.

OSHA received comments from Ingersoll-Rand Company (Ex. 3-18) which suggested that the use of derricks for hoisting personnel be prohibited. Ingersoll-Rand asserted that derrick hoisting was more likely than crane hoisting to result in accidents, even if derrick operators complied with the draft revision of ANSI B30.6-1982, because derricks are material handling devices which do not incorporate the safety devices needed for personnel hoisting. Furthermore, the commenter noted that derricks are usually designed and assembled at the jobsite, and that safe alternatives are available. On the other hand, the National Constructors Association and DuPont (Exs. 3-74 and 3-75) stated that derrick hoisting which complies with the existing derrick standards and with the requirements of this standard will not expose hoisted employees to an unreasonable risk, because derricks, though temporary structures, are more stable than mobile cranes and because derricks are available with the same safety devices which would be required for cranes.

OSHA has determined, upon review of the record, that derricks can comply with the provisions of this standard; that there are circumstances, such as during the painting of a water tower (Tr. 554), where there is no safe alternative to the use of a derrick to hoist personnel; and that derrick hoisting in compliance with this standard does not pose a greater danger than crane hoisting. Therefore, OSHA has retained derricks within the scope of paragraph (g), as proposed.

OSHA has deleted the second and third sentences of proposed paragraph (g)(1) because the Agency has determined that they do not deal with the scope and application, and because they add nothing to the requirements of the standard. These sentences merely pointed out that the requirements of this paragraph must be met before hoisting personnel, and that paragraph (g)(2) specifies when this practice is permitted.

The Magma Copper Company and National Constructors Association (Exs. 3-27 and 3-30) suggested that the definition of "hoisting," which appeared as a note to proposed paragraph (g)(1), be revised to cover explicitly booming

up or down; extending the boom; swinging; and positioning, so that the term would more fully cover the circumstances encountered during personnel hoisting.

OSHA's intent has been to establish a single term, "hoisting," which could be applied to all operations covered by paragraph (g). Therefore, OSHA has made the suggested change in order to state clearly the meaning of the term "hoisting."

Paragraph (g)(2) of this final rule sets forth OSHA's general policy regarding the use of cranes or derricks to hoist personnel platforms. In proposed paragraph (g)(2), OSHA "permitted" the use of cranes or derrick to hoist personnel when that use was "as safe as the erection, use or dismantling of conventional means of reaching the worksite * * *". OSHA has modified proposed paragraph (g)(2) so it clearly states OSHA's recognition that cranes and derricks are not manufactured for use as personnel hoists. In particular, paragraph (g)(2) of the final rule states that personnel hoisting is "prohibited," subject to exceptions based on necessity. The AGC (Ex. 3-28 and Tr. 164) and Granite Construction (Ex. 3-50), suggested that OSHA permit crane or derrick hoisting "where the use of other conventional means of reaching the worksite is more hazardous or is not practical because of structural design and worksite conditions." In addition, Johnson Brothers Corporation and Gulf Oil Corporation (Exs. 3-43 and 3-68) stated that OSHA should concern itself with ensuring that the appropriate equipment and procedures are used, rather than with limiting circumstances where cranes or derricks may be used for personnel hoisting. Furthermore, Organization Resource Counselors, Inc. (Ex. 3-89) commented that, given the "difficult, if not impossible, task of determining the safest way to perform work, employers will continue to base their decision to use personnel platforms on many considerations, not just safety." As stated above, OSHA has determined that, given the significant risk posed by personnel hoisting, concern for employee safety is the only justification for the practice. Therefore, the Agency will consider personnel hoisting conducted for reasons of practicality or convenience alone, to violate this standard. As discussed above, the experience of three states with stringent personnel platform standards indicates that setting such narrow limits on the circumstances under which personnel platforms may be used will minimize personnel platform accidents.

Several commenters, including the Frey & Egle Company and the United Steelworkers of America (Exs. 3-7 and 3-10) objected to the use of cranes or derricks for personnel hoisting under any circumstances. They stated that personnel hoisting is inherently dangerous and noted that cranes and derricks are not designed or manufactured for personnel hoisting. In addition, the Farm and Industrial Equipment Institute [FIEI] (Ex. 3-37) commented that using a boom-mounted bucket is always safer than using a suspended personnel platform. National Crane Services (Ex. 3-71), while disagreeing with the FIEI contention that boom-mounted baskets are always safer than crane-hoisted platforms, supported narrowly limiting personnel hoisting because cranes are not designed to hoist personnel and because crane hoisting requires more skill and process control than material hoisting.

OSHA recognizes the seriousness of these concerns. In addition, the Agency has received written comments (Ex. 3-7) and public hearing testimony (Tr. 58-163) from Frey & Egle which states that its product, the Crane Air Bridge (CAB), hoists personnel for all the purposes where employers might use cranes or derricks without exposing employees to the hazards associated with crane or derrick hoisting.

OSHA, however, is concerned that the CAB has not been extensively marketed or operated in the United States. OSHA also notes that there is inadequate information in the record to determine if the CAB could satisfactorily replace crane and derrick personnel hoisting equipment totally, now or in the future. Additionally, due to the lack of information, the Agency is unable to determine whether the CAB can be considered a conventional means of access under § 1926.556, Aerial Lifts, or under § 1926.451(f) Elevating and Rotating Work Platforms. That determination will depend upon compliance with ANSI A92.2-1969, Vehicle Mounted Elevating and Rotating Workplatforms, required by both §§ 1926.556 and 1926.451(f). Therefore, while the use of the CAB is arguably as safe as or safer than crane or derrick personnel hoisting, OSHA is going forward with the promulgation of this standard, pending a future determination as to whether or not the CAB can indeed provide safe and reliably available personnel positioning.

The final rule requires that employers take a hard look at their workplace situations before deciding how employees will be transported to or maintained at different elevations.

Where conventional means of access, such as scaffolds, ladders and, perhaps ultimately, CAB's are less hazardous, personnel hoisting by crane or derrick will be prohibited. Where conventional means of access would not be considered safer, personnel hoisting operations which comply with the terms of this standard would be authorized, only to the limited extent that the dangers of using conventional means would justify them or to the extent that it is not possible to transport or position employees using conventional means. OSHA stresses that employee safety, and not practicality or convenience, must be the basis for the employer's choice of method.

The Construction Industry Manufacturers Association (Ex. 3-31) stated that OSHA's use of the word "permitted" in proposed paragraph (g)(2) seemed to promote rather than limit the use of cranes or derricks to hoist personnel. As has already been discussed, OSHA is limiting, not promoting, crane or derrick personnel hoisting. Therefore, OSHA has revised the language of paragraph (g)(2) to reflect the Agency's policy more clearly.

Also, in paragraph (g)(2), OSHA has added "personnel hoist" to the list of conventional means used to reach a worksite. OSHA had intended only to provide examples of such means, not an exhaustive list. However, since a personnel hoist is a commonly used piece of conventional access equipment, OSHA decided that the addition was appropriate.

Paragraph (g)(3) presents the requirements for operating and equipping cranes or derricks used to hoist employees.

Paragraph (g)(3)(i) presents general operational criteria. OSHA received a number of comments regarding the provisions of this paragraph, and has revised it to reflect commenter input as discussed below.

In proposed paragraph (g)(3)(i)(A), OSHA required that hoisting speed not exceed 100 feet per minute. This proposed requirement was based on ANSI B30.5-1982 and recommendations from ACCSH in 1974 and 1983, and reflected the recognition that employee hoisting requires even greater caution and margin of safety than material hoisting. In particular, OSHA was concerned that hoisted personnel or their platforms could be tipped or dropped if hoist speed outstripped the operator's ability to maneuver safely. The Agency believes that those dangers would be especially great when a hoist operation is beginning or ending.

OSHA observed, in its discussion of the proposed provision and in Issue 5,

that there were questions regarding the feasibility of and need for a specific speed limit, and for a device to indicate the line speed to the operator. In light of these questions, OSHA did not propose to require that cranes used to hoist personnel be equipped with line speed indicators. The Agency noted that ACCSH in 1974 viewed line speed indicators as either infeasible or unnecessary. In addition, OSHA cited a draft revision of ANSI B30.5-1982, section 5-3.2.2(a)(13), (Ex. 2-14) under which the 100 foot per minute limit would have been changed to a requirement "that movement of the work platform with personnel shall be done in a slow, controlled, cautious manner with no sudden movements of the crane or work platform." (49 FR 6285). OSHA also noted that Grove Crane (Ex. 2-17) included a 100 foot per minute limit in the specifications for the use of its cranes to hoist personnel. As with ANSI and ACCSH, Grove did not suggest specific means by which operators could determine if they were operating within the 100 feet per minute limit.

OSHA received a number of comments on this proposed paragraph. The Tennessee Road Builders Association and the Commonwealth of Puerto Rico (Exs. 3-41 and 3-55) expressed support for the provision as proposed, with Puerto Rico suggesting that employers following the draft revision of ANSI B30.5 use 100 feet per minute as the upper limit of "slow," even if ANSI revised its standard to require "caution" instead of a set limit. On the other hand, Bechtel Corporation (Ex. 3-45) commented that the proposed limit was overly conservative because crane manufacturers' technical specifications for personnel hoisting showed speeds between 150 and 300 feet per minute, and because a requirement that the hoist speed be "reasonable for the conditions" would provide adequate protection. In addition, the Standard Oil Company (Indiana) (Ex. 3-46) emphasized that it is the rate of acceleration or deceleration, not the speed, itself, that was the primary safety concern. Also, the T.A. Loving Company (Ex. 3-82) and the AGC of America (Tr. 191-192) suggested that OSHA not require a line speed indicator because watching it would distract the operator from watching the platform and thus increase the risk of two-blocking.

Most of the comments received on this proposed provision, such as those from the State of California, the Boeing Company and the Panama Canal Commission (Exs. 3-33, 3-38 and 3-51) supported wording similar to that in the

draft revision of ANSI B30.5, section 5-3.2.2(a)(13).

ANSI retained the 100 foot per minute speed limit when it revised B30.5. OSHA has determined, however, based on its review of the record, that requiring "slow, cautious and controlled" hoisting will provide hoisted personnel with better protection than would a 100 foot per minute limit.

In the course of this rulemaking, OSHA has determined that line speed indicators capable of measuring a speed as slow as 100 feet per minute are not readily available for many cranes. Additionally, OSHA agrees with comments that the operator's attention should be directed to the platform during a lift, and not to a line speed indicator. Also, OSHA agrees with Standard Oil that line speed indicators are not needed on cranes or derrick hoisting personnel because the rate of acceleration or deceleration is more important than the line speed itself in determining the safety of hoisting operations. OSHA notes that the size of the crane or derrick hoist drum and the height of the lift are important considerations in determining what is "slow." For example, when using a crane with a large hoist drum for personnel lifts of several hundred feet, OSHA believes that hoisting at 100 feet per minute is unnecessarily slow. On the other hand, when using cranes with small hoist drums, a rate of 100 feet per minute or less may be necessary for proper control of the platform. As a point of reference, OSHA notes that 100 feet per minute is equivalent to a very slow walk. Site conditions also are important in deciding what rate is safe for a particular lift. Furthermore, a limit on the number of feet a platform can travel in a minute will not protect employees unless the crane or derrick operator otherwise exercises caution while hoisting. Finally, OSHA believes that requiring "slow, cautious and controlled" hoisting will ensure that the operator pays attention to the location of the platform during the lift, the rate of acceleration and deceleration, and the rate of ascent or descent. OSHA, therefore, agrees with the commenters who suggest that the Agency require "slow, cautious and controlled" hoisting as the appropriate means of protecting hoisted employees from sudden pitching of the crane or platform. Accordingly, OSHA is issuing paragraph (g)(3)(i)(A) as revised.

In Issue 5 of the proposed rule, OSHA also asked for comments and information on the need for load line position indicators. The commenters who responded to this Issue (Exs. 3-9, 3-

14, 3-22, 3-30, 3-33 and 3-47) generally stated that the position indicator would be an unnecessary burden because the requirement in proposed paragraph (g)(6)(viii) for continuous sight and communication would protect hoisted employees. The State of California (Ex. 3-33) also stated that specifications for use and maintenance raised concerns. OSHA has determined, based on the record, that the requirements for continuous sight and communication in paragraph (g)(6)(vi) of the final rule make a requirement for a loadline position indicator unnecessary.

Paragraph (g)(3)(i)(B) sets forth the safety factors for load hoist wire ropes on cranes or derricks used to hoist personnel. The proposed paragraph simply stated that the minimum hoist load safety factor would be seven. It became clear to OSHA from commenter responses that the proposal did not indicate clearly how the safety factor for hoisting personnel compared to the safety factor already required for materials hoisting in § 1926.550. The Agency also determined employers need additional information in the standard to determine if their operations comply with the standard. Therefore, the Agency has revised this paragraph to state clearly the required strength of wire rope used to hoist personnel.

OSHA has also added definitions for "failure," "load refusal," and "maximum intended load" in paragraph (g)(1)(ii) in order to state clearly the usage of those terms in the final rule. Additionally, OSHA has added an explanation of how employers are to comply with this requirement.

Section 1926.32(m) defines "safety factor" as "the ratio of the ultimate breaking strength of a member or piece of material or equipment to the actual work stress or safe load when in use."

Under existing OSHA regulations, § 1926.550 (b) and (e), which incorporate ANSI B30.5-1968 (cranes) and B30.6-1969 (derricks) by reference, wire ropes used to hoist material must have a minimum safety factor of 3.5. OSHA has determined, based in part on information from the ACCSH, and ANSI B30.5 Committee and the "Rigging Manual" published by the Construction Safety Association of Ontario, Canada, that a wire rope safety factor of 3.5, alone, is inadequate to protect hoisted personnel from hoisting risks such as the severing of the load line. The ACCSH recommended that the safety factor be eight, while a draft revision of ANSI B30.5, section 5-3.2.2.3(a)(5) recommended a safety factor of eight for rotation resistant rope, and five for other wire rope. The draft revision was not adopted by ANSI as a national

consensus standard. The Canadian "Rigging Manual" specifies 10 as the minimum wire rope safety factor for personnel hoisting.

OSHA did not propose any of the suggested safety factors in paragraph (g)(3)(i)(B). Instead, OSHA determined that the necessary employee protection could be achieved by keeping the existing 3.5 safety factor requirement and derating the capacity of a crane or derrick by 50 percent, which would effectively double the safety factor to seven. The proposed safety factor, seven, was intended as an adequate and easy to calculate upgrade in the protection provided by wire ropes used for personnel hoisting.

In Issue 4 of the proposal, OSHA discussed the above-mentioned safety factors and explained how the requirements of proposed paragraph (g)(3)(i)(B) and the 50 percent derating required in paragraph (g)(3)(i)(F) are intended to provide the safety factor of seven. OSHA also requested input regarding the adequacy of the proposed regulatory approach and regarding the need for a different safety factor for rotation resistant wire rope. The latter topic reflected OSHA's concern that while rotation resistant rope reduces platform swaying and spinning, it is also subject to internal, often undetectable, damage.

Ebasco Constructors, Inc. (Ex. 3-6), the National Constructors Association (Ex. 3-30) and Organization Resource Counselors (Exs. 3-89) suggested that OSHA simply refer employers to the manufacturers' specifications for their cranes or derricks and apply the derating provisions of proposed paragraph (g)(3)(i)(B) without setting a separate safety factor provision. Ebasco, in particular, stated that OSHA would confuse compliance efforts if it promulgated both as 50 percent derating and a safety factor, because employers might conclude that they were required both to use wire ropes with a safety factor of seven and to derate capacity by 50 percent. Indeed, the Commonwealth of Puerto Rico (Ex. 3-55) apparently drew that conclusion, as reflected by its comments which favored the proposed safety factor of seven because the 50 percent derating would raise the safety factor to 14.

On the other hand, some commenters, such as Unit Crane, Dupont, and Union Wire Rope (Exs. 3-47, 3-75 and 3-22), stated that the proposed deratings alone would not raise the wire rope safety factors to the extent predicted by OSHA. Those commenters noted that variations in a crane or derrick boom angle, boom weight, or rigging configuration would determine the

extent to which derating increased the safety factor. Indeed, Unit Crane observed that, if the boom weighed 20,000 pounds and the rated load was 5,000 pounds, derating by 50 percent would reduce the suspension system load by only 10 percent. Dupont, however, noted that derating capacity by 50 percent would provide a "generous" addition margin of safety for personnel hoisting operations, as long as the minimum boom angle was at least 40 degrees. Another commenter, the United Steelworkers of America (Ex. 3-10), suggested that OSHA require employers to make charts available to crane operators so that they can quickly and accurately calculate a crane's capacity when the crane boom is at a particular angle.

Several commenters, such as Magma Copper, Bechtel Corporation and the Granite Construction Corp. (Exs. 3-27, 3-45 and 3-50), stated that a safety factor lower than seven would protect workers adequately. Bechtel suggested that OSHA retain 3.5 as the safety factor, without derating, while Magma Copper and Granite Construction suggested that the safety factor be set at five, as recommended by a draft revision of ANSI B30.5 which was then in circulation. The Salt River Project (Ex. 3-61) specifically opposed raising the wire rope safety factor either to seven or 10. Other commenters, including the Wire Rope Safety Board, Kerr-McGee Corporation and Spartan Equipment Company (Exs. 3-15, 3-23 and 3-82), stated that setting the wire rope safety factor at seven would provide adequate protection. In particular, Spartan expressed its understanding that the safety factor of seven would be achieved through derating.

Several commenters, including the Boeing Company, Unit Crane & Shovel and Boeing Aerospace Company (Exs. 3-38, 3-47 and 3-57) suggested that OSHA set the minimum wire rope safety factor for personnel hoisting at 10. In particular, those commenters cited the Canadian "Rigging Manual" published by the Construction Safety Association to support their position. The Boeing commenters also referenced regulations for powered platforms (29 CFR 1910.66) and consensus standards for personnel hoists (ANSI A10.4). In addition, Unit Crane & Shovel based its recommendation on the Power Crane and Shovel Association Standard No. 4-1983, the American Petroleum Institute's API Spec. 2C, Third Edition, March 1983, and the retirement criteria for wire rope presented in ANSI B30.5-1982. The Boeing Company (Ex. 3-78) later reversed its position regarding wire rope

safety factors, suggesting that OSHA raise the safety factors above the levels mandated for material hoisting only if OSHA determined, through a review of accident data, that hoisting personnel with ropes satisfying the existing safety factors poses a significant risk to employees.

The commenters differed in their suggestions for the standard wire rope safety factor but were uniform in their recommendation that OSHA ban or limit the use of rotation resistant wire rope for personnel hoisting. Many commenters suggested that OSHA set a higher safety factor for rotation resistant wire rope. Granite Construction specifically invoked ANSI and, in addition, suggested that OSHA prohibit the use of rotation resistant rope for personnel hoisting. Kerr-McGee suggested that employers avoid the use of rotation resistant rope for personnel hoisting because of problems with the rate and detection of rope deterioration. The Wire Rope Safety Board noted that static tests on rotation resistant rope indicated reduction in breaking strength of up to 50 percent when compared to the same tests on non-rotation resistant rope. The Wire Rope Safety Board also observed that, while the safety factor of seven would provide a reassuring level of protection, the tendency for rotation resistant rope to break down could be important if the rope was burdened at its full breaking strength. That situation could occur in an emergency, such as the snagging of a platform on a projection.

Both the Boeing Company and Boeing Aerospace (Exs. 3-38 and 3-57) expressed special concern about the use of rotation resistant wire rope for personnel hoisting, because that rope is "susceptible to internal damage (from overload) that cannot be detected by inspection." They noted that wire rope manufacturers recommended that employers effectively double the safety factors when using rotation resistant rope. Therefore, they suggested that OSHA set the safety factor for rotation resistant wire rope at double that for other hoisting rope.

The United Steelworkers of America (USWA) and the Construction Industry Manufacturers Association (CIMA) (Exs. 3-10 and 3-31), suggested that, because of the potential hazards to hoisted personnel, OSHA set the safety factor for rotation resistant wire rope at 10, rather than at seven. The USWA cited MSHA's proposed regulation for personnel lifts which requires a 10:1 safety factor for rotation resistant ropes. Also, the CIMA pointed out that, since section 5-1.7.1(c) of ANSI B30.5-1982

requires rotation resistant wire rope to have a minimum design factor of five, setting the minimum safety factor at 10 for personnel hoisting would be consistent with OSHA's position that halving the rated capacity doubles the safety factor.

OSHA has determined, based on its review of the record, that requiring a safety factor of seven for running ropes, other than rotation resistant ropes, provides adequate protection for hoisted personnel. In particular, the Agency believes that setting the safety factor below seven would not satisfy OSHA's intention that hoisted personnel receive more protection than hoisted material. On the other hand, OSHA has decided that setting the safety factor at 10 for standard design running rope is not necessary to protect employees, and would be unnecessarily burdensome, without providing a significant increase in employee safety. In addition, OSHA notes that compliance would be more complicated if the Agency set the safety factor at 10 because the simple 50 percent derating approach could not be applied. OSHA believes that using the 50 percent derating is a convenient and easy to use method of providing the required employee protection. OSHA's deliberations regarding derating are discussed below in more detail under paragraph (g)(3)(i)(F).

OSHA has determined, through its review of the numerous comments received and other information in the record, that although the minimum safety factor of seven is adequate for standard wire rope, it would not adequately protect employees being hoisted with rotation resistant wire rope. In particular, OSHA has concluded that rotation resistant rope is more easily damaged and is more difficult to inspect than other wire rope. Section 5-1.7.1 of ANSI B30.5-1982, for example, takes those differences into account in the context of material hoisting, by setting the minimum design factor at 3.5 for live or running ropes and at five for rotation resistant ropes. Therefore, consistent with its calculations for other wire rope, OSHA believes that derating cranes using rotation resistant wire rope by 50 percent will raise the effective safety factor to 10. The Agency has determined that this increase in the safety factor is necessary to protect employees from the combined hazards of personnel hoisting and rotation resistant rope. OSHA has chosen to set a separate, higher, safety factor for rotation resistant rope rather than limit or prohibit its use because, when used in compliance with the provisions of this standard, rotation resistant rope

increases the crane or derrick operator's control over the movement and position of a personnel platform during hoisting, and precludes having to change ropes on a crane already using rotation resistant rope that is used to hoist personnel. OSHA has determined that rotation resistant rope which satisfies the safety factor of 10 is already used by or readily available to employers, so this requirement imposes a minimal additional burden.

Paragraph (g)(3)(i)(C) requires that all brakes and other locking devices be engaged when a personnel platform is in a stationary working position, so that hoisted employees are not exposed to the hazards of cable to slip. The Boeing Company, Boeing Aerospace and Unit Crane & Shovel (Exs. 3-38, 3-57 and 3-47), were the only commenters on this provision. The Boeing commenters supported regulatory language which would protect hoisted employees against sudden platform movement during periods when the platform was suspended at a work position. Unit Crane commented that "this provision in this position is a good one and should be retained." United Crane also noted that this provision, while not part of section 5-3.2.2, Personnel lifting, of ANSI B30.5, was implied by section 5-3.2.1.3(c), "Holding the load." In addition, the commenters suggested that OSHA require automatic brakes in order to prevent inadvertent platform movement. This issue is discussed in detail below. Based on the record, OSHA has determined that paragraph (g)(3)(i)(C) is necessary to protect hoisted employees from the hazards of being spilled from the platform.

Paragraph (g)(3)(i)(D) of the final rule requires that cranes and derricks used to hoist personnel be equipped for and operated with controlled load lowering. This provision also prohibits free fall. The paragraph is based on ANSI B30.5-1982, section 5-3.2.2(a)(9). Issue 2 specifically requested additional comments on this subject. This paragraph is intended to ensure that employers operate their personnel hoisting equipment so that hoisted personnel are not exposed to the hazards of sudden, fast descents.

The Agency received many comments on this provision. The Milwaukee Construction Industry Safety Council (MCISC), (Exs. 3-26 and 3-70), for example, asserted that engineering and economic constraints would prevent all but the largest contractors from retrofitting their cranes, so the small contractors would be unable to hoist employees. In addition, the Associated General Contractors of America (AGC)

(Ex. 3-28) suggested that such a requirement should be phased in as new equipment is marketed. The AGC joined with the MCISC in recommending that cranes used for pile driving be exempted from this paragraph because "companies engaged in pile driving cannot operate with power load lowering" and those companies "have to hoist personnel aloft to perform pile driving work." Therefore, according to the AGC, the proposed requirement was impracticable for pile driving cranes. Also, the National Association of Demolition Contractors (NADC) (Ex. 3-8) commented that controlled load lowering would impede demolition operations which require free fall. The NADC suggested that the use of oversized brakes and clutches would ensure the safety of hoisted personnel, because the oversized brakes and clutches could be engaged to slow descent safely. Unit Crane & Shovel (Exs. 3-47 and 3-81), on the other hand, asserted that effective field-installed retrofit kits are available at reasonable cost. Unit Crane also observed that the restrictions on personnel hoisting would mean that relatively few cranes with the required equipment would be needed and that contractors could plan ahead to have a properly equipped crane on hand when needed. Indeed, the vast majority of commenters who addressed this issue agreed that OSHA should require controlled load lowering features on all cranes which hoist personnel. These commenters included Northwest Engineering Company, the State of Alaska, the U.S. Air Force, Johnson Brothers Corporation, the Farm and Industrial Equipment Institute, the National Construction Association and the Spartan Equipment Company. (Exs. 3-3, 3-4, 3-24, 3-43, 3-47, 3-73, 3-74 and 3-82). The Parsons Corporation (Ex. 3-22) stated that "We agree with OSHA's proposal to require controlled load lowering; in fact, we consider such a function as essential. DuPont (Ex. 3-75) took issue with those commenters who suggested that OSHA exempt cranes used for pile driving and demolition from the controlled load lowering requirements, stating that most cranes are available with drum drives that allow operation in free fall or controlled lowering mode and that the cost of retrofitting is reasonable. In addition, Northwest Engineering Company (Ex. 3-3) noted that, while it may be impractical to retrofit old cranes, there are enough properly equipped cranes which could be borrowed or rented to hoist employees safely.

OSHA has determined that a controlled load lowering requirement

will effectively protect hoisted employees from sudden stops, starts and free fall, without unduly burdening employers. Although they can help stop a fall once it has begun, oversized brakes or clutches will not themselves prevent precipitous free fall. OSHA is also concerned that without controlled load lowering, the use of oversized brakes to stop free fall would jolt the platform, possibly throwing employees off. As documented by JACA, OSHA's contractor for this rulemaking (Ex. 5-2, Appendix C) many employees have been killed or injured in accidents which would have been prevented by the use of controlled load lowering. Therefore, OSHA has decided, based on the evidence in the record, to promulgate paragraph (g)(3)(i)(D) as proposed, except that the explanatory note in the proposed provision has been incorporated into the standard itself.

In addition, Issue 7 requested information on the need for an automatic brake which stops the load when the operator releases the controls. The comments received indicated that opinions on automatic brakes (also referred to as "deadman brakes") intertwined with views on the proposed controlled load lowering requirement. Thus, commenters, such as the AGC of America (Exs. 3-28 and 3-67), and the National Constructors Association mixed their statements of opposition to automatic brakes with assertions that free fall was necessary. Commenters such as Dupont, Spartan Equipment, and Organization Resource Counselors (Exs. 3-75, 3-82 and 3-89) stated that an automatic brake requirement would pose great expense and difficulty for users of mechanical clutch-drive cranes (i.e., cranes which do not have controlled load lowering). On the other hand, Puerto Rico and Boeing Aerospace (Exs. 3-55 and 3-57) stated that automatic brakes were needed to prevent free-fall, and the Construction Safety Association of Ontario (Ex. 3-81) stated that inexpensive automatic brake retrofit kits were readily available.

OSHA has determined, based on its review of the record on Issue 7, that the benefits of an automatic brake requirement will be gained through the promulgation of the proposed controlled load lowering and, in part, anti-two blocking requirements, because the equipment and procedures necessary to prevent free fall or two-blocking will approximate those envisioned for an automatic brake. Therefore, OSHA has decided not to promulgate a separate requirement for an automatic brake.

Paragraph (g)(3)(i)(E) requires that cranes used to hoist personnel be

uniformly level within one percent of level grade and located on firm footing. In addition, cranes equipped with outriggers shall have all of them deployed, according to manufacturer's specifications, when personnel are to be hoisted. This language is essentially identical to that in the proposed requirement.

This requirement, based on ANSI B30.5-1968, section 5-1.2, B30.5-1982, sections 5-1.2.2(e) and 5-3.2.1.4(a)(1), and the specifications provided by manufacturers such as Grove (Ex. 2-17), requires that the crane be "level." The Agency notes that B30.5-1968 as referenced in § 1926.550(b)(2), sets the requirements for compliance with the existing standard. OSHA is aware that a crane loses between five and 30 percent of its capacity when it deviates from level by as little as one degree. Indeed, capacity charts generally are based on the assumption that hoisting cranes are within one percent of level. Also, OSHA is aware that most cranes used to hoist personnel are "free-swinging," so that the boom of a crane which is not level will swing around to the "low spot." Based on those considerations and the Agency's concern about the tipping hazards to which hoisted employees are exposed, OSHA has determined that limiting deviation to within one percent of level will provide operators with reliable capacity information and overall stability.

Some of the commenters, such as the Carolinas Branch of the AGC and the T.A. Loving Company (Exs. 3-39 and 3-82), stated that it was impossible to operate a crane uniformly level within one percent of level grade because movement of certain crane components causes one percent deviation, even when no load is hoisted. OSHA observes that the proposed provision covers the placement of the crane, not the operation. Even so, the Agency has determined that the operation of a crane on a surface which has been properly leveled will not result in deviation beyond one percent of level grade. Therefore, OSHA notes the importance of choosing the appropriate set up location and leveling materials and procedures to ensure that deviation does not exceed one percent. Also, the Equitable Gas Company (Ex. 3-25) stated that requiring mobile cranes to be leveled within one percent of level grade would defeat the design of the rear tires, which are designed to be load bearing under certain conditions. OSHA notes that mobile cranes equipped with outriggers are often required to deploy all outriggers, and that the leveling of the crane is accomplished by use of the

outriggers, so that the tires are not load bearing during hoisting operations.

The AGC of America (Ex. 3-28 and Tr. 165, 197), suggested that a crane operating within three percent of level grade would be safe. Another commenter, Granite Construction (Ex. 3-50), suggested that mobile cranes equipped with outriggers can readily satisfy the proposed one percent limit, while crawler cranes, which are not so equipped, should only have to operate within three percent of level grade because it would be too difficult for the crawler cranes to achieve one percent.

The Agency agrees that providing a level grade for a crane without outriggers may be more difficult. OSHA has determined, however, based on the record, that all cranes can be leveled within one percent of grade and that the additional effort required to do so is not an unreasonable burden. The Agency reiterates that employee safety, not the employer's convenience, controls the setting of requirements for personnel hoisting.

Several commenters, such as the State of Maryland, the Construction Industry Manufacturer's Association (CIMA), the Boeing Company and Boeing Aerospace (Exs. 3-19, 3-31, 3-38 and 3-57), expressed support for the one percent limit.

In particular, the CIMA stated that "the correct level is critical to the safe operation of the crane," especially because, as stated above, the load charts only apply when the crane is level. CIMA suggested that the one percent limit be measured as one foot of rise for one hundred feet of run.

The State of Maryland (Ex. 3-19) suggested that OSHA revise this paragraph to specify that *all* outriggers on a given crane be deployed because otherwise employers could interpret the provision as not requiring that all outriggers be used. The danger is that deploying only some of the outriggers could permit the crane to tip out of balance as the boom swings, as documented by JACA, OSHA's contractor for this rulemaking (Ex. 5-2, Case No. P-6). Since some manufacturers do not specify that *all* outriggers must be used, OSHA is requiring that, in the absence of applicable manufacturer instructions, all outriggers be fully extended and positioned.

OSHA believes that the crane leveling requirement, as clarified, provides the necessary protection for hoisted employees, while taking into account the deviation from level for which crane load charts make allowance. OSHA has concluded that allowing greater leeway for deviation from level would

dangerously reduce the reliability of the load charts and increase the likelihood of the crane tipping over. Therefore, OSHA promulgates this paragraph, as revised.

Paragraph (g)(3)(i)(F) requires a 50 percent derating of a crane used to hoist personnel, so that the crane would be authorized to lift no more than half the load it could lift if it were hoisting materials. This provision is based on section 5-3.2.2(a)(17) of ANSI B30.5-1982. Parsons Corporation (Ex. 3-22) and the National Constructors Association (Ex. 3-74), among others, supported the proposed derating, focusing on the ease of applying a provision which simply requires the crane operator to divide the referenced load chart figure by two, and on the attendant safety benefit. Universal Wire Rope Products (Ex. 3-36) and DuPont (Ex. 3-75) supported the derating, but noted that achieving the advantages of derating depended on carefully controlling boom angle. Other commenters, such as the United Steelworkers of America (Ex. 3-10) and the Organization Resources Counselors (Ex. 3-89), emphasized the need to provide crane operators with charts so they could calculate the crane's capacity at different boom angles.

The National Association of Demolition Contractors (NADC) (Ex. 3-8) and Unit Crane & Shovel (Ex. 3-47) recommended the cranes be derated to 25 percent, with Unit Crane considering derating to 33 percent adequate for some cranes. NADC apparently viewed derating as a substitute for controlled load lowering and other paragraph (g)(3) requirements. Unit Crane, in turn, based its recommendation on the American Petroleum Institute's Specification 2C, March 1982, which addresses tipping hazards.

OSHA received comments from the Associated General Contractors of St. Louis (Ex. 3-14), the Carolinas Branch of the AGC, (Exs. 3-39 and 3-82), Bechtel (Ex. 3-45) and the State of Michigan (Ex. 3-84) which challenged the need for the proposed derating. Those commenters generally stated that existing safeguards were adequate or that the anticipated platform load was too low compared to the rating of the crane to justify derating. The AGC of America (Ex. 3-28 and Tr. 199) and Granite Construction (Ex. 3-50) asserted that existing and proposed safety requirements made it unnecessary to derate below 75 percent of rated capacity.

OSHA notes that load rating charts are already required by existing § 1926.550(a)(2). OSHA also notes that the commenters who opposed derating and other proposed criteria generally did not distinguish between the

safeguards considered adequate for hoisting material and those necessary for hoisting personnel. OSHA has determined that personnel hoisting, insofar as it is allowed, requires a higher degree of caution and a greater margin of safety than is required for material hoisting because the potential for employee injury in a personnel hoisting accident is far greater. OSHA agrees with the commenters who stress that the 50 per cent derating is both protective and easy to apply, increasing the assurance that crane operators will calculate correctly the load limits and safely hoist personnel platforms. OSHA has no basis for concluding that setting the derating requirement at some other percentage would provide more safety. Indeed, the Agency is concerned that setting a different derating percentage would increase the likelihood that the operator would miscalculate the load limit, possibly causing an accident. Therefore, based on the evidence in the record, OSHA is promulgating paragraph (g)(3)(i)(F) as proposed.

Paragraph (g)(3)(i)(G) prohibits employers from hoisting personnel using cranes or derricks with live booms. This provision is based on ANSI A10.28-1983, "Work Platforms Suspended from Cranes or Derricks—Safety Requirements," section 3.1 ANSI A10.28 defines a live boom as one whose lowering is controlled by brakes without aid from other devices. OSHA agrees with ANSI that the use of live booms would endanger hoisted employees.

The agency received comments on this provision from the Carolinas Branch of the AGC (Ex. 3-39 and 3-82) and the Tennessee Roadbuilders Association (Ex. 3-41), requesting that OSHA add an exemption for "life or death emergencies." OSHA understands that during a "life or death emergency" people will do what is necessary, using whatever equipment is available to prevent death or injury. Therefore, this provision is promulgated as proposed, except that the explanatory note in the proposal has been incorporated into the standard.

Paragraph (g)(3)(ii) requires that cranes or derricks used to hoist personnel be equipped with certain operational aids in order to prevent tipping, two-blocking or other accidents. OSHA specifically requested additional input in this subject in Issue 5.

Proposed paragraph (g)(3)(ii)(A) required employers to equip those cranes and derricks having variable angle booms with boom angle indicators which are readily visible to the operator. This provision is based on ANSI B30.5-1982, section 5-1.9.1(c). The Agency

received comments from Unit Crane & Shovel (Ex. 3-47) and Puerto Rico (Ex. 3-55) which supported this requirement as proposed. The State of California, the Boeing Company and Boeing Aerospace (Exs. 3-33, 3-38 and 3-57) supported the proposed requirements and suggested that the Agency also require a radius chart. That suggestion has not been adopted because the necessary data is incorporated in the load chart which is already required by § 1926.550(a)(2) of the construction standards.

As proposed, paragraph (g)(3)(ii)(A) appeared to require that cranes be equipped with boom angle indicators, whether or not they had variable angle booms. Therefore, in promulgating the final rule, OSHA has rephrased paragraph (g)(3)(ii)(A) to make it clear that only cranes and derricks equipped with variable angle booms and used to hoist personnel must have boom angle indicators.

Proposed paragraph (g)(3)(ii)(B) required employers to equip or mark any telescoping boom so that the extended length is clearly indicated. This provision is based on ANSI B30.5-1982, section 5-1.9.1(e). However, commenters such as the Daniel Construction Company and the Carolinas Branch of the AGC (Exs. 3-17 and 3-39), indicated that the marking would be ineffective because the marking would not be visible to the crane operator at the controls. Another commenter, the Al Johnson Construction Company (Ex. 3-42), asserted that effective instruments are not available, and that compliance with paragraph (g)(6)(vi), which requires continuous contact between the operator or signal person and the platform occupants, will provide the operator with the information necessary to hoist employees safely. On the other hand, Wylie Systems presented testimony at the public hearings (Tr. 472-73, 489-90) and the PAT Equipment Corporation submitted information (Ex. 7-E) which indicated that effective instrumentation is available.

Standard Oil (Indiana) (Ex. 3-46) commented that "Safe work practice requires that a crane operator knows the load weight, load radius and height of lift prior to actually making the lift." Using that information, the operator could refer to the crane's range diagram to determine the required boom length without reference to length markings or indicators.

OSHA has determined that there are effective boom length indicators readily available for installation on telescoping booms. In addition, the Agency believes that markings on the boom can provide the operator with boom length information. OSHA also agrees with

Standard Oil (Indiana) that an operator preparing to hoist personnel could determine the boom length without using a boom length indicator. Therefore, OSHA has revised proposed paragraph (g)(3)(ii)(B) so that, as promulgated, it permits operators, as an alternative to using the required markings or indicators, to determine the anticipated load radius accurately and use that finding to calculate the necessary boom length.

Paragraph (g)(3)(ii)(C) of this final rule requires the use of an anti-two-blocking device, or a two-block damage prevention feature on cranes or derricks used to hoist personnel. These devices are intended to prevent the boom tip from contacting the load block or overhaul ball and severing the hoist rope. Anti-two-blocking devices detect that the overhaul ball has come close to the boom tip and activate a brake which immediately stops the hoist and holds the platform in place. This provision is based, in part, on ANSI B30.5-1982, section 5-3.2.2, which states that employers shall have warning or other limiting devices "to prevent two-blocking, unless audible communications have been provided and one of the persons being lifted has been specifically assigned" to warn against two-blocking hazards. OSHA did not adopt this approach in the proposed rule. The Agency, however, did request (49 FR 6285) that commenters inform OSHA of any conditions where the use of warning devices would be more feasible than the use of positive acting mechanisms.

OSHA received a great volume of comment on this provision, most of it opposing the requirement or urging that OSHA require something less than the proposed positive acting preventive devices. For example, Longview Fibre Company, Columbia Nitrogen Corporation and the AGC of California (Exs. 3-52, 3-58 and 3-66) asserted that available anti-two-blocking equipment does not work properly and that careful operation of a crane would obviate the need for installation of anti-two-block controls. In addition, Dupont (Ex. 3-75) stated that the kind of automatic brake needed to prevent two-blocking has not yet been developed to the point where it could be considered "a reliable safety component." Therefore, Dupont along with other commenters, such as the Pennzoil Company (Ex. 3-29), Boeing Company (Ex. 3-38), Boeing Aerospace (Ex. 3-57) and the Carolinas Branch of the AGC (Exs. 3-39 and 3-82) requested that OSHA permit employers to use warning devices so that operators could be alerted to two-blocking situations and avoid two-blocking accidents.

These commenters stated that requiring positive acting devices would impose unreasonable economic burdens; that many cranes and derricks, particularly older ones, could not be retrofitted; and that anti-two-blocking devices require excessive maintenance, are unreliable, and are misused or abused by operators.

On the other hand, comments by Unit Crane & Shovel (Exs. 3-47 and 3-81) and Kenny Construction Company (Ex. 3-56), in addition to testimony by the Operating Engineers at the public hearing (Tr. 454-457), indicated that workable anti-two-blocking "stop and hold" devices are available and should be required. BWB Controls, Inc. (Ex. 3-63), a manufacturer of anti-two-blocking warning devices, submitted product literature and testimonials attesting to the reliability of its products. OSHA also noted that the CAL/OSHA hearing transcript from May 12, 1983, submitted by opponents of a requirement for anti-two-blocking devices (Exs. 3-28 and 3-66), also included testimony that the devices were, in fact, available and workable.

OSHA does not believe that alarm devices or shouted warnings would provide effective protection for hoisted personnel because they place too much reliance on operator reaction time. For example, the system may function properly, but the operator may be distracted by the noise of the construction site, or the noise of the crane engine and hoist mechanism and not notice the alarm or warning for several seconds, or the reaction time of the operator may simply be too slow. In either case, a two-blocking incident could easily result. Therefore, because the Agency believes that only two-blocking preventive devices will provide the necessary employee protection, OSHA has not followed the pertinent ANSI standard. As stated in its discussion of Issue 7, above, OSHA has, in part, based its decision not to promulgate a separate automatic brake requirement on its determination that the brake mechanism of an anti-two-blocking device will provide reliable protection for hoisted personnel.

OSHA concludes, based on the evidence in the record and its regulatory impact analysis, that the anti-two-blocking device requirement is both feasible and cost effective. The Agency agrees that cranes equipped with these devices require more maintenance than cranes which are not so equipped. OSHA notes, however, that this maintenance would be comparable to that required on the alarm devices which many commenters recommended. The major maintenance and malfunction

concern with either system is the switch at the boom tip. OSHA believes that proper maintenance of the device and proper treatment during rig up, rig down, and transport, coupled with proper adjustment of the device once the crane is in place, will prevent the reported unreliability and malfunctioning.

OSHA has received a considerable amount of information regarding the misuse of anti-two blocking devices by operators. OSHA has determined that the proper selection and training of operators is necessary to prevent the misuse of these devices as "operational controls." In particular, operators must be taught that an anti-two-blocking device is a backup for proper operator control, and must not be used routinely as a stopping device.

Therefore, based on its review of the evidence in the record, which includes many two-blocking accident reports, such as the one discussed earlier in this preamble (Cheyenne, Wyoming, 1973), OSHA is promulgating paragraph (g)(3)(ii)(C) as proposed, except that the term "fall ball" has been replaced by the term "overhaul ball," to conform with current industry terminology.

Paragraph (g)(4) provides design criteria, platform specifications, loading requirements and rigging requirements for personnel platforms.

Paragraph (g)(4)(i) provides design criteria for personnel platforms. One proposed provision, paragraph (g)(4)(i)(D), has been moved to paragraph (g)(4)(ii)(E) because it involves platform specifications. The language of the remaining three provisions is identical to that in the proposal, except as discussed below.

Paragraph (g)(4)(i)(A) requires the employer to ensure that personnel platforms and suspension systems are designed by a qualified engineer or qualified person who has demonstrated skill and experience in structural design. The term "qualified" is defined in § 1926.32(e). In the proposed standard, this provision required that the employer have a qualified engineer design the platform, based on ANSI A10.28-1983, section 5.1. The States of Maryland and California (Exs. 3-19 and 3-33) commented favorably on the proposed requirement. However, the International Cargo Gear Bureau Inc. (ICGBI) (Ex. 3-1) asserted that the proposed language was too vague and asked OSHA to specify design criteria and accredited persons who would certify that the platforms were built to specifications. The ICGBI did not express an opinion on the need to require that only engineers provide the certification. On the other hand, Magma Copper (Ex. 3-27) and Lunda

Construction Company (Ex. 3-92) suggested that only a "competent" individual is necessary to design a personnel platform. OSHA notes that the term "competent person" has a unique meaning by definition in §1926.32(f). However, the Magma Copper and Lunda Construction comments appear to use the term "competent" to indicate that the person designing the platform must be "competent" to design and construct platforms which meet this standard, and that a person need not be an engineer to demonstrate such competence. In other words, they indicate that the standard should not require design by an engineer, because platforms can be properly designed by knowledgeable non-engineers, as well. OSHA agrees that some individuals, who lack engineering degrees, have the requisite skill and experience to design and construct a personnel platform which meets the requirements of the standard. Based on the above discussion, OSHA has determined, notwithstanding ANSI A10.28-1983, that design by a qualified engineer or a qualified person with specific structural design skills and experience will ensure that a personnel platform and its rigging provide the necessary employee protection and has revised this provision as noted.

This paragraph has also been modified to make it clear that the suspension system (i.e., the permanently attached rigging), as well as the platform, must be designed by a qualified engineer or qualified person. Based on comments from Bechtel (Ex. 3-45), OSHA determined that the compatibility of the platform structure with the attached rigging is critical to safe hoisting. OSHA also notes that the rigging is subject to the same loads and operating conditions as the platform, and that the platform tackle is often attached to the platform at the time the platform is made. The Agency notes that in some circumstances the person who designs the platform will also design the tackle attached to the platform.

Proposed paragraph (g)(4)(i)(B) required that the suspension system for personnel platforms be designed to minimize tipping. The Agency received very few comments on this provision. Bechtel (Ex. 3-45) commented that the requirement was unnecessary in light of the preceding paragraph. The State of Maryland (Ex. 3-19) suggested that OSHA require a suspension system consisting of a factory-made wire bridle with four legs and suspended at 60 degrees to the horizontal, because this configuration has a known rated capacity and is easily inspected. OSHA notes that employers use personnel

platforms to access a wide variety of workplaces and believes a specific bridle configuration would not be appropriate with all platforms or for all hoists. In addition, as was stated in the discussion of the previous paragraph, OSHA has determined that requiring qualified engineers or qualified persons to design the bridle provides adequate protection. Therefore, OSHA will not prescribe what tackle may be used. The ICGBI (Ex. 3-1) argued that the requirement should be "to prevent tipping." OSHA agrees with the ICGBI that "to prevent tipping" is the desired goal, but believes it is not feasible to prevent tipping totally, due to the nature of personnel platforms. Therefore, this paragraph is promulgated as proposed.

Proposed paragraph (g)(4)(i)(C) required that personnel platforms be designed with a minimum safety factor of five. As discussed under paragraph (g)(3)(i)(B), above, OSHA is incorporating language related to safety factors which the Agency believes will express clearly the regulatory intent of the provision. OSHA based this provision on ANSI standards B30.5-1982, section 5-3.2.2(b)(3) and A10.28-1983, section 5.2.

In 1974, as noted in the proposal, the ACCSH recommended a safety factor of six for the design of personnel platforms. In 1983, the ACCSH discussed setting a safety factor for personnel platforms, but made no recommendations. OSHA specifically requested input regarding the sufficiency of the proposed safety factor in Issue 4 of the proposal (49 FR at 6283).

Bechtel (Ex. 3-45) stated that the proposed safety factor of five was "unnecessary and wasteful," because existing American Institute of Steel Construction (AISC) specifications provided sufficient guidance for the design of personnel platforms, just as they already did for other temporary personnel supports."

The Department of the Air Force, Milwaukee Construction Industry Safety Council, National Constructors Association and Unit Crane & Shovel (Exs. 3-24, 3-26, 3-30 and 3-47) expressed support for the proposed safety factor. In particular, Unit Crane cited ANSI B30.5-1982 to support this provision and noted that, "since a platform is not subject to the same sorts of fatigue as running ropes," there was no inconsistency in supporting five as a safety factor for platforms, while suggesting that OSHA set the wire rope safety factor at 10.

The Boeing Company (Ex. 3-38) recommended setting the safety factor at four, as provided in the § 1910.28(a)(4)

requirements for "suspended scaffolds," so that the provision would be consistent with the "safety factors established for similar set ups." Boeing Aerospace (Ex. 3-57) disagreed with this recommendation, suggesting that "the safety factor should be at least 5," because personnel platforms are exposed to hazards, such as snagging, which ordinary scaffolds do not confront. Boeing Aerospace also stated that setting the safety factor at five was appropriate so that hoisted personnel would have at least as much protection as hoisted material, citing § 1926.251(c)(i), rigging, and § 1926.251(f)(1), shackles and hooks for material handling.

The United Steelworkers of America and the Spartan Equipment Company (Exs. 3-10 and 3-82) suggested that setting the platform safety factor at 10 would provide adequate protection. In particular, the United Steelworkers stated that the higher the safety factor, the greater the assurance that OSHA is satisfying its statutory duty to protect employees.

Norpac Engineering (Ex. 3-88) suggested that OSHA set personnel platform safety factors which are comparable to those for elevator design and which are at least as safe as those required for scaffolds. OSHA has determined that the current ANSI standard for Elevators, A17.1-1984, is not an appropriate reference because it does not provide clear guidance for the construction of personnel platforms. Norpac (Ex. 3-88) also recommended that OSHA use the scaffold standards, §§ 1926.28(a)(4) and 1926.451(a)(7) which, as noted above, require a safety factor of four.

OSHA has determined that setting the platform safety factor at five provides adequate protection for hoisted personnel, consistent with the applicable consensus standards and most of the comments received. In addition, the Agency believes that neither the AISC specifications nor the ANSI elevator standard provides the specific pertinent information which an employer needs to fabricate a platform properly. Furthermore, OSHA has determined that setting the safety factor at four, as is required under the scaffold standard, would not adequately protect hoisted personnel because, as noted by Boeing Aerospace (Ex. 3-57), platforms are exposed to hazards which suspended scaffolds do not face.

OSHA also has determined that it is unnecessary to set the safety factor at six or ten, as recommended by the ACCSH and certain commenters because, as observed by Unit Crane & Shovel (Ex. 3-47), five is recognized by

ANSI as providing adequate protection under the conditions where platforms are used. Accordingly, the Agency promulgates this paragraph as revised and has added an explanation to clarify that the criteria for guardrails and body belt/harness system anchorage points are found in other Subparts of the Construction Standards. OSHA believes that this revision will clarify the requirements and increase consistency within the construction standards, thereby improving compliance.

Proposed paragraph (g)(4)(i)(D) required that personnel platforms have six feet minimum headroom. The commenters uniformly considered this provision as overly restrictive in that it limited the employer's flexibility. Ebasco Constructors and the International Brotherhood of Boilermakers (Exs. 3-6 and 3-53) suggested a minimum height of six feet, six inches. The National Association of Demolition Contractors and Parson Corporation (Exs. 3-8 and 3-22) suggested seven feet. Other commenters, such as Magma Copper, Bechtel, Unit Crane & Shovel and the Commonwealth of Puerto Rico (Exs. 3-27, 3-45, 3-47 and 3-55), suggested that OSHA simply require "adequate" headroom. OSHA agrees that specifying a minimum height is unnecessary to protect workers and has deleted this specification from paragraph (g)(4)(ii)(E) of the final rule. OSHA has also determined that the headroom requirements for hoisted personnel are already properly addressed in paragraph (g)(4)(ii), "Platform specifications," instead of in paragraph (g)(4)(i), "Design criteria."

Paragraph (g)(4)(ii) of this final rule specifies that personnel platforms must have certain features.

Proposed paragraph (g)(4)(ii)(A) required employers to equip personnel platforms with perimeter protection from the floor to 42 inches, plus or minus three inches, which would consist of either solid construction or expanded metal with openings no greater than one-half inch. This provision was based on § 1926.500(f) and ANSI A10.28-1983, section 5.6. Commenters, including the National Association of Demolition Contractors, Equitable Gas, the Associated General Contractors of America and Standard Oil (Indiana) (Exs. 3-8, 3-25, 3-28 and 3-46), stated that standard guardrails have satisfactorily prevented accidental falls. Commenters, such as Columbia Nitrogen and the Milwaukee Construction Industry Safety Council (Ex. 3-26 and 3-58), suggested that OSHA permit the use of standard guardrails, except with six inch or 12 inch toe plates in lieu of enclosure between the toe plate and

mid-rail. In addition, commenters, such as Granite Construction (Ex. 3-50) and Organization Resources Counselors, Inc. (Ex. 3-32 and 3-89) stated that requiring enclosure to 42 inches, as proposed, would unnecessarily interfere with the intended use of the platform. The State of Maryland (Ex. 3-19) noted that the requirement would necessitate the frequent repositioning of the platform to make the work area accessible.

Further, Unit Crane & Shovel (Ex. 3-47) commented that permitting the use of solid sidewalls would increase the tendency of a platform to swing in the wind and recommended that only expanded metal be allowed.

On the other hand, the Boeing Company (Ex. 3-38), Boeing Aerospace (Ex. 3-57), and the Salt River Project (SRP) (Ex. 3-61) stated that the proposed enclosure requirement was "acceptable." The Boeing commenters also stated that "Guardrails have been satisfactory," and SRP noted that it has a variance for certain operations which require top guardrails at 30 inches.

OSHA has revised this provision to require simply that the employer provide a guardrail system which meets the requirements of Subpart M. OSHA anticipates that employers will already be familiar with the requirements for guardrail systems in Subpart M, so it would be unnecessary to set out specifications in this provision. OSHA notes that, under Subpart M, the required height for a top rail is approximately 42 inches, as was proposed. In addition, OSHA has determined that perimeter enclosure between the toe board and the midrail of the guardrail provides appropriate platform level protection against the hazard to employees below from falling objects. Further, OSHA has determined that since perimeter enclosure will only be required between the toe board and the mid-rail, swinging will not pose difficulties and employers will have flexibility to address workplace circumstances.

Paragraph (g)(4)(ii)(B) requires that the employer provide a grab rail inside the entire perimeter of the personnel platform. This provision is based, in part, on A10.28-1983, section 5.8. The proposal did not specify that the grab rail would extend along the entire inside perimeter of the platform. OSHA revised the provision because it determined that, as noted by the State of Maryland (Ex. 3-19) and Unit Crane & Shovel (Ex. 3-47), a worker might not otherwise have a grab rail readily available when needed.

The Salt River Project (Ex. 3-61) suggested that the top rail of a platform

constitutes an adequate grab rail. OSHA, however, believes that permitting the use of the top rail as a grab rail would expose employees to the risk of having their hands smashed against external objects while grabbing the top rail. The ACCSH drew a clear distinction between the use of the guardrail to prevent falls and the use of a grab rail to help employees maintain balance during hoists (Tr. 5-23-83, pp. 123-124.) Therefore, OSHA has determined that the required grab rails must be inside the personnel platform, and promulgates this provision as revised.

Proposed paragraph (g)(4)(ii)(C) required that an access gate, if provided, must not swing outward during hoisting and must be equipped with a restraining device to prevent accidental opening. This provision was based on ANSI A10.28-1983, section 5.4 and B30.5-1982, section 5.3.2.2(b)(7). The Agency has decided, however, to relocate the restraining device requirement to a separate provision (paragraph (g)(4)(ii)(D)) of this final rule, for the sake of clarity. OSHA received several comments, including those from Ebasco Constructors, The National Constructors Association and Granite Construction (Exs. 3-6, 3-30 and 3-50), which suggested a revision of the proposed rule to permit the use of sliding or folding gates. Since the modifications requested are in line with the Agency's original intent, paragraph (g)(4)(ii)(D) of the final rule reflects the acceptability of these other approaches and incorporates the proposed requirement for restraining devices. This provision is discussed further below.

OSHA also received comments from the Carolinas Branch of the AGC (Exs. 3-39 and 3-82) which requested that OSHA permit the access gate on small platforms to swing out when there is not room for it to swing in. The Agency has not adopted this suggestion because, as noted by Unit Crane & Shovel (Ex. 3-47), an outward opening gate could strike against a wall or other object during hoisting, possibly upsetting the platform. In addition, OSHA is concerned that an improperly designed outward opening gate could open accidentally if objects or personnel inside the platform were thrown against it. On the other hand, OSHA recognizes that the restrictive approach of the proposed standard is not necessary to protect workers because the Agency knows of platforms which do not conform to the proposed rule but which adequately protect occupants. OSHA also recognizes that some personnel platforms are used in emergency situations to transport

injured employees on stretchers or to effect rescues. In such circumstances access gates that only swing inward would create access and egress problems, especially on smaller platforms. OSHA also notes that sliding or folding gates may not be feasible for a given personnel platform. The Agency does not wish to preclude the use of properly designed personnel platforms in emergency situations by requiring a gate swing which would render them useless.

In order to resolve these conflicting concerns, OSHA has decided that access gates that swing, must be configured so that they do not open outward during hoisting. OSHA notes that it is technically feasible and equally protective to install a single gate which is capable of swinging both inwardly and outwardly, provided that the gate not open outwardly during hoisting. Therefore, based on the above discussion, OSHA promulgates this paragraph as revised and relocated.

Paragraph (g)(4)(ii)(D) requires that access gates be equipped with a restraining device to prevent accidental opening. This provision was proposed as part of paragraph (g)(4)(ii)(C). The Agency determined that, because of the above-described revisions to paragraph (g)(4)(ii)(C), retaining this provision within paragraph (g)(4)(ii)(C) could obscure this important requirement. Therefore, the Agency decided to incorporate the appropriate comments received on this provision and promulgate the revised requirement as a separate provision. The comments received on this provision are discussed above under paragraph (g)(4)(ii)(C).

As discussed above, paragraph (g)(4)(ii)(E) of this final rule presents the revised requirements of proposed paragraph (g)(4)(i)(D) for adequate headroom in the personnel platform. Specifically, this provision requires that platforms have headroom which allows employees to stand upright. OSHA has determined that this performance-oriented approach is appropriate for a provision where, as the commenters observed, the circumstances for its application may vary significantly. Therefore as revised and relocated, OSHA is promulgating this provision.

Paragraph (g)(4)(ii)(F) requires that personnel platforms have overhead protection when there is employee exposure to falling objects. This provision is based on ANSI A10.28-1983, section 5.5, and B30.5-1982, section 5.3.2.2(b)(8). This requirement is similar to that in proposed paragraph (g)(4)(ii)(D), and has been shifted

because of the addition or relocation of paragraphs, as discussed above.

OSHA requested additional information on the need for overhead protection on personnel platforms in Issue 6. A number of commenters, such as the State of Alaska (Ex. 3-4), Unit Crane & Shovel (Ex. 3-47) and Kenny Construction (Ex. 3-56), agreed that overhead protection should be required "as needed." Several commenters, including the State of Maryland (Ex. 3-19) and the AGC of America (Exs. 3-28 and 3-67) expressed general support for the requirement, while noting that certain work cannot be performed when overhead protection is in place. Unit Crane (Ex. 3-47) noted that the boom tip and hoist lines above the platform effectively block work which is directly overhead and constitute falling object hazards because they may be lowered into a landed platform. Unit Crane also noted that, "Anytime the occupants must work above shoulder height and might be restricted from the work piece (SIC) by overhead protection, such a condition can be eliminated by merely elevating the platform another three feet."

Gulf Oil (Ex. 3-68), stated that overhead protection on the platform was unnecessary and would reduce visibility. Gulf suggested that, "If a hazard of falling objects is present, a more positive means of protection should be provided other than assuming the personnel platform would withstand the dropping objects." Gulf Oil, however, did not specify any "positive means." The Carolinas Branch of the AGC (Exs. 3-39 and 3-82) observed that requiring overhead protection would negate the possibility of employees tying off to anything other than the platform itself, an action which is useless and impractical. The Carolinas Branch was apparently concerned that if the platform tipped or fell the lanyard attached to an employee's body belt or harness would pull the employee up against the overhead protection, preventing escape from the platform and increasing the likelihood and severity of injuries. The Carolinas Branch was also concerned that "work from a platform often must be done above the top of the platform, such as, but not limited to: Rubbing concrete; form work; passing and receiving tools and material, etc." In addition, the Al Johnson Company (Ex. 3-42) stated that the proposed overhead protection was unnecessary because it is more effectively handled under the general safety regulations which limit work overhead * * *. Some commenters, including Equitable Gas, Standard Oil (Indiana) and Organization

Resources Counselors (Exs. 3-25, 3-46 and 3-89), suggested that requiring the use of hard hats would generally be preferable to requiring overhead protection.

OSHA has determined, based on the evidence in the record, that hoisted personnel who are exposed to falling objects need overhead protection. Given the small area of a personnel platform, OSHA is concerned that workers would not be able to avoid falling materials, and that head protection alone would not be sufficient. OSHA notes that this provision is consistent with the requirements for scaffolds in §§ 1926.451(a)(16) and 1926.451(h)(13), which require overhead protection when employees working on other types of scaffolds are exposed to overhead hazards. The Agency is concerned that overhead protection and the use of hard hats could be viewed as either equivalent or mutually exclusive. Therefore, OSHA has added language to this provision so it is clear that overhead protection is required in addition to the use of hard hats.

The final rule is drafted in performance-oriented language which requires that employers install the protective covering whenever employees are exposed to falling objects. Therefore, when there is no potential for injury, whether due to the nature of the work or the work practices enforced at the workplace, the employer need not provide overhead protection other than hard hats.

OSHA notes that this paragraph does not prohibit the use of a personnel platform with overhead protection that incorporates a removable top, a hinged top, or a trap door to permit overhead work, if such work is necessary, as long as the necessary overhead protection function is not compromised. In addition, this paragraph does not prohibit the use of transparent materials to provide a viewing port in the overhead protection.

In response to the concern that overhead protection would complicate tying off (as required by paragraph (g)(6)(viii) of the final rule), the Agency notes that the requirement to tie off is intended to protect employees from falling in the event the platform tips or the employees are thrown from the platform. It is not intended to protect workers in the event that the platform breaks free of the load line or hook. Most of the remaining provisions of the standard focus on preventing the platform from dropping. These provisions, such as the requirement for tests, derating and prevention of two-blocking are intended to prevent

situations where the personnel platform breaks free of the load line or hook.

Paragraph (g)(4)(ii)(G) of this final rule requires employers to ensure that all rough edges of the platform exposed to employee contact are so surfaced as to prevent injury to employees from punctures or lacerations. This paragraph, based on ANSI A10.28-1983, section 6.1, is similar to (g)(4)(ii)(E) of the proposal, but has been rephrased to clarify OSHA's intent. The Agency received virtually no comment on this provision. Bechtel (Ex. 3-45) asserted that this requirement was a matter of common sense and that it need not be covered by an OSHA standard. OSHA believes that this provision provides necessary guidance to employers, so it is promulgating this provision as revised.

Proposed paragraph (g)(4)(ii)(H) has been deleted from the final rule. That proposed paragraph required that a personnel platform be readily identifiable by color or marking. This provision was based on ANSI B30.5-1982, section 5-3.2.2(b)(9).

Most of the comments received, such as those from Magma Copper, Bechtel, and Granite Construction (Exs. 3-27, 3-45 and 3-50), indicated that this provision was unnecessary and would impose high maintenance costs. The State of California and Boeing Company (Exs. 3-33 and 3-38) supported the proposed provision. OSHA has determined, based on its consideration of the record, that the proposed provision is not needed to protect workers, given the other provisions of paragraph (g) which cover the design, construction, testing and use of the personnel platform. The Agency, therefore has eliminated proposed paragraph (g)(4)(ii)(H).

Paragraph (g)(4)(ii)(I) requires that all welding of the platform and components be performed by a qualified welder familiar with the weld grades, types and materials specified in the design. This provision, which is virtually identical to proposed paragraph (g)(4)(ii)(F), is based on ANSI A10.28-1983, section 6.3.

In addition, OSHA solicited comments on whether a welder who is "qualified" as defined in § 1926.32(1) is sufficient or if a certified welder would be more appropriate. Magma Copper (Ex. 3-27) cautioned OSHA regarding use of the term "qualified," because "Any experienced * * * welder could assemble a cage." Unit Crane & Shovel (Ex. 3-47) suggested that OSHA require American Welding Society certified-welders, while the Boilermakers Union (Ex. 3-53) suggested that OSHA require that fabrication be done by a certified welder who has passed a welding test

that meets the specifications of the ASME welding code. On the other hand, Puerto Rico (Ex. 3-55) suggested that requiring a "qualified" welder, as understood in terms of section 1926.32(1), provided adequate assurance that the platform would be safe. The Agency believes that requiring welder certification or specifying a particular set of credentials for a platform welder would not improve employee protection. Indeed, OSHA agrees with Puerto Rico that the term "qualified," as defined, provides appropriate assurances that the welder assigned to construct a personnel platform will assemble it properly.

Paragraph (g)(4)(ii)(I) of this final rule requires that employers post personnel platforms with plates or other permanent markings indicating the platform weight and its rated load capacity or maximum intended load. This provision is based on ANSI A10.28-1983, section 5-3 and, in part, on B30.5-1982, section 5-3.2.2(b)(4). This requirement was proposed as paragraph (g)(4)(ii)(G) and has been redesignated.

A few commenters, including the International Cargo Gear Bureau, the United Steelworkers, and Norpac Engineering, Inc. (Exs. 3-1, 3-10 and 3-88), suggested that the marking also indicate the maximum number of personnel who may be lifted. OSHA notes that ANSI B30.5-1983, section 5-3.2.2(b)(4), provides that the plate shall specify the maximum number of persons to be hoisted. In addition, the United Steelworkers of America (Ex. 3-10) recommended that this provision be revised to include a platform certification requirement, with the certification posted on the platform.

OSHA has determined that the platform posting provision as proposed will provide adequate protection for hoisted workers by alerting everyone involved in a lift of the rated load capacity or maximum intended load of the platform. Furthermore, insofar as A10.28 and B30.5 differ in their provisions for marking of personnel platforms, OSHA has decided to rely on ANSI A10.28-1983, which exclusively covers personnel platforms, rather than B30.5-1982, which focuses on cranes, in deciding not to require the plate to state the maximum number of passengers. The Agency believes that an additional requirement to post the personnel platform with the maximum number of passengers will not add to the degree of employee protection provided by the requirement to post the maximum intended load or rated load capacity. Finally, OSHA has determined that although a personnel platform designed

and built at the worksite may not have a rated load capacity (such capacities are normally determined for manufactured platforms) the design will have been based on a determinable maximum intended load. In those situations where a platform does not have a rated load capacity, the maximum intended load shall be posted. Therefore, this paragraph is being promulgated as revised.

Paragraph (g)(4)(iii) of this final rule covers personnel platform loading.

Paragraph (g)(4)(iii)(A) prohibits loading the platform in excess of its rated load capacity or maximum intended load, whichever is less. This provision is similar to the proposed requirement and is based on ANSI B30.5-1982, sections 5-3.2.1.1-(b) and (c). The Agency received no comments which opposed this requirement. Ebasco Constructors (Ex. 3-6) suggested that OSHA base the rated load capacity on a specified minimum pounds-per-square-foot requirement.

The performance-oriented language of the provision, as originally proposed, allows the employer to determine what criteria are used to rate the capacity of the personnel platform. OSHA believes that this provision, when coupled with the design, construction, and testing requirements presented in this standard, will provide adequate protection for employees. As noted above, a job built and designed personnel platform may not have a rated capacity, but the design will have been based on a maximum intended load. Therefore, for platforms whose rated load capacity has not been determined, or for which there is no such rating, the employer can comply with this provision by ensuring that the maximum intended load is not exceeded.

Paragraph (g)(4)(iii)(B) limits the number of employees being hoisted to those required to do the work. This provision, which is identical to the proposed requirement, is based on ANSI A10.28-1983, section 12.2. OSHA specifically requested additional input on this subject in Issue 3. Many commenters, especially contractors such as Parsons, Johnson Bros. and Granite (Exs. 3-22, 3-43 and 3-50), supported the provision as proposed. Supportive comments were also received from the Boilermakers Union (Ex. 3-53).

As indicated by the discussion of paragraph (g)(4)(ii)(I) above, some commenters suggested that OSHA limit the number of employees to be hoisted and that the maximum intended load and rated load capacity be based on that number of employees times a pounds per employee load factor (Exs. 3-24, 3-27, 3-33, 3-47, 3-76, and 3-82).

However, other commenters, such as Puerto Rico (Ex. 3-55) and the Salt River Project (Ex. 3-61), asserted that OSHA should focus on preventing loads from exceeding capacity, not on the number of employees needed to perform work duties. OSHA agrees with those commenters who favored compliance capacity requirements set forth in terms of total load weight. Indeed, OSHA has determined that compliance with the load limits of the platform and maintenance of the platform safety factor established by the standard will provide the necessary protection, while allowing the employer the flexibility to determine how many employees must be hoisted to perform assigned work. The Agency believes that specifying a limit on the number of hoisted personnel would unreasonably restrict the determination of how many workers are required to perform a particular task safely. Accordingly, OSHA has promulgated this paragraph unchanged.

Paragraph (g)(4)(iii)(C) limits the occupancy of the personnel platform to employees, and the tools and materials necessary to do the work they are assigned. This provision reflects input from the ACCSH which urged OSHA to ensure that personnel platforms were not used as material hoists (Tr. 5-23-83 pp. 50-52). Unit Crane & Shovel (Ex. 3-47) recommended that OSHA prohibit the use of personnel platforms to hoist bulk material because a shifting load could endanger the hoisted personnel. The Carolinas Branch of the AGC (Exs. 3-48 and 3-82) opposed such a restriction on transporting material in bulk or other loads not related to the task to be performed on personnel platforms, as long as the capacity of the platform was not exceeded. OSHA believes that compliance with capacity limitations above does not provide adequate assurance of employee safety when loading personnel platforms. OSHA believes that it is less likely that the appropriate concern for capacity limitations would be shown when using a personnel platform as a material hoist. This misuse would cause structural fatigue which may not be readily detected by inspection, until failure occurs. The Agency reiterates its concern that personnel hoisting, insofar as it is permitted under the terms of this standard, must satisfy more demanding criteria than are required for material hoisting. Given the special concern OSHA has expressed regarding the hazards of personnel hoisting, the Agency has determined that it would be inappropriate to allow personnel platforms to be used as material hoists. In addition, the Agency believes that any blurring of the distinction between

personnel hoisting and material hoisting would increase the likelihood of operator error. Therefore, OSHA is promulgating this paragraph as proposed, with a clarification that the platforms are not to be used for other purposes when they are not hoisting personnel.

Proposed paragraph (g)(4)(iii)(D) has been separated into two provisions for the sake of clarity, but the provisions will be discussed jointly since it was proposed as one provision. The proposed paragraph required that materials on a personnel platform be secured and evenly distributed while the platform is in motion. Paragraph (g)(4)(iii)(D) requires that materials and tools on an occupied personnel platform be secured to prevent displacement. Paragraph (g)(4)(iii)(E) requires materials to be evenly distributed within the confines of the platform. These provisions are based on ANSI A10.28-1983, section 8.1. The few comments received support these provisions in principle. The Boeing Company and Boeing Aerospace (Exs. 3-38 and 3-57), however, suggested that OSHA change the wording to "loaded in such a way that they do not present a hazard to personnel." Ebasco Construction (Ex. 3-6) suggested that the language be changed to require materials to be "evenly distributed within the confines of the platform." The Agency believes that the Boeing commenters' suggested revision provides less guidance to the employer, and would be less protective than the requirement, as proposed. On the other hand, OSHA has determined that Ebasco's suggested language better expresses OSHA's original intent that the load be evenly distributed within the platform. Therefore, the Agency has adopted Ebasco's suggested change and promulgates these paragraphs as revised and separated.

Paragraph (g)(4)(iv) addresses the rigging used to suspend personnel platforms.

Paragraph (g)(4)(iv)(A) requires that if a rope bridle is used to connect the personnel platform to the load line, the bridle legs shall be connected to a master link or shackle, so that the weight of the platform is evenly distributed among the bridle legs.

The State of California (Ex. 3-33) suggested requiring that four part bridles be designed as if only two legs were supporting the platform to ensure stability, because the weight of the loaded platform would probably not be evenly distributed. Although this suggestion, in general, is technically sound rigging practice, OSHA has determined that other bridle

configurations will provide the necessary protection. In addition, OSHA believes that the bridle configuration suggested by the State of California may not be appropriate in all circumstances. Therefore, OSHA has determined that the requirement, as proposed, provides the necessary protection for hoisted employees.

Lift-All Company, Inc., the Boeing Company and Boeing Aerospace (Exs. 3-13, 3-38 and 3-57) commented that the use of the term "ring" in paragraph (g)(4)(iv)(A) was inappropriate. They suggested that OSHA use the term "master link" adopted by ANSI B30.9-1984, "Slings". OSHA has decided that the suggested change is proper and has reworded the final rule accordingly.

Standard Oil (Indiana) (Ex. 3-46) expressed concern that this provision as proposed would not permit alternatives to wire rope bridles and requested that OSHA clearly state that such alternatives were permitted. OSHA believes that it is sufficiently clear from the use of the expression "when a wire rope bridle is used" that OSHA is simply taking into account the consequences of a particular rigging choice and does not mean to limit the choice of equipment. Therefore, OSHA has not made the requested change.

The Organization Resources Counselors (Ex. 3-32) asserted that hoisted personnel would be safer if OSHA permitted bridle legs to be attached to the hook individually, rather than joined at a single ring or shackle. OSHA has determined that the suggested change would allow hoisted personnel to be exposed to greater danger than would be permitted under the standard as proposed, because the displacement of any one of the bridle legs could cause the platform to tip. Therefore, the suggested change has not been made.

Paragraph (g)(4)(iv)(B) requires that the hooks or other attachment assemblies used for rigging personnel hoists be of types that can be closed and locked. This provision, which is identical to the proposed requirement, is based on ANSI A10.28-1983, section 9.2. OSHA highlighted this subject in Issue 8. Many commenters, including Johnson Bros. Corporation, Unit Crane & Shovel and Lunda Construction Company (Ex. 3-43, 3-47 and 3-92), strongly supported this requirement. On the other hand, Bechtel (Ex. 3-45) asserted that this provision was redundant with existing safety standards, and the American Road & Transportation Builders Association (ARTBA) (Ex. 3-65) stated that the proposed requirements were "excessively descriptive and restrictive," though ARTBA did suggest

that OSHA require positive locking devices on hooks. As has been discussed above, OSHA believes that the hoisting of personnel requires even greater care than the hoisting of material, so the precautions required by this paragraph are necessary.

Some commenters, such as Standard Oil (Indiana) (Ex. 3-46) and Gulf Oil (Ex. 3-68), suggested that OSHA permit "mousing," a practice by which wire rope is wrapped around a hook to cover the hook opening and to prevent the dropping of a hoisted load, as an alternative to the shackles and locking hooks required in the proposed standard. These commenters asserted that mousing was a safe and proven technique and that the provision, as proposed, would impose hardship. Indeed, ANSI B30.5-1982, section 5-3.2.2(b)(10), recognizes mousing as a means of securing the hook opening for personnel hoisting operations. Other commenters, including Parsons Corporation (Ex. 3-22), the State of California (Ex. 3-33), the Boilermakers Union (Ex. 3-53) and NORPAC Engineering (Ex. 3-88), asserted that OSHA should not allow mousing. These commenters stated that mousing was unsafe and that a strong, securely locked hook should be used instead. In addition, the International Union of Operating Engineers testified (Tr. 465-466) that mousing does not close a hook opening and that properly closing safety hooks are available.

OSHA has determined that mousing would not provide the necessary assurance that a personnel platform would not be dropped, because the platform could still slip off the hook despite the mousing. The Agency agrees with those commenters who suggest that only hooks whose openings lock closed may be used. Therefore, OSHA has not made the suggested revision. OSHA has followed ANSI A10.28 instead of ANSI B30.5 in this case, because the Agency believes that permitting mousing under this standard would not effectuate the purposes of the OSHA Act.

OSHA has revised the wording of proposed paragraph (g)(4)(iv)(B) in several places to clarify the intended meaning. As was the case with paragraph (g)(3)(ii)(C), the term "overhaul ball" has replaced "fall ball" to be consistent with current industry terminology. In addition, OSHA has replaced the term "screw pin" with "bolt" and has specified that any shackles used must be of the "alloy anchor-type," in response to comments from Columbus McKinnon Corporation (Ex. 3-16), which reflect current usage in the industry. Otherwise, this paragraph has been promulgated unchanged.

Proposed paragraph (g)(4)(iv)(C) required that all wire rope and hardware used to rig personnel platforms have a minimum safety factor of seven, in order to be consistent with the proposed load line (running rope) safety factor. Issue 4 of the proposal discussed the proposed equipment safety factors and solicited additional input. Some commenters, including Lift-All and the Wire Rope Technical Board (Exs. 3-13 and 3-15), supported setting the safety factor at seven. Other commenters, such as the Salt River Project and the Spartan Equipment Co. (Exs. 3-61 and 3-82), "accepted" the proposed safety factor, while Standard Oil (Indiana) (Ex. 3-46) simply took it as a "given." Spartan suggested that setting the safety factor at five instead of seven would still provide "satisfactory" protection. These comments either did not provide a basis for using seven or they relied on the rationale presented in the proposal to support setting seven as the safety factor for hoist ropes.

Unit Crane & Shovel, the Boeing Company, and Boeing Aerospace (Exs. 3-47, 3-38 and 3-57) suggested that OSHA set the safety factor for rigging at 10, based on the same authorities and rationale used to support their suggestion that the safety factor for running ropes be set at 10 (See discussion of paragraph (g)(3)(i)(A) of the final rule.) The Boeing commenters also suggested that OSHA require a higher safety factor when employers use rotation resistant rope. OSHA notes that Unit Crane would set different safety factors for the personnel platform and its "attaching devices" (safety factor of 5) on the one hand, and running ropes (safety factor of 10) on the other, citing ANSI B30.5-1982, section 5-3.2.2(b)(3). This raises the question whether platform rigging should be considered part of the platform or part of the load line for the purpose of setting a safety factor for rigging.

ANSI A10.28-1983 does not specify a safety factor for rigging, but it does agree with ANSI B30.5-1982 in setting the safety factor for the personnel platform at five. The National Constructors Association, Johnson Bros. Corporation and Granite Construction (Exs. 3-30, 3-43 and 3-50) suggested setting the rigging safety factor at five so that it would be consistent with the personnel platform safety factor. Magma Copper and the AGC of America (Exs. 3-27 and 3-28) suggested that setting the safety factor for rigging at five would be adequate. In addition, Columbus McKinnon (Ex. 3-16) opposed the proposed rigging safety factor of seven because it was inconsistent with the

industry practice regarding hooks (safety factor of three to five) and shackles (five to six).

OSHA notes that the load imposed on the hoist line is greater than that imposed on any single static line, such as a platform sling. Based on the comments and the pertinent consensus standards, OSHA is convinced that it is critical to provide employers with clear, readily applicable guidance for designing the platform and its rigging. Accordingly, the Agency has determined that the platform rigging safety factor should be the same as for the platform itself and has revised the proposed paragraph to require a safety factor of five. OSHA agrees that rotation resistant rope is subject to greater and harder to detect deterioration than standard wire rope, therefore the Agency has set the safety factor for rotation resistant rope at 10. Therefore, OSHA promulgates paragraph (g)(4)(iv)(C), as revised.

Paragraph (g)(4)(iv)(D) requires that all eyes in wire rope slings be fabricated with thimbles to prevent excessive wear on the rigging.

Magma Copper (Ex. 3-27) commented that thimbles were unnecessary, based on its suggestion that OSHA set the wire rope and hardware safety factors at five. In addition, Standard Oil (Indiana) (Ex. 3-46) commented that thimbles would only be minimally useful, based on a safety factor of seven. The Salt River Project (Ex. 3-61) and Lunda Construction Company (Ex. 3-92) supported the proposed provision, with the Salt River Project emphasizing that OSHA should require thimbles of the flemish eye type, rather than the fold back splice type.

OSHA has determined that there is a reasonable basis for this requirement because thimbles are generally used in the fabrication of slings intended for use more than one time, whether hoisting material or personnel. Thimbles allow a smoother bending of the portion of wire rope used to make eyes, and help prevent kinks and crimps that would occur without the thimble. This results in less deformation of the wire rope, and, therefore, reduces deterioration of the ropes strength. In keeping with the performance-oriented approach OSHA has taken in setting requirements for personnel platforms, the Agency will not specify the type of thimble to be used. Therefore, this paragraph is promulgated unchanged.

Paragraph (g)(4)(iv)(E) prohibits the use of personnel hoisting bridles and other personnel hoisting rigging for any other purpose. This provision appeared in the proposed standard as paragraph (g)(6)(x). It has been relocated so it will

appear with other provisions which regulate rigging.

The Construction Industry Manufacturers Association (Ex. 3-31) recommended that "no external load shall be lifted by attaching to the personnel platform." The State of California (Ex. 3-33) and the National Constructors Association (Ex. 3-74), while generally opposed to hoisting of other loads, commented that it should be permitted in the isolated circumstances when need was shown. The Milwaukee Construction Industry Safety Council (MCISC) (Ex. 3-70) commented that a crane should not hoist other loads while employees are aloft, suggesting that the platform be lowered when the workers need more materials. DuPont (Ex. 3-75) and the State of Michigan (Ex. 3-84) suggested that OSHA expressly prohibit any other crane operations while employees are being hoisted. On the other hand, Kenny Construction (Ex. 3-69) asserted that it needs to use a "whip" line to assist hoisted personnel in their work.

As already stated in the discussion of paragraph (g)(4)(iii)(C), OSHA believes that the use of a personnel platform for material hoisting would expose hoisted employees to increased risks. Given the close relationship between the platform and the attached rigging, OSHA has concluded that the ban on material hoisting should also apply to the rigging. In particular, OSHA has determined based on the evidence in the record, that the danger of excessive wear and entanglement from hoisting other loads far outweighs the convenience value of permitting the practice. OSHA has revised the language to prohibit clearly the use of the rigging for other service and to make the language consistent with the similar restrictions for use of the platform found in paragraph (g)(4)(iii)(C).

In addition, OSHA solicited comments in Issue 10 regarding the need for an additional sling (bridle) which would be in position to support the personnel platform in case the primary connection failed. Several commenters, such as Parsons Corporation, the U.S. Air Force and the Research and Trading Corporation (Exs. 3-22, 3-24 and 3-60) stated that a secondary bridle was necessary for protection of hoisted personnel. Other commenters, the Boeing Company and Boeing Aerospace (Exs. 3-38 and 3-57), stated that secondary bridles were not always needed, particularly where independent lifelines were feasible. The Boeing commenters noted that the "safety" bridle protected against only one possible cause of platform fall. The State of California (Ex. 3-33) noted that

a secondary bridle would not be needed where the requirement in proposed paragraph (g)(4)(iv)(B) for positive locking load hook was satisfied and suggested that hooks be designed to ensure that secondary bridles would not be needed. The Milwaukee Construction Industry Safety Council (Ex. 3-26), in turn, noted that a standard hook with a safety latch would be sufficient to comply with proposed paragraph (g)(4)(iv)(B) if the second sling was required.

On the other hand, the Northwest Engineering Company, the AGC of St. Louis, Unit Crane and Shovel and Norpac Engineering, Inc. (Exs. 3-3, 3-14, 3-47 and 3-88) commented that a safety sling requirement was neither necessary nor desirable. In particular, the AGC of St. Louis and Unit Crane stated that the proximity of the "redundant" sling to the load line would cause damage through chafing and tangling. Unit Crane added that compliance with the proposed requirements for closing the hook throat, prohibiting free fall, using lifelines and performing prelift safety checks would properly protect hoisted personnel. In addition, the Boilermakers Union (Ex. 3-53) stated that there had been no accidents involving its members which indicated need for a safety bridle. The Boilermakers added that the "rigorous testing" required under the proposed rule made the possibility of such an accident "virtually non-existent."

OSHA agrees with the commenters who noted that compliance with the provisions of the proposed rule, such as the requirements for hook throat closing and equipment testing, will protect hoisted personnel, so that a secondary sling is not needed.

Paragraph (g)(5) of this final rule details the inspection and testing requirements for cranes, derricks and platforms used to hoist personnel. This paragraph has been extensively revised, as discussed below.

Paragraph (g)(5)(i) as proposed required the inspection, by a competent person, of the crane or derrick used to hoist personnel, before each shift and after material handling operations where the load exceeded 50 percent of the rated capacity. The Boeing Company and Boeing Aerospace (Exs. 3-38 and 3-57) commented that the latter requirement would necessitate disruptive mid-shift inspections. In addition, the National Constructors Association and Bechtel (Exs. 3-30 and 3-45) noted that inspections are already required by other paragraphs in § 1926.550.

OSHA has determined that any potential problem involving a crane or

derrick supported personnel hoisting system or set-up would be detected through compliance with the existing requirements of § 1926.550, or through the evaluation of a trial lift which satisfies the terms of new paragraph (g). Therefore, OSHA has deleted the inspection requirements set out in proposed paragraph (g)(5)(i).

In the proposed rule, OSHA required that employers perform trial lifts, and the Agency provided guidance regarding the information to be obtained through the trial lifts. OSHA recognizes that some commenters were confused by the proposed language.

OSHA intended to require that employers conduct trial lifts with the personnel platform unoccupied. The trial lift would encompass the entire operational cycle—from the point where an employee entered the platform; through each work location accessible from the set up location, in sequence; and, return to the point where the employees would exit the platform. The trial lift would be repeated each time the crane was set up in a new location. The Agency position regarding this provision has not changed. In this final rule, OSHA provides specific guidance to employers as to what must be determined during this trial lift.

Commenters also expressed uncertainty regarding the Agency's purpose in requiring trial lifts. Many commenters apparently confused the trial lift and proof testing requirements. In order to eliminate misunderstanding, OSHA notes that the purpose of the trial lift is to determine that the lift route is free of obstacles; to determine work location accessibility; to confirm that no work locations will place the crane or derrick in such a configuration where the intended load would exceed the 50 percent limit of the crane's rated capacity; to ensure soil or other supporting surface stability, and to determine suitability for the intended lift. The trial lift is conducted just prior to commencing actual hoisting operations. The proof test, on the other hand, is conducted to test the capacity and construction of the personnel platform. Proof testing is required prior to hoisting personnel and after any repair or modification. The proof test and trial lift can be conducted simultaneously, as long as the specific requirements for each are satisfied.

Paragraph (g)(5)(i), as promulgated, requires that the operator perform a full cycle operational trial lift before allowing personnel in the platform. This paragraph is similar to proposed paragraph (g)(5)(ii) and is based on ANSI B30.5-1982, section 5-3.2.2(a)(6). Additionally, this paragraph requires the

operator to determine that all systems, controls and safety devices actuate and function properly; that there is nothing along the hoisting route which would interfere with the platform reaching the work location and returning; and that all configurations needed during the hoisting operation will allow the operator to remain within the derated capacity. OSHA believes that the crane or derrick operator is the best and, probably, the only person qualified to make these determinations.

Most of the commenters supported proposed paragraph (g)(5)(ii), although they diverged as to the circumstances when the trial lift must be performed. A few commenters, such as Columbia Nitrogen (Ex. 3-58), stated that the requirement would impose a burden without providing a benefit, because the 50 percent derating already provided the necessary protection. Some commenters, such as Unit Crane & Shovel and the Organization Resources Counselors (Exs. 3-47 and 3-88), suggested that OSHA promulgate the provision as proposed. Others, such as the Associated General Contractors of America and Granite Construction (Exs. 3-28 and 3-50), asserted that trial lifts should only be required at the beginning of a shift. Granite Construction's comment, however, reflected the mistaken impression that operators would have to interrupt hoisting to perform a trial lift each time the platform was repositioned, even if the crane or derrick were not moved. OSHA's intent is for operators to run the unoccupied platform through all movements and positions necessary to do the work before permitting employees aboard the platform. By contrast, a change in the set-up location of the crane or derrick, the addition of one or more work locations to those already reached from an existing set-up location, or a significant change in the lift route, will require another trial lift.

OSHA has determined that a trial lift should be performed directly before personnel are hoisted, rather than at the beginning of a shift, as was proposed. The Agency is concerned that a trial lift would not take into account the circumstances under which personnel hoisting would take place if the trial lift were conducted hours before the hoisting. Under those circumstances, the proposed trial lift might not provide the necessary assurance that the lift would be completed safely.

OSHA believes that the requirement as revised will impose a more reasonable regulatory burden on employers than did the requirement as proposed. Employers will only need to perform trial lifts when they will

actually be hoisting employees, instead of having to perform them at the beginning of any shift in which there is a possibility that they might need to hoist personnel. Therefore, OSHA has decided that this requirement, as revised, most effectively regulates the timing of trial lifts.

Paragraph (g)(5)(ii) of this final rule requires that the trial lift be repeated whenever the crane is moved and set up in a new location or returned to a previously used location. This provision is similar to and replaces paragraph (g)(5)(iii) of the proposal.

In the proposal, OSHA required that the test lift at each new set-up location be conducted at 150 percent of the intended load. OSHA recognizes that the proposed language was not sufficiently clear. Several commenters apparently misconstrued the trial lift requirement as requiring a proof test of the platform. For example, the Bechtel Power Corporation (Ex. 3-45) commented as follows:

The proposed requirement is excessive, costly and nonproductive. We agree a load test of the personnel platform is a good practice but there is no sense in requiring load testing more often than that for the crane. ANSI requires load testing of cranes at the time they first come on the job or when modified or possibly damaged or on an annual basis.

The National Constructors Association, Standard Oil Company (Indiana), the American Road and Transportation Builders Association, and the Carolinas Branch of the ACC, (Exs. 3-30, 3-46 3-65 and 3-82), opposed the proposed requirement on the grounds that compliance would involve frequent handling of materials, which could damage the platform and cause employee injury, and would require employers to carry test weights or ensure test weights are available.

On the other hand, many commenters, such as the Commonwealth of Puerto Rico (Ex. 3-55) and the Milwaukee Construction Industry Safety Council (Ex. 3-26), supported the proposed trial lift requirements. Unit Crane & Shovel (Ex. 3-47) suggested that, in addition, OSHA require a trial lift when a crane or derrick is moved back to a former set-up location. Further, the International Union of Operating Engineers testified:

And whenever that crane is relocated, I mean, from coming around from this side of the building over to this other side of the building, and set up to work to operate again with a work platform, it should be tested again.

Our feeling is that it should be tested again. Because, we're not just testing, and load the

sandbags in and take it up to the point where the work is going to be performed.

We're not just testing for the rigging or the stability of the crane, but we're testing for clearances on whatever obstructions there might be, like the edge of a building, or a tree over here, or a guide wire going up to a stack.

We're going to see if we can get the crane into this place with this work platform, with the men in it, without hitting any kind of an obstruction. So, we're testing for clearances, as well as for stability of the crane.

And, of course, there could be something. There's always the possibility that there's an old manhole or a sewer or something down there. And we get this concentrated ground bearing pressure under an outrigger or under the end of the cats or something, that we might drop down through. (Tr. 424-425)

OSHA agrees with the Operating Engineers' reasons for performing trial lifts in these situations. Accordingly, based on the evidence in the record, the Agency is requiring that the employer conduct a trial lift, with the platform loaded to the anticipated lift weight, at each new set-up location and when returning to previously used locations.

OSHA has relocated the provisions of proposed paragraph (g)(6)(vii) to paragraph (g)(5)(iii) in the final rule. This consolidates the inspection and testing requirements in paragraph (g)(5), as suggested by the National Constructors Association (Ex. 3-30). Proposed paragraph (g)(6)(vii), which is based on ANSI B30.5-1982, section 5-2.4.2(a), requires testing and inspection to ensure, prior to hoisting, that a personnel platform is secure and properly balanced. In particular, the inspection must ensure that hoist ropes are free of kinks; lines are not twisted around each other; the primary attachment is centered over the platform; and all ropes are properly seated on drums and in sheaves.

Several commenters, including the American Road & Transportation Builder Association (ARTBA) (Ex. 3-65), stated that these proposed provisions were unnecessary and should be deleted. In particular, the ARTBA contended that the determinations required under proposed paragraph (g)(6)(vii) could be made in conjunction with the trial lift. This was OSHA's intent, and in order to clarify this intent, the Agency now specifically states that this is to be done as part of the trial lift.

OSHA has relocated these provisions, related to hoist rope and rigging inspection, to paragraph (g)(5)(iii) because the Agency believes that they deserve specific mention as a reminder to employers that these items must be inspected at the end of the trial lift, and directly before actually hoisting personnel.

Paragraph (g)(5)(iv) provides that a competent person shall inspect the equipment and base support or ground immediately after a trial lift, to determine whether the test exposed any defects or had any adverse effects. This requirement is virtually identical to proposed paragraph (g)(5)(iii)(A). The added "competent person" requirement reflects input from the ACCSH (Tr. 5-23-83 pp. 148-149) and is intended to ensure that the designated person has the skill, experience and authority to perform the inspection and have any defects repaired. Unit Crane & Shovel (3-47) suggested that OSHA specifically require employers to inspect the rigging after a trial lift. The Agency intended the employers to include the rigging when they performed their post-trial lift inspection. For the sake of clarity, OSHA has revised this provision as suggested. Therefore, OSHA promulgates paragraph (g)(5)(iv) as renumbered and revised.

Paragraph (g)(5)(v) requires that employers correct any defects found during an inspection before hoisting personnel. This provision is identical to proposed paragraph (g)(5)(iii)(B). There were no comments regarding this requirement. Therefore, OSHA promulgates proposed paragraph (g)(5)(iii)(B) as paragraph (g)(5)(v).

Paragraph (g)(5)(vi) requires that employers proof test their personnel platforms and hoist rigging at 125 percent of the rated capacity of the platform, with the test load evenly distributed on the platform. The proof test is to be performed prior to hoisting personnel for the first time at a work site, or whenever the platform or rigging has been repaired or modified. This provision, based on ANSI A10.28-1983, section 7.2, has been added because of OSHA's concern that employees might otherwise be hoisted unsafely in personnel platforms whose structural integrity may have been compromised by damage, repair or modification. In its discussion of proposed paragraph (g)(4)(ii)(F), covering welding (49 FR 6286), OSHA requested input regarding the need for proof testing and the appropriate weight and procedure. Unit Crane & Shovel (Ex. 3-47) recommended that "the platform be proof tested after fabrication and certified to have withstood a load five times its assigned capacity rating." The Specialized Carriers and Rigging Association (Ex. 3-54) noted that "B30.9 of ANSI requires that all welded assemblies used in overhead lifting (personnel platform) must be proof tested to twice their rated capacity." The Commonwealth of Puerto Rico (Ex. 3-55) recommended proof testing at 150 percent of rated capacity

after fabrication, and the Boeing Company and Boeing Aerospace (Exs. 3-38 and 3-57) recommended proof testing at 200 percent every three months, if the platform is in continual use. In addition, Bechtel (Ex. 3-45) suggested that OSHA require proof testing at 125 percent of the rated capacity of the personnel platform.

The State of California (Ex. 3-33) recognized proof testing as an option, but suggested that OSHA instead require personnel platform certification by an engineer, coupled with periodic inspection by a competent person.

OSHA has determined that proof testing at each job site is the most effective way to evaluate structural integrity, because the testing would detect deficiencies in fabrication and any damage caused in transit. OSHA also believes that a platform certification requirement is unnecessary because the required proof testing and inspection requirements would disclose any defects.

OSHA believes that field proof testing at 200 percent of the rated capacity could possibly permanently deform structural members. The Agency has further determined that suspending the platform for five minutes, loaded at 125 percent of the rated capacity, is considered an adequate, non-destructive field test and will provide the necessary assurance that any defect in the platform or rigging would be detected and corrected before any personnel were hoisted. Therefore, new paragraph (g)(5)(vi) incorporates such a requirement.

Paragraph (g)(6) addresses work practices which the Agency has determined will enhance the safety of workers being hoisted in personnel platforms.

Paragraph (g)(6)(i) of this final rule requires that hoisted employees keep all parts of their bodies inside the platform during raising, lowering and positioning. This provision, which is based on ANSI A10.28-1983, section 12.6, is identical to the proposed provision, except that the Agency has added an explanation which states that the requirement does not apply to an occupant of the platform performing the duties of a signal person. Thus, the paragraph, as promulgated, takes into account a common sense consideration which was overlooked in the proposal. OSHA determined that this revision was needed based on comments submitted by Magma Copper and Bechtel (Exs. 3-27 and 3-45). The Construction Industry Manufacturers Association (Ex. 3-31) expressed support for the provision as proposed.

Proposed paragraph (g)(6)(ii) required that the platform be landed or secured to the structure before employees enter or exit the platform. This provision was based on ANSI A10.28-1983, section 12.7. One commenter, the State of Maryland (Ex. 3-19), disagreed with the proposed requirement, stating that "securing the platform to another structure can be dangerous." On the other hand, commenters such as the Commonwealth of Puerto Rico (Ex. 3-55) supported the proposed provision. In addition, Unit Crane & Shovel (Ex. 3-47) commented that "it is unclear what structure OSHA is referring to." Unit Crane suggested that OSHA use the term "stable structure." Unit Crane also noted that the movement of workers in a personnel platform could cause dangerous instability and suggested that the hoisted platform be secured to a "stable structure" whenever employees were working either in the platform or outside.

OSHA has reviewed the evidence in the record regarding this issue and agrees that the language of this provision needs to be clarified. In response to Unit Crane's concern, the Agency is revising the paragraph to make it clear that the platform is to be secured to "the structure where the work is to be performed * * *". On the other hand, the Agency concluded that a requirement to secure the platform to a "stable structure" would be inappropriate for certain work activities, such as demolition, where securing to the structure would create an unsafe condition. Indeed, OSHA recognizes that there are circumstances where there is no structure to which it is possible to secure the platform safely, and has revised the paragraph accordingly. Therefore, OSHA has decided to promulgate this provision as revised.

Paragraph (g)(6)(iii) of the final rule is identical to the proposed provision. This provision, which is based on ANSI A10.28-1983, section 12.8, requires the use of tag lines, unless the use of a tag line creates an unsafe condition. The Agency believes, based on ANSI B30.5-1982, section 5-3.2.1.4(m) and the *Crane Handbook* (Ex. 5-2D), that compliance with this provision will be an important element in ensuring that any hoisting while traveling, as regulated by paragraph (g)(7) below, proceeds safely. The Agency received few comments on this provision. Kerr-McGee (Ex. 3-23) commented that the use of a tag line as a means of controlling platform motion was preferable to the use of rotation resistant wire rope. In addition, the Milwaukee Construction Industry Safety

Council (Ex. 3-26) and Organization Resources Counselors (Ex. 3-89) expressed support for the proposed requirement. Therefore, OSHA promulgates the requirement as proposed.

Proposed paragraph (g)(6)(iv), which prohibited traveling with personnel suspended on a hoisted platform, has been deleted. Traveling is now addressed in paragraph (g)(7), below.

Proposed paragraph (g)(6)(v) has been redesignated as paragraph (g)(6)(iv) in the final rule. The proposed provision required that the crane or derrick operator remain at the controls at all times when hoisting employees. The requirement was based on ANSI A10.28-1983, section 12.4, and B30.5-1982, section 5-3.2.2(a)(12), which provide that the crane or derrick operator shall stay at the controls while the platform is suspended. Boeing (Ex. 3-38) and Standard Oil (Indiana) (Ex. 3-46) agreed that this requirement should only apply when the platform was suspended. In addition, Unit Crane & Shovel (Ex. 3-47) suggested that the crane operator remain at the controls, with "attention directed to the platform at all times when the platform is suspended." Unit Crane recognized that careful regulatory drafting would be necessary to ensure that compliance with this requirement did not detract from the performance of the operator's other duties. OSHA believes that a requirement for the operator to remain at the controls and carefully conduct the lift ((g)(3)(i)(A)) will ensure that the necessary attention is paid to the position of the platform. Therefore, OSHA has responded to Unit Crane's concern, but has not adopted the suggested language.

Also, the Construction Industry Manufacturers Association (CIMA) and the Boilermakers Union (Exs. 3-31 and 3-53) stated that the operator should remain at the controls while the platform is "occupied." The CIMA emphasized the alertness required to ensure the safety of platform passengers while the crane engine is running, and the Boilermakers Union was particularly concerned that hoisted personnel would be endangered if the operator left the controls once the platform had been hoisted to and secured at its working position.

OSHA agrees with the CIMA and Boilermakers Union that the operator should be at the controls once the crane engine is running and the personnel platform is occupied, because inadvertent movement by the crane before hoisting or after landing could cause injuries. Therefore, OSHA has

revised this paragraph to require that the operator remain at the controls whenever the crane engine is running and the personnel platform is occupied.

Paragraph (g)(6)(v) requires that employers discontinue personnel hoisting promptly when there are indications that hoisted employees would be exposed to dangerous weather conditions or other impending danger. This provision is virtually identical to paragraph (g)(6)(vi) of the proposed standard. The Agency has added the word "promptly" to this paragraph, as recommended by the Construction Industry Manufacturers Association (Ex. 3-31). The Agency believes that this modification clarifies its regulatory intent.

Some commenters suggested that OSHA set a specific wind speed at which operations would be discontinued (Ex. 3-31 and 3-46). Other commenters, such as the Boeing Company (Ex. 3-38), suggested that OSHA specify the weather conditions under which employers would be required to discontinue personnel hoisting operations. OSHA believes that it is neither possible nor necessary to compile such a list, because circumstances vary so much between construction sites. Indeed, the ACCSH declined to suggest more specific language for this provision because it felt that a broadly worded requirement was needed to cover the many hazards which could arise (Tr. 5-23-83 pp. 147-148). OSHA also notes that its enforcement efforts would be adversely affected if problems arose due to conditions not specifically included in a list.

In addition, the Boilermakers Union (Ex. 3-53) suggested that OSHA require a "constant monitor" to detect hazardous gases when employees are hoisted to repair the tops of foundry stacks, coke ovens and other chimneys at facilities where normal operations are continuing. Although OSHA is concerned that hoisted employees could be harmed by toxic materials, the hazards raised by the Boilermakers are already regulated by other construction standards, such as the permissible exposure limits set forth in § 1926.55. Therefore, the Agency believes that it is not necessary to adopt the suggested revision.

The provisions of proposed paragraph (g)(6)(vii) have been moved to paragraph (g)(5) and have been discussed above.

Paragraph (g)(6)(vi) of this final rule, which is virtually identical to proposed paragraph (g)(6)(viii), requires that employees being hoisted remain in continuous sight of and in direct

communication with the operator or signal person, while allowing the use of direct communications alone only if the circumstances warrant. This provision is consistent with ANSI A10.28-1983, sections 11.1 and 11.2, and with B30.5-1982, section 5-3.2.2(a)(15). Proposed paragraph (g)(6)(viii) required in all circumstances both continuous visual contact, and communication with the operator or signal person. OSHA received written comments and hearing testimony which indicated that radios or other means of communication would enable the hoist to proceed safely when direct visual contact with the operator or signal person was impossible or unsafe.

A representative of Sigma Associates, Ltd. testified as follows:

I can envision times when it's going to be impractical and really unsafe to place a signalman in a position where he would have view of the crane operator as well as the personnel work platform. So I can see some conditions where it would not be possible or practical to have a signalman in view and, under these conditions, would recommend that communications would be permitted in lieu of the signalman concept. (Tr. 39)

Several other commenters suggested that OSHA permit the use of two-way audio communication equipment as an alternative to visual contact. Some commenters, such as Morrison-Knudsen Co. and Standard Oil Company (Indiana) (3-9 and 3-46), stated that audio contact was appropriate where visual contact could be lost in the course of the hoisting operation, such as where employees are hoisted inside a silo or furnace stack. Other commenters, such as the National Constructors Association, Boeing Aerospace and the Organization Resources Counselors (Exs. 3-30, 3-57 and 3-89), stated that audio contact was a satisfactory means of maintaining communication.

OSHA has determined that there are circumstances where it would be impossible or unsafe for hoisted personnel to maintain visual contact with the signal person or crane operator. In particular, the Agency believes that stationing a signal person atop a chimney or silo to observe hoist operations would be dangerous. Therefore, OSHA has revised the proposed standard to provide that hoisted employees may use direct communication, such as audio contact, as an alternative to continuous sight when it would be more dangerous for the signal person to remain in continuous sight.

Paragraph (g)(6)(vii) of this final rule is essentially the same as paragraph (g)(6)(ix) of the proposed standard, except that proposed paragraph

(g)(6)(ix) provided only for the use of body belts. The final rule reflects the ACCSH recommendations for flexible approaches to protection of hoisted personnel from fall hazards (Tr. 5-23-83 p. 143). This provision requires employees occupying a personnel platform to use a body belt or harness system, with a lanyard attached to either the load block, overhaul ball or a structural member of the platform capable of supporting the anticipated fall impact. This provision is based on ANSI A10.28-1983, sections 10.1 and 10.2. However, at the suggestion of the Boeing Company (Ex. 3-38), OSHA has added the option for personnel to use a body harness system to comply with this provision.

Several commenters, including the Panama Canal Commission (Ex. 3-51) and Standard Oil Company (Indiana) (Ex. 3-46), asserted that the tie-off requirement, especially during over water operations, would be hazardous. The Panama Canal Commission pointed out that:

In the event of cable or crane failure, employees attached to the work platform by belts or lanyards would be dragged under with the dropped platform.

In addition, the American Road and Transportation Builders Association (ARTBA) (Ex. 3-65) commented that the proposed provision was "not realistic." ARTBA stated that tie-off should not be required "where it creates another hazardous situation."

OSHA recognizes that there is a basis for special concern regarding crane or cable failure over water, and has incorporated this suggestion into this revised paragraph. In addition, OSHA notes that the revision is consistent with the existing § 1926.106 which requires specific precautions for all construction work over water.

Proposed paragraph (g)(6)(x) has been relocated to paragraph (g)(4)(iv)(E) of the final rule so that all provisions related to rigging are consolidated. The provisions of that paragraph are discussed as part of paragraph (g)(4).

OSHA has added a new paragraph (g)(6)(viii) to the final rule. This provision prohibits cranes or derricks being used to hoist personnel from hoisting any other loads at the same time. OSHA added this paragraph because, as noted by several commenters, including the Construction Industry Manufacturing Association and the National Roofing Constructors Association (Exs. 3-31 and 3-59), the use of other lines would endanger hoisted personnel due to risks of entanglement and destabilization.

OSHA has added a new paragraph (g)(7) to the final rule in order to provide requirements for cranes which need to travel with employees suspended in a personnel platform.

Proposed paragraph (g)(6)(iv) prohibited hoisting personnel while the supporting crane was traveling, except where a portal or tower crane was operating on a fixed track. This proposed provision reflected OSHA's concern that a crane moving across a construction site would be unable to maintain the stability necessary to protect employees from tipping or other hazards. OSHA notes that section 5-3.2.2(a)(14) of ANSI B30.5-1982 prohibits "travel while personnel are on the platform." On the other hand, ANSI A10.28-1983, section 12.9, provides that cranes shall not travel while hoisting personnel, "except under carefully controlled conditions." In Issue 9, the Agency presented questions regarding the circumstances which would make it necessary for a truck or crawler crane to travel while hoisting personnel.

Several commenters, such as the State of Alaska, Granite Construction Company and the Spartan Equipment Company (Exs. 3-4, 3-50 and 3-82), stated that traveling while hoisting was sometimes necessary in order to protect employees from greater hazards. In particular, Alaska stated that the decision should be based on the weather, terrain, the height to which personnel would be hoisted and the obstacles anticipated in lowering and rehoisting personnel and suggested that employers be required to demonstrate the need for travel. Also, Granite Construction stated that traveling while hoisting would be necessary where the crane was so hemmed in by structures that the boom could not be adjusted to reach all work stations. Granite Construction and Spartan Equipment stated that limited travel should be permitted to position the crane properly. In addition, the AGC of America (Exs. 3-28 and 3-67) stated that the proposed provision was too restrictive and unrealistic in light of workplace realities. The AGC suggested that OSHA permit travel when the terrain is firm, smooth and even; when traveling is done at a very slow speed; when travel is limited to the radius of the boom; when the boom is parallel to the direction of travel; and with outriggers, if equipped, fully extended with rams no more than 50 percent raised.

The National Constructors Association and the State of California (Exs. 3-30, and 3-33) generally favored prohibition of traveling, subject to exception for minor movement for final

positioning. California added that "traveling on rail, prepared level pads, or concrete floors could be acceptable." The State of Maryland (Ex. 3-19) also commented that hoisting while traveling on rails was acceptable.

Other commenters, such as Ebasco Constructors, Inc., Unit Crane & Shovel and the Commonwealth of Puerto Rico (Exs. 3-6, 3-47 and 3-55), suggested that OSHA prohibit travel. Ebasco Constructors noted the continual "changes in the physical surrounding" and the high rate of employee turnover as reasons why traveling would be unsafe. Unit Crane & Shovel stated that even slightly uneven terrain could cause a personnel platform to bounce and swing, and that traveling would cause stability and occupant footing problems. Unit Crane and Puerto Rico noted that swinging of the boom during travel was a particularly dangerous situation. Norpac Engineering, Inc. (Ex. 3-88) commented that cranes should not be allowed to travel while hoisting and that requiring mobile cranes to deploy their outriggers while hoisting would ensure that cranes would not travel.

The Parsons Corporation (Ex. 3-22) supported the proposed ban on travel by truck or crawler cranes while hoisting. Parsons also suggested that OSHA regulate travel by cranes on fixed tracks to ensure that the speed and path of movement are safe.

Sigma Associates, in its hearing testimony (Tr. 48-49), stated that it knew of "no condition where a pneumatic or rubber tired crane or even a crawler would * * * need to travel." Sigma Associates emphasized the importance of ensuring that the crane was supported on a firm level surface and indicated that travel would detract from crane stability and would endanger employees.

OSHA has determined, based on the evidence in the record, that hoisting of employees while traveling is, in general, an extremely dangerous practice. Therefore, the Agency has prohibited the practice, *except* under very limited circumstances. Because this practice is so inherently dangerous, OSHA has determined that the ANSI A10.28 requirement for "careful control" of operations is not sufficient to protect employees from the hazards of traveling. The Agency has determined that a prohibition against all hoisting while traveling, except as set forth in paragraph (g)(7) of this standard, is the only way to ensure that personnel hoisting is done only in those situations where it is necessary, and not just for an employer's convenience. OSHA notes that the Panama Canal Commission (Ex. 3-51) has had successful experience

with locomotive cranes and agrees that those types of cranes should be included, along with tower and portal cranes, in the exception to the prohibition. In addition, OSHA believes that the circumstances where other kinds of cranes would need to travel while hoisting are so rare that the proper course is to require an employer to demonstrate to OSHA, as suggested by the State of Alaska (Ex. 3-4), that traveling is necessary to avoid greater hazards while performing work.

Paragraph (g)(7)(i) prohibits cranes from traveling while hoisting employees, except for portal, tower and locomotive cranes, or where the employer demonstrates that there is no less hazardous way for employees to perform their work. This paragraph, which is similar to proposed paragraph (g)(6)(iv), adds exceptions for personnel hoisting operations involving locomotive crane and other circumstances where traveling has been shown to be necessary. OSHA stresses that this practice would still have to satisfy all of the other requirements of the standard so that employees would be hoisted safely. This provision reflects a recommendation from Granite Construction (Ex. 3-50) which commented:

Hoisting of personnel while the crane travels should be permitted to a limited extent under carefully controlled conditions where necessitated by worksite restrictions.

Other commenters, including the State of Alaska (Ex. 3-4), The National Constructors Association (Ex. 3-30), and the Spartan Equipment Company (Ex. 3-82) also suggested that OSHA allow some travel under controlled conditions, when the circumstances required it.

Paragraph (g)(7)(ii) provides additional rules that must be followed when cranes travel while hoisting employees.

Paragraph (g)(7)(ii)(A) requires crane travel to be restricted to a fixed track or runway. This provision is similar to the exception in proposed paragraph (g)(6)(iv). OSHA has added provision for traveling on a "runway," as defined in paragraph (g)(1)(ii)(E), to reflect recognition that there may be cranes, other than those on fixed tracks, which need to travel while hoisting personnel. This requirement, as revised, reflects comments from the State of California (CAL/OSHA) (Ex. 3-33) and the approved revision of ANSI A10.28-1983, which has not yet been published. In particular, CAL/OSHA stated that "traveling on rail, prepared level pads, or concrete floors could be acceptable."

Paragraph (g)(7)(ii)(B) limits travel to the load radius of the boom used during

the lift. This requirement was suggested by the AGC of America (Ex. 3-28) and Granite Construction (Ex. 3-50). Therefore, if travel would exceed the boom radius used during a particular personnel hoisting operation, the crane operator would be required to lower the platform, unload the occupants, reposition the crane, and perform another trial lift at the new position, before resuming the hoist operations. OSHA believes that this limitation will ensure that only the minimal, necessary traveling takes place.

Paragraph (g)(7)(ii)(C) requires that the boom be parallel to the direction of travel. This requirement, also suggested by the AGC (Ex. 3-28) and Granite Construction (Ex. 3-50), is consistent with ANSI B30.5-1982, section 5-3.2.1.4(m) which covers travel while hoisting material. This provision is intended to minimize the possibility that the crane will tip over, due to swinging of the boom and platform during travel.

Paragraph (g)(7)(ii)(D) requires that an employer perform a complete trial run before allowing employees on the platform. OSHA intends this requirement to supplement the requirements of paragraph (g)(5). It imposes only a nominal additional burden, because all testing requirements can be satisfied through one full cycle trial lift or run. This provision reminds the employer to test the route of travel as well as the route of the lift.

Paragraph (g)(7)(ii)(E) provides requirements for travel by rubber-tired cranes, reflecting OSHA's concern that rubber-tired cranes have lower capacity ratings than crawler cranes. These provisions are based on generally accepted good safety practice and comments received from the AGC of America (Ex. 3-28).

Paragraph (g)(8) requires that a pre-lift meeting be held prior to the trial lift. This paragraph reflects a suggestion received from the ACCSH at the May 23-24, 1983 meeting (Tr. 149-150), and is very similar to proposed paragraph (g)(7). The pre-lift meeting requirements have been modified slightly to clarify the Agency's regulatory intent.

One commenter, the Farm and Industrial Equipment Institute (FIEI) (Ex. 3-37), suggested that OSHA require employers to document, in writing, that they have complied with the standard. The FIEI stated "such documentation will fix accountability, aid enforcement and immeasurably improve the overall effectiveness of the rule in actual practice." Another commenter, the State of California (Ex. 3-33) suggested that OSHA require a written pre-lift plan.

OSHA has determined that the suggested written plan and recordkeeping requirements are not necessary. The procedures to be followed are clearly set forth and whether or not they have been followed can be readily determined by employee interviews at the hoist site.

The Agency has undertaken several recent rulemakings which follow the mandate of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*) and section 8(d) of the OSH Act (29 U.S.C. 657(d)) to reduce recordkeeping requirements where they do not significantly contribute to employee safety and, therefore, unnecessarily burden employers. Accordingly, OSHA is very concerned that there be a clear benefit from any additional recordkeeping requirements. OSHA believes that requiring employers to document their compliance efforts, as suggested, would not significantly enhance the protection provided to employees by this standard. Therefore, the Agency has not adopted the suggested paperwork requirements, and promulgates paragraph (g)(8) as revised.

III. Final Analyses of Regulatory Impact, Regulatory Flexibility, and Environmental Impact

The following is a summary of the final regulatory impact and regulatory flexibility analyses prepared by OSHA for the final revised standard for crane or derrick suspended personnel platforms. The full text of the document may be examined and copied in OSHA's Docket Office, 200 Constitution Avenue, NW., Room N-3670, Washington, DC, 20210; telephone (202) 523-7894.

Summary of Effects

Affected Firms and Industries and Construction

The hoisting of personnel occurs in construction firms classified under a broad range of four-digit Standard Industrial Classification Codes (SICs). OSHA has determined that the final rule could potentially affect all firms within SICs 1541, Industrial Buildings and Warehouses; 1542, Nonresidential, not elsewhere classified; 1622, Bridge, Tunnel, and Elevated Highway Construction; 1629, Heavy Construction, Not Elsewhere Classified; 1791, Steel Erection; and 1795, Demolition. There were 42,804 firms in these SICs in 1982, and OSHA estimates that the number increased to about 45,000 firms in 1987. However, a number of these firms may adopt alternative means for hoisting personnel, such as aerial lifts, once the standard is implemented.

In addition to directly affecting the construction industry, the final rule will also indirectly affect the crane manufacturing industry and the firms that sell, lease, or rent cranes. In 1983, there were 26 companies that manufactured the types of cranes covered by the final rule, 7 of which were considered large companies. Crane rental agencies buy about 60 percent of all new construction cranes and construction companies buy most of the remainder.

Feasibility, Benefits, and Costs

OSHA has determined that compliance with this standard is technologically feasible. The standard does not require any devices that are not presently available for use on cranes and derricks. However, some cranes, especially the older mechanical ones, would require considerable modification in order to comply with the standard.

The benefits of the rule accrue to those workers who are at risk from current hoisting practices in the construction industry. Although the JACA Corp., OSHA's contractor, was unable to estimate the total number of workers who would benefit from the final standard due to the infrequency of such operations and the wide diversity of potentially affected workers, JACA was able to estimate the rate of injuries per lift. It is estimated that 1 injury occurs for every 36,500 persons lifted and that 3 fatalities and 3 nonfatal injuries occur each year as a result of crane- or derrick-suspended platform accidents. OSHA concludes that compliance with the final standard will avert most of these predicted fatalities and nonfatal injuries. In fact, a review of the experience of the states with stringent suspended platform rules in place for five years revealed no accidents during the five-year period.

Using current industry practice as a baseline, OSHA estimates that the annualized costs of full compliance with the final standard would be \$5.8 million in 1987 and \$5.5 million each for the years 1988-1991. The cost of using substitutes where they are a safe alternative to hoisting personnel by means of cranes or derricks accounts for over half of the estimated annual compliance cost for this baseline. The costs of retrofitting or converting cranes, retrofitting or building personnel platforms, and providing locking hooks and test weights comprise about 26% of the total cost. Delay-of-job, pre-lift meeting, and familiarization costs comprise the remainder. If all firms were in full compliance with the current OSHA Directive on work platforms suspended from crane booms, the cost of

the proposed changes would be \$2.8 million in 1987, and from \$2.4 million to \$2.6 million on an annual basis over the 1988-1991 period. There would be no cost for the substitution of alternative hoisting methods because the current OSHA Directive requires the use of less hazardous substitutes. This category represents the bulk of the cost difference between the two baselines.

Economic Effect

JACA used model firms to characterize the impacts on major users of suspended platforms. JACA estimated that the percentage increases in prices that would be needed for model firms to pass forward their compliance costs fully to their customers were insignificant; none would exceed 0.1 percent. JACA also calculated the effects of compliance costs on return-on-assets and profit margins assuming costs would be fully absorbed by model firms, and concluded that the decline in the rates of return on assets and profit margins was insignificant for all size firms. JACA concluded further that firms would be able to pass on most of their incremental costs to customers, and projected that compliance with the proposed standard would not result in decreased competition within the affected sectors of the construction industry as compliance costs are not likely to force the closure of any firms. In view of these factors, OSHA concludes that compliance with this final rule is economically feasible.

OSHA has assumed that crane manufacturers would be able to pass forward to the construction industry the increased costs of their product attributable to the standard because the magnitude of the costs is small. But if it were assumed that manufacturers would not be able to pass forward the increased costs, any adverse financial effects would be mitigated by the very small proportion of total output represented by cranes used for personnel hoisting. OSHA therefore concludes that the final rule will have no adverse economic effects on the crane manufacturing industry.

Regulatory Flexibility Certification and Environmental Impact Assessment

Regulatory Flexibility Certification

Pursuant to the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*), OSHA has assessed the impact of the final rule and concludes that it would not significantly affect a substantial number of small entities. Specialization and the highly fragmented nature of the market structure in the construction industry

tend to minimize the extent of direct competition between small and large firms.

Assuming that the full cost of compliance would be passed through, OSHA estimated the economic impacts according to firm size by examining the relationship between compliance costs (in both low and high-cost estimates) and annual contract revenues for three size categories of model firms (annual revenues of \$11 million, \$50 million, and \$250 million). The ratio of these costs to annual revenues was nearly proportional across all size categories for both low and high cost estimates, in no case exceeding 0.1 percent. However, if firms would be forced to absorb all of their compliance costs, OSHA found that the percentage decline in the profit margins of small firms would be slightly greater than for larger firms under both cost estimates. Under the low cost estimate, the small firm's profitability declined an average 1.7 percent over the five year period while the large firm's profitability declined an average 1.5 percent. Under the high cost estimate, the small firm's profitability declined 5 percent over the five years while the large firm's profitability declined 3 percent. The significance of the differential impact on profit margins is reduced by the likelihood that all firms in the industry should be able to pass on a substantial portion, if not all, of their compliance costs. OSHA believes the demand for the projects built by construction firms which rely on hoisting of personnel by cranes and derricks is inelastic. Therefore, construction firms would have no incentive to underbid on projects requiring cranes since they would be unable to reduce operating costs merely by using equipment other than cranes to hoist personnel platforms or by redesigning structures to eliminate the use of cranes. In effect, both large and small firms will shift costs forward to the buyer.

For these reasons, OSHA concludes that small entities would not be significantly affected by the final rule.

Environmental Impact Assessment

This final rule has been reviewed in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4231 *et seq.*), the Guidelines of the Council on Environmental Quality (CEQ) (40 CFR Parts 1500-1517), and the Department of Labor's NEPA Procedures (29 CFR Part 11). As the result of this review, the Assistant Secretary of Labor for OSHA has determined that the final rule qualifies as a categorically excluded action according to Subpart B, § 11.10 of

the DOL NEPA regulations and that the final rule would have no significant environmental impact.

OSHA's final rule contains provisions for work practices which will enhance worker safety and reduce safety hazards from the hoisting of personnel platforms by cranes and derricks. The provisions include design criteria for cranes, derricks, and platforms; inspection and testing of cranes and derricks; required test lifts; and pre-lift meetings. Because the final rule focuses on the reduction of accident or injury by means of compliance with design criteria and work practices and procedures, it does not impact on air, water, or soil quality, plant or animal life, the use of land or other aspects of the environment.

IV. Recordkeeping

The recordkeeping requirements in this standard have been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* The approval number is 1218-0151 and the approval has been granted until June, 1991.

List of Subjects in 29 CFR Part 1926

Construction safety, Construction industry, Cranes, Derricks, Hoisting, Personnel platform, Rigging.

V. State Plan Standards

The 25 States with their own OSHA-approved Occupational Safety and Health plans must adopt a comparable standard within six months of this publication date. These States are: Alaska, Arizona, California, Connecticut,¹ Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York,¹ North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. Until such time as a State standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate.

VI. Authority

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

Accordingly, pursuant to sections 4, 6(b), and 8(g) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), section 107 of the Construction Safety Act (40 U.S.C. 333), Secretary of Labor's Order No. 9-83 (48 FR 35736),

¹ Plan covers only State and local government employees.

and 29 CFR Part 1911, 29 CFR Part 1926 is amended as set forth below.

Signed at Washington, DC this 26th day of 1988.

John A. Pendergrass,
Assistant Secretary of Labor.

29 CFR Part 1926 is amended as follows:

PART 1926—SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

1. The authority citation for Subpart N of Part 1926 is revised 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 (49 FR 35736), as applicable. Section 1926.550 also issued under 29 CFR Part 1911.

2. In § 1926.550, a new paragraph (g) is added to read as follows:

§ 1926.550 Cranes and derricks.

* * * * *

(g) *Crane or derrick suspended personnel platforms*—(1) *Scope, application and definitions*—(i) *Scope and application.* This standard applies to the design, construction, testing, use and maintenance of personnel platforms, and the hoisting of personnel platforms on the load lines of cranes or derricks.

(ii) *Definitions.* For the purposes of this paragraph (g), the following definitions apply:

(A) "Failure" means load refusal, breakage, or separation of components.

(B) "Hoist" (or hoisting) means all crane or derrick functions such as lowering, lifting, swinging, booming in and out or up and down, or suspending a personnel platform.

(C) "Load refusal" means the point where the ultimate strength is exceeded.

(D) "Maximum intended load" means the total load of all employees, tools, materials, and other loads reasonably anticipated to be applied to a personnel platform or personnel platform component at any one time.

(E) "Runway" means a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane suspended platform. An existing surface may be used as long as it meets these criteria.

(2) *General requirements.* The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the erection, use, and dismantling

of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous, or is not possible because of structural design or worksite conditions.

(3) *Cranes and derricks*—(i)

Operational criteria. (A) Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or derrick, or the platform.

(B) Load lines shall be capable of supporting, without failure, at least seven times the maximum intended load, except that where rotation resistant rope is used, the lines shall be capable of supporting without failure, at least ten times the maximum intended load. The required design factor is achieved by taking the current safety factor of 3.5 (required under § 1926.550(b)(2)) and applying the 50 per cent derating of the crane capacity which is required by § 1926.550(g)(3)(i)(F).

(C) Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs shall be engaged when the occupied personnel platform is in a stationary working position.

(D) The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering.) Free fall is prohibited.

(E) The crane shall be uniformly level within one percent of level grade and located on firm footing. Cranes equipped with outriggers shall have them all fully deployed following manufacturer's specifications, insofar as applicable, when hoisting employees.

(F) The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick.

(G) The use of machines having live booms (booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds) is prohibited.

(ii) *Instruments and components.* (A) Cranes and derricks with variable angle booms shall be equipped with a boom angle indicator, readily visible to the operator.

(B) Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom's extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel.

(C) A positive acting device shall be used which prevents contact between the load block or overhaul ball and the boom tip (anti-two-blocking device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two block damage prevention feature).

(4) *Personnel Platforms.*—(i) *Design criteria.* (A) The personnel platform and suspension system shall be designed by a qualified engineer or a qualified person competent in structural design.

(B) The suspension system shall be designed to minimize tipping of the platform due to movement of employees occupying the platform.

(C) The personnel platform itself, except the guardrail system and body belt/harness anchorages, shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load. Criteria for guardrail systems and body belt/harness anchorages are contained in other Subparts, E and M, respectively of this part.

(ii) *Platform specifications.* (A) Each personnel platform shall be equipped with a guardrail system which meets the requirements of Subpart M, and, shall be enclosed at least from the toeboard to mid-rail with either solid construction or expanded metal having openings no greater than ½ inch (1.27 cm).

(B) A grab rail shall be installed inside the entire perimeter of the personnel platform.

(C) Access gates, if installed, shall not swing outward during hoisting.

(D) Access gates, including sliding or folding gates, shall be equipped with a restraining device to prevent accidental opening.

(E) Headroom shall be provided which allows employees to stand upright in the platform.

(F) In addition to the use of hard hats, employees shall be protected by overhead protection on the personnel platform when employees are exposed to falling objects.

(G) All rough edges exposed to contact by employees shall be surfaced or smoothed in order to prevent injury to employees from punctures or lacerations.

(H) All welding of the personnel platform and its components shall be performed by a qualified welder familiar with the weld grades, types and material specified in the platform design.

(I) The personnel platform shall be conspicuously posted with a plate or other permanent marking which indicates the weight of the platform and its rated load capacity or maximum intended load.

(iii) *Personnel platform loading.* (A) The personnel platform shall not be loaded in excess of its rated load capacity. When a personnel platform does not have a rated load capacity then the personnel platform shall not be loaded in excess of its maximum intended load.

(B) The number of employees occupying the personnel platform shall not exceed the number required for the work being performed.

(C) Personnel platforms shall be used only for employees, their tools, and the materials necessary to do their work, and shall not be used to hoist only materials or tools when not hoisting personnel.

(D) Materials and tools for use during a personnel lift shall be secured to prevent displacement.

(E) Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform while the platform is suspended.

(iv) *Rigging.* (A) When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner to ensure that the load is evenly divided among the bridle legs.

(B) Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

(C) Wire rope, shackles, rings, master links, and other rigging hardware must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings shall be capable of supporting without failure at least ten times the maximum intended load.

(D) All eyes in wire rope slings shall be fabricated with thimbles.

(E) Bridles and associated rigging for attaching the personnel platform to the hoist line shall be used only for the platform and the necessary employees, their tools and the materials necessary to do their work, and shall not be used for any other purpose when not hoisting personnel.

(5) *Trial lift, inspection, and proof testing.* (i) A trial lift with the unoccupied personnel platform loaded at least to the anticipated liftweight shall be made from ground level, or any other location where employees will enter the platform, to each location at

which the personnel platform is to be hoisted and positioned. This trial lift shall be performed immediately prior to placing personnel on the platform. The operator shall determine that all systems, controls and safety devices are activated and functioning properly; that no interferences exist; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50 percent limit of the hoist's rated capacity. Materials and tools to be used during the actual lift can be loaded in the platform, as provided in paragraphs (g)(4)(iii) (D), and (E) of this section for the trial lift. A single trial lift may be performed at one time for all locations that are to be reached from a single set up position.

(ii) The trial lift shall be repeated prior to hoisting employees whenever the crane or derrick is moved and set up in a new location or returned to a previously used location. Additionally, the trial lift shall be repeated when the lift route is changed unless the operator determines that the route change is not significant (i.e. the route change would not affect the safety of hoisted employees.)

(iii) After the trial lift, and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. Employees shall not be hoisted unless the following conditions are determined to exist:

(A) Hoist ropes shall be free of kinks;
(B) Multiple part lines shall not be twisted around each other;

(C) The primary attachment shall be centered over the platform; and

(D) The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly stated on drums and in sheaves.

(iv) A visual inspection of the crane or derrick, rigging, personnel platform, and the crane or derrick base support or ground shall be conducted by a competent person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure.

(v) Any defects found during inspections which create a safety

hazard shall be corrected before hoisting personnel.

(vi) At each job site, prior to hoisting employees on the personnel platform, and after any repair or modification, the platform and rigging shall be proof tested to 125 percent of the platform's rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform (this may be done concurrently with the trial lift). After proof testing, a competent person shall inspect the platform and rigging. Any deficiencies found shall be corrected and another proof test shall be conducted. Personnel hoisting shall not be conducted until the proof testing requirements are satisfied.

(6) *Work practices.* (i) Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning. This provision does not apply to an occupant of the platform performing the duties of a signal person.

(ii) Before employees exit or enter a hoisted personnel platform that is not landed, the platform shall be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe situation.

(iii) Tag lines shall be used unless their use creates an unsafe condition.

(iv) The crane or derrick operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.

(v) Hoisting of employees shall be promptly discontinued upon indication of any dangerous weather conditions or other impending danger.

(vi) Employees being hoisted shall remain in continuous sight of and in direct communication with the operator or signal person. In those situations where direct visual contact with the operator is not possible, and the use of a signal person would create a greater hazard for that person, direct communication alone such as by radio may be used.

(vii) Except over water, employees occupying the personnel platform shall use a body belt/harness system with lanyard appropriately attached to the lower load block or overhaul ball, or to a structural member within the personnel platform capable of supporting a fall impact for employees

using the anchorage. When working over water, the requirements of § 1926.106 shall apply.

(viii) No lifts shall be made on another of the crane's or derrick's loadlines while personnel are suspended on a platform.

(7) *Traveling.* (i) Hoisting of employees while the crane is traveling is prohibited, except for portal, tower and locomotive cranes, or where the employer demonstrates that there is no less hazardous way to perform the work.

(ii) Under any circumstances where a crane would travel while hoisting personnel, the employer shall implement the following procedures to safeguard employees:

(A) Crane travel shall be restricted to a fixed track or runway;

(B) Travel shall be limited to the load radius of the boom used during the lift; and

(C) The boom must be parallel to the direction of travel.

(D) A complete trial run shall be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift required by paragraph (g)(5)(i) of this section which tests the route of the lift.

(E) If travel is done with a rubber tired-carrier, the condition and air pressure of the tires shall be checked. The chart capacity for lifts on rubber shall be used for application of the 50 percent reduction of rated capacity. Notwithstanding paragraph (g)(3)(i)(E) of this section, outriggers may be partially retracted as necessary for travel.

(8) *Pre-lift meeting.* (i) A meeting attended by the crane or derrick operator, signal person(s) (if necessary for the lift), employee(s) to be lifted, and the person responsible for the task to be performed shall be held to review the appropriate requirements of paragraph (g) of this section and the procedures to be followed.

(ii) This meeting shall be held prior to the trial lift at each new work location, and shall be repeated for any employees newly assigned to the operation.

[FR Doc. 88-17199 Filed 8-1-88; 8:45 am]

BILLING CODE 4510-26-M