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Safety Standards for Fall Protection in the Construction Industry; Proposed Rule

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1926

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[Docket No. S–206C]

Safety Standards for Fall Protection in the Construction Industry

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

ACTION: Advance Notice of Proposed Rulemaking.

SUMMARY: In this advance notice of proposed rulemaking (ANPRM), OSHA requests comments and information on fall protection for workers engaged in certain construction activities currently covered by OSHA's Standards for Fall Protection in the Construction Industry, published in volume 29 of the Code of Federal Regulations at §§ 1926.500–1926.503 (referred to here as the ''rule''). Since the rule was published on August 4, 1994, OSHA has received numerous communications requesting interpretations and claiming that compliance with the rule is sometimes infeasible in certain activities, such as in residential and post-frame construction, while climbing reinforced steel, erecting precast concrete, drilling shafts, and when providing prompt rescue. We are asking the public for information and data on fall protection for employees in these situations.

Information provided to the Agency in support of a claim of infeasibility should explain, in detail, why the rule cannot be complied with in certain circumstances, what fall protection methods could be used to protect workers engaged in these activities, and the degree of protection such methods would provide. In addition, such claims should be supported by data demonstrating that the current rule is not feasible for a particular activity and data demonstrating the effectiveness of any alternative approaches suggested. Respondents should also provide any information on the costs of alternative approaches and the reduction in injuries likely to be experienced if alternatives were to be adopted. With respect to OSHA Instruction STD 3–0.1A (interim fall protection compliance guidelines for residential construction), the Agency intends to rescind that directive unless persuasive evidence is submitted in response to this ANPRM demonstrating that for most residential construction employers complying with the rule is infeasible or presents significant safety hazards.

DATES: Comments in response to this ANPRM must be received by October 22, 1999.

ADDRESSES: Two copies of comments must be submitted to the OSHA Docket Office, Docket S206C, Room N2625, U.S. Department of Labor, 200 Constitution Avenue NW, Washington, D.C. 20210, 202–693–2350. Comments consisting of 10 pages or less may be faxed to the Docket Office at the following FAX number: 202–693–1648. However, two hard copies must be mailed to us within two days. Electronic comments can be submitted on the Internet at *http://www.osha-slc.gov/e-comments/e-comments-fallprotection.html.* The exhibits referred to throughout this document are available for inspection and copying at the OSHA Docket Office (see address and telephone number above), which is open weekdays from 10:00 am to 4:00 pm.

FOR FURTHER INFORMATION CONTACT: Ms. Bonnie Friedman, Occupational Safety and Health Administration, Office of Information and Consumer Affairs, Room N3647, U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, D.C. 20210, Telephone: 202 693–1999. Anyone with questions regarding the technical content of this document should contact Ms. Jule Jones at 202 693–2345. For electronic copies, contact OSHA's web page on the Internet at *http://www.osha.gov.*

SUPPLEMENTARY INFORMATION:

I. Background

On November 25, 1986, OSHA proposed to revise the fall protection standard. The rulemaking record, developed over a nine-year period, resulted in a more performance-oriented rule, issued on August 9, 1994 (published in volume 29 of the Code of Federal Regulations, part 1926, subpart M, and in volume 59 of the **Federal Register**, beginning on page 40,672). You can view the rule on OSHA's Internet site at www.osha.gov. In general, the rule requires that an employee exposed to a fall hazard of six feet or more must be protected by equipment that prevents or arrests the fall.

Subsequently, some employers have claimed that parts of the rule are not appropriate for their operations. The residential, precast concrete, and post-frame construction industries state that different fall protection provisions are needed for their activities. Some vendors who deliver roofing material believe the rule should not apply to them. Reinforcing steel (rebar construction) employers request that workers who climb rebar walls and assemblies be permitted to climb without fall protection and only be required to tie off upon reaching their work location. Also, some persons familiar with safety harnesses, restraint systems and positioning devices have raised concerns regarding the standard's performance criteria for fall protection systems.

In response to feasibility issues about the rule raised by the residential construction industry, on December 8, 1995, we issued interim fall protection procedures for residential construction employers (''OSHA Instruction STD 3.1'') that differ from those in the rule (on June 18, 1999, we issued a plain language re-write of STD 3.1. The re-write, STD 3–0.1A, replaces STD 3.1). We stated that we would undertake further rulemaking to address these fall protection issues. STD 3–0.1A permits employers to use specified work practices instead of conventional fall protection (systems/devices that physically prevent a worker from falling or arrest a worker's fall) for foundation work, some installation work on roofs and in attics, and some residential roofing work.

This notice begins our evaluation of these and other fall protection practices and of STD 3–0.1A. OSHA emphasizes that the extensive rulemaking process completed in 1994 established that the fall protection requirements in the rule are reasonably necessary and appropriate to protect employees from the significant risks of fall hazards. Providing such protection was demonstrated to be both technologically and economically feasible. (See the complete discussion in the preamble to the final rule for subpart M (volume 59 of the **Federal Register** at pages 40672–40722. That preamble is available at OSHA's Internet web site at www.osha.gov.) However, because of the concerns raised by employers engaged in the operations listed above, we are seeking additional information.

OSHA needs to hear the views of interested parties on all issues raised in this notice. After reviewing your comments and data, OSHA will decide what further steps, if any, may be appropriate.

We encourage interested parties to respond to the questions raised in Section IV— Summary and Explanation of Issues, where we detail each issue that you have brought to our attention.

II. Advisory Committee on Construction Safety and Health

A summary of the issues addressed by this notice was presented to the Advisory Committee on Construction Safety and Health (ACCSH). The full committee was initially briefed April 8, 1998, with updates provided on both July 22 and October 8 of that year.

III. Explanation of Issues

OSHA solicits information on a variety of issues pertaining to the fall protection standard. We are addressing 10 issues, most of which have been raised by interested parties who believe that alternatives to some of the rule's provisions should be permitted. They generally recommend that OSHA allow work practices rather than personal fall arrest systems and guardrails to protect employees against falls. The 10 issues identified for discussion and comment are as follows:

Issue 1. Whether There Is A Need for Alternative Procedures for Residential Construction
Issue 2. Whether There Is A Need for Alternative Procedures for Precast Concrete Erection
Issue 3. Whether There Is A Need for Alternative Procedures for Post-Frame Construction
Issue 4. Whether There Is A Need For Alternative Procedures For Vendors Delivering Construction Materials
Issue 5. Whether There Are Alternative Methods of Fall Protection While Climbing Reinforcing Steel (Rebar Walls and Cages)
Issue 6. What Criteria Should Be Used for Restraint Systems
Issue 7. Whether the Strength Requirements for Anchorage Points for Personal Fall Arrest Systems, Positioning Device Systems and Restraint Systems Should Be Changed
Issue 8. Whether the Standard's Prompt Rescue Requirements Should Be Revised
Issue 9. Whether There Is A Need for Alternative Procedures for Drilling Shafts
Issue 10. Whether Body Belts Incorporated Into Full Body Harnesses Provide Appropriate Employee Protection in a Fall

Issue 1. Whether There Is A Need For Alternative Procedures for Residential Construction

Alternative Measures Allowed by the Rule

Section 1926.501(b)(13) contains the fall protection requirements for residential construction, which state:

> Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of § 1926.502.

When promulgating this standard, OSHA acknowledged that some employers in the residential construction industry might have difficulty providing conventional fall protection for certain operations. Difficulties were expected during the erection of roof trusses and the installation of roof sheathing, exterior wall panels, floor joists, and floor sheathing. Accordingly, the final rule allows some flexibility for the residential construction employer. The rule states that conventional fall protection in residential construction is presumed to be feasible. However, where the employer can show that conventional fall protection is infeasible at a particular worksite, the employer may implement a written ''alternative fall protection plan.'' The plan must be in writing, designed for the particular work site, and specify alternative measures that are as protective as possible.

Alternative Procedures Allowed by Appendix E of the Rule

OSHA published a sample fall protection plan for residential construction that outlined acceptable alternative fall protection measures for each of the operations mentioned above. That plan is published in Appendix E to the rule (it begins on page 343 of the July 1, 1998 version of volume 29 of the Code of Federal Regulations, Part 1926). The Appendix E procedures consist of training requirements, supervision and administration of the plan by a designated competent person, use of a controlled access zone to minimize access to the work area, and use of a safety monitor. It has additional work practice requirements for each of the listed work activities. Workers may work on the ''top plate'' of stud walls and on the peaks of roof trusses and ridge beams without fall protection, under certain circumstances. Roof sheathing operations must be done with slide guards and certain work practice requirements. Work practice requirements are also delineated for installation of floor joists, floor sheathing, and the erection of exterior walls.

Alternative Measures Permitted by OSHA Instruction STD 3–0.1A That Differ From the Rule

After the rule was enacted, homebuilder representatives identified three additional categories of residential work where the use of conventional fall protection systems was, in their judgment, infeasible or would present a greater hazard to their workers: (1) Working on foundation walls and formwork used to build the walls; (2) installing drywall, insulation, heating/cooling systems, electrical systems, plumbing and carpentry in attics and on roofs, and (3) roofing work (the installation of weatherproofing roofing materials). These commenters asserted that, when doing these activities, nets could not be used and there was no place available and/or strong enough to anchor fall arrest equipment. They also stated that conventional fall protection for these activities was infeasible, or would create a greater hazard, in all residential projects, so it did not make sense to require employers to have written, site-specific alternative procedure plans for each site.

OSHA Instruction STD 3–0.1A provides a list of work practice measures that employers engaged in residential construction may use instead of fall protection for work on foundation walls/formwork, installation work in attics and on roofs and for roofing work. In addition, it provides that an employer's alternative fall protection plan does not have to be written or site-specific as long as it follows either Appendix E or, for these additional types of work, the procedures in STD 3–0.1A. Further, it permits employers to use these procedures without first having to show that conventional fall protection is infeasible or creates a greater hazard.

Procedures for Foundation/formwork Activities and Installation Work in Attics and On Roofs

The work practices allowed as alternatives to fall protection for working on foundation walls and related formwork consist of limiting the work to trained workers, minimizing their fall exposure, adequately supporting the wall/formwork, not working in bad weather, staging materials and equipment in locations that are convenient to those on the formwork, and eliminating impalement hazards. The procedures for installation work in attics and on roofs require limiting the work to trained employees, limiting their exposure, staging materials, eliminating impalement

hazards, limiting access to affected work areas, and not working in bad weather.

Procedures for Roofing Work

STD 3–0.1A also contains alternative procedures for some roofing work. Shortly after OSHA issued the rule, the National Roofing Contractors Association (NRCA) and the National Association of Home Builders (NAHB) asked OSHA to clarify how the roofing provisions applied to residential construction and asserted that more flexibility was warranted. They provided information on industry practices in support of their claims.

NAHB suggested that the sample fall protection plan found in Appendix E be expanded to specifically address roofing work at residential sites. The Association considered the use of conventional fall protection systems in residential roofing to be either infeasible or to pose a greater hazard. Roofing contractors claimed that requiring conventional fall protection is extreme and would not improve safety. They stated that their workers are skilled professionals who wear the proper footwear and understand the consequences of falling, and do not believe that fall protection is necessary during roofing activities. They further believe that full compliance with the rule is too costly and interferes with their ability to remain competitive, especially since, in their view, their competitors do not use conventional fall protection. To a large extent, information from the NAHB formed the basis of the alternative procedures in STD 3–0.1A for residential roofing work.

The STD 3–0.1A alternative procedures for roofing work may only be used where the roof slope is no more than 8 inches (vertical) in 12 (horizontal) and the fall distance, from the eave of the roof to the ground level, is 25 feet or less. Workers must be trained on slip hazards, and access to the rake edge must be minimized. Work must be suspended in bad weather, and impalement hazards must be eliminated.

In addition, for roofs with a slope of up to 4 in 12 inches, the employer has the option of using either a safety monitor or slide guards. A slide guard is typically a 2″ x 6″ board attached along the roof. STD 3–0.1A specifies certain materials, configurations, and locations for slide guards, depending on the steepness of the roof.

With two exceptions, slide guards must be used on any roof with a slope of over 4 in 12, up to 8 in 12. Those two exceptions are for roofs made of tile or metal, in which case a safety monitor may be used instead of slide guards. Fall protection must be used for all roofs with a roof slope steeper than 8 in 12.

Since the rule was enacted, there have been advances in the types and capability of commercially available fall protection equipment. OSHA specifically solicits comment on the alternatives to the rule permitted for roofing work by STD 3–0.1A. Specific questions on the various operations are listed later in this document.

Definition of Residential Construction

Although the rule has specific requirements for residential construction, it does not define that term. NAHB and others have asserted that ''residential construction'' should be defined to include light commercial structures in which the materials, methods and work environment are essentially the same as in homebuilding. They asserted that many homebuilders construct light commercial structures and that the hazards on both residential and these light commercial structures are essentially the same. NRCA has also asked that we clarify the term ''residential construction.'' NRCA asserts that homebuilding and similarly constructed light commercial structures should be treated in the same way with respect to providing fall protection during roofing work.

In STD 3–0.1A, OSHA defined residential construction as including work on structures where the working environment, construction materials, methods, and work procedures are essentially the same as those used for building typical single family homes and townhouses. Also, STD 3–0.1A stated that work on discrete parts of a large commercial structure could be considered residential construction as long as the working environment, materials, methods, and procedures were similar to those used for single family homes and townhouses.

We have received a number of inquiries and comments about this definition. A number of commenters have stated that the definition fails to adequately distinguish between work that is residential and work that is commercial. Some have suggested that some fall protection devices and methods that may not be economically feasible in constructing single family homes and townhouse residences are economically feasible when similar structures are built for commercial use. Others have suggested that as long as the materials, methods and work environment are the same, the alternative procedures allowed in STD 3–0.1A should apply, without regard to whether the building will be occupied as a residence or used for commercial purposes.

Request for Comments and Supporting Information

OSHA solicits comments on the alternative fall protection measures for residential construction work in Appendix E of the rule and in STD 3–0.1A, as well as on the STD 3–0.1A definition of residential construction. We seek comments and supporting information on whether the alternative procedures in STD 3–0.1A are the most protective and feasible methods currently available for protecting residential construction workers from falls. We request that comments include detailed information on fall protection methods, equipment, injuries and accidents, and personal experience related to these topics in both residential and light commercial construction.

Questions on Installing Floor Joists and Floor Sheathing

A fall protection system that is currently available consists of three components: a body harness, an anchor, and an adjustable strap with snap hooks at each end (Ex. 1–1). The anchor consists of a strap, which looks similar to a seat belt strap, with a D-ring at one end. For a floor sheathing operation, the anchor is installed by nailing the strap end to the first course of floor sheathing with double-headed nails. The nails are installed through the floor sheathing and into a floor joist.

The adjustable strap has snap hooks at each end—one connects to the anchor's D-ring and the other connects to the harness. As the leading edge advances, or as the worker moves about, the strap can be lengthened or shortened by depressing an adjustment device and letting out or pulling in the strap. When the anchor is no longer needed, the nails are removed (facilitated by the double headed nail) and the strap is discarded.

Is there a reason why this system is not feasible in floor joist and floor sheathing installations? Are there situations where movable catch platforms could not be used below the areas where workers are installing floor joists and floor sheathing to protect against falls?

Another way of providing fall protection for some construction activities is to set up a lifeline, to which individual workers attach their lanyards. As work progresses, the lifeline is moved forward. Is there a reason why this type of system could not be used when installing floor joists and floor sheathing? Are there retractable lanyards that will engage fast

enough to prevent a worker installing floor joists and floor sheathing approximately 10 feet above the next lower level from being injured in an arrested fall?

Questions on Installing Roof Sheathing

There are a number of commercially available products designed to serve as anchor points in wood framed structures for fall arrest systems. Most of these are designed to be attached to a roof truss, rafter or sheathing. Some provide a single attachment point, while others have multiple attachment points. Some are designed to be used to support a lifeline to which two workers can attach their lanyards. Some incorporate a swivelling, retractable lanyard (Exhibits 1–2 through 1–5).

Most of these products are designed to withstand a 5,000 pound load (the rule requires fall arrest system anchors to support a 5,000 pound load or to have a safety factor of two). A key question in determining the viability of these anchors in roof sheathing operations is the strength of the part of the structure to which the anchor is attached. Some contractors are adding bracing to roof trusses so that the strap anchors can be used during part of the sheathing operation. Are there other anchor systems available that can be installed before some (or any) sheathing is in place and still withstand a 5,000 pound load? How much sheathing (and in what arrangement) has to be installed before an anchor will support this load?

Various ''shock-absorbing'' lanyards and fall protection devices have been developed. The loads imposed in an arrested fall on the anchor point when using shock-absorbing equipment is less than when using conventional equipment. How much less are those loads? What is the minimum strength needed for anchors when shock-absorbing equipment is used?

The rule's 5,000 pound/factor of two requirement is for an anchor that is used as part of a fall protection system. A fall protection system arrests a person's fall. In contrast, a fall restraint system is a system that prevents a worker from falling any distance at all. The anchor for such a system is not called upon to withstand the forces of an arrested fall—it only has to withstand the forces of restraining a worker from moving further than the length of the lanyard. What is an appropriate minimum strength for an anchor in a restraint system? Is there a reason why a restraint system could not be used when installing roof sheathing?

Some roof sheathers use the strap anchor in conjunction with the following sheathing method: The strap anchor is nailed to (and wrapped around) one or more roof trusses before it is erected. Sheathing is installed by workers by standing on platforms on the inside of the second floor, starting from the eaves and working upward toward the ridge (top) of the roof (this eliminates the fall hazard to the exterior). The final (top) course is installed by workers on the roof who tie-off to the strap anchor. At that point the trusses are braced by all but the final course of sheathing. Is there a reason why this system is not feasible in roof sheathing installations?

Questions on Setting and Bracing Roof Trusses and Rafters

The procedures in Appendix E of the rule call for the first two trusses or rafters to be set from ladders. After the first two are set, a worker is permitted to climb a ladder onto the interior top plate to secure the peaks. The worker may remain on the top plate, using the (now stabilized) trusses or rafters for support, while the other trusses or rafters are erected. Also, workers may be stationed on the peaks of trusses or the ridge beam to detach trusses from cranes and to secure trusses (and also to secure rafters to the ridge beam, where there is no other feasible means of doing this).

There is now at least one commercially available device that eliminates the need for a worker to be on a truss to install bracing. This device is a temporary, reusable brace which is attached on one end to the truss before the truss is erected. Once the truss is raised, a worker on the floor level pulls the other end of the brace down onto the adjoining truss by a rope (Ex. 1–6). This eliminates the need for a worker to be on the truss or ridge to attach bracing. There are also devices available that permit a load to be detached from a crane remotely, rather than having to be on a peak or ridge beam to detach it manually.

We are interested in hearing from those who are familiar with these types of systems and have used them in residential construction or similar situations. Is there a reason why these types of systems are not feasible or present a greater hazard to workers performing this type of work? Is there a reason why some of this work could not be done from platforms? Are there other ways of protecting against the fall hazards facing workers performing residential construction or similar work?

The sample plan in Appendix E of the rule contains the following sample statement of why ladders may be a greater hazard on a particular site: ''requiring workers to use a ladder for the entire installation process [of roof trusses and rafters] will cause a greater hazard because the worker must stand on the ladder with his back or side to the front of the ladder. While erecting the truss or rafter the worker will need both hands to maneuver the truss and therefore cannot hold onto the ladder. In addition, ladders cannot be adequately protected from movement while trusses are being maneuvered into place. Many workers may experience additional fatigue because of the increase in overhead work with heavy materials, which can also lead to a greater hazard.''

There are commercially available hooking devices for the tops of ladders. Is there a reason why these or similar devices could not be used to help secure the ladder? When a ladder is used while erecting a truss, the ladder and the worker are on the inside of the exterior wall. If the worker were to fall, the worker would fall to the inside floor. In contrast, a worker on the top plate could fall to the exterior. On a second story, that fall would be a significantly greater distance than the interior fall. Is there a reason why it would be safer to erect the truss while standing on the top plate than to use a ladder with a securing device? OSHA seeks comment on these statements and questions, particularly from equipment manufacturers and those who have used or seen devices or methods other than working from the top plate, peak or ridge.

The sample plan in Appendix E of the rule also states that ''exterior scaffolds cannot be utilized on this job because the ground, after recent backfilling, cannot support the scaffolding. In most cases, the erection and dismantling of the scaffold would expose workers to a greater fall hazard than erection of the trusses/rafters.'' OSHA seeks comments on whether the problem of recently backfilled soil is unique to residential construction and whether this is an impediment to using exterior scaffolds. We also ask for comment on the extent to which different types of scaffolding are suitable to this work.

Questions on Working on Concrete and Block Foundation Walls and Related Formwork

STD 3–0.1A permits workers to work on the top of the foundation wall or formwork to the extent necessary to do the work. The only protective measures required when working on the top of the foundation wall or formwork are training, not working in bad weather, staging materials, and eliminating impalement hazards. Are there reasons why this work could not be done from ladders and/or scaffolds? Is there formwork available for this type of work

to which scaffolds can be attached? We are particularly interested in hearing from workers or employers who have done this work without standing on the tops of the walls or formwork.

Questions on Installation Work (Drywall, Insulation, Heating and Cooling Systems, Alarms, Telephone Lines and Cable TV, Plumbing and Carpentry) in Attics and on Roofs

The only protective measures required in STD 3–0.1A for these types of installation work are training, staging materials, eliminating impalement hazards, restricting access, and suspending work in bad weather. The strap anchor mentioned above, when attached to roof trusses before installation, can be left in place to provide tie-off points for this type of work in attics and on roofs (after all work is completed, the strap is cut off). Is there a reason why that system is infeasible for this work? Is there a reason why it is not feasible to use platforms, scaffolds or ladders when doing some or all of this work? Is there a reason why other fall arrest or fall restraint systems could not be used? In particular, with respect to the work on roofs, is there a reason why a fall restraint or fall arrest system could not be anchored to the roof structure during this work?

Questions on Roofing Work

The alternative procedures in STD 3–0.1A for roofing work consist of work practices and, depending on the steepness of the roof, monitors or slide guards. For roofs with a slope of up to 4 in 12 inches, monitors may be used instead of slide guards. Are monitors an effective means of preventing falls? What experience have you had using monitors? Is there a reason why slide guards are infeasible on roofs with slopes of less than 4 in 12?

STD 3–0.1A permits monitors to be used in place of slide guards for tile or metal roofs with a slope of up to 8 to 12 inches. Since these roof surfaces are more slippery than most other types of roofing, is there a reason why monitors should be allowed in place of slide guards for these roofs? Are there slide guard brackets/devices that can be used on these roofs?

STD 3–0.1A contains specifications for the configuration and installation of slide guards. Are these specifications appropriate? Are slide guards effective as replacements for personal fall protection?

OSHA has received a number of comments stating that roof anchors cannot be used on unsheathed or partially sheathed roofs because the structure to which the anchor is attached cannot withstand a 5,000 pound load. However, there are anchors on the market that are advertised as being suitable for use on a fully sheathed roof. Since roofing work is done after the roof is fully sheathed, are there technical or other reasons why roof anchors could not be used for roofing work? Some commenters have suggested that there are liability issues associated with installing roof anchors and then leaving them in place for others to use once the job is done. The strap anchors can be removed by simply cutting the strap. Why is it infeasible to remove a roof anchor (please specify how much time/expense is needed)? Are there other roof anchors that are designed to be readily removed? OSHA is particularly interested in comments from workers, employers and manufacturers who have studied, used or designed roof anchors for roofing work.

Questions on the Definition of Residential Construction

STD 3–0.1A defines residential construction as any construction project where the working environment, materials, methods and procedures are essentially the same as those used for typical single family homes and townhouses. Therefore, many buildings that will not be occupied as residences, but will be used for light commercial purposes, are included in the definition. Also, the STD 3–0.1A definition would include portions of commercial structures where the environment, materials and methods are similar to those used in building homes and townhouses. Is this an appropriate definition of residential construction for the purposes of the rule? Does this definition adequately distinguish between projects where conventional fall protection is feasible and those where, for some operations, it is not? Is this a workable definition—can employers readily use it to determine whether their project is considered residential construction? OSHA has received letters asking how the STD 3.1 definition applies to stick frame and brick apartment buildings; single story stick-framed commercial malls; and single story stick-framed retail structures. Does the STD 3–0.1A definition adequately deal with these type of projects? Should OSHA define residential construction in terms of the end use of the structure? Should the economic scale of the project be a factor in determining the fall protection options available to the builder? Would it be appropriate for OSHA to allow the use of alternative fall protection procedures on portions of a commercial structure that meet the definition of residential construction?

Issue 2. Whether There Is A Need for Alternative Procedures for Precast Concrete Erection

The precast concrete erection rule in subpart M, § 1926.501(b)(12), generally requires protection for employees exposed to fall hazards of 6 feet or more. Fall protection options are guardrails, safety nets, or personal fall arrest systems. In addition, if the employer demonstrates that it is infeasible or creates a greater hazard to use these systems, alternative measures may be used. When using alternative measures, the employer must implement a fall protection plan meeting the requirements of section 1926.502(k).

To meet the section 1926.502(k) requirements, a precast erection employer may follow the sample plan spelled out in Appendix E to subpart M (this is printed beginning on page 343 of the July 1, 1998 edition of volume 29 Code of Federal Regulations Part 1926). Under certain circumstances, that plan permits work without conventional fall protection during leading edge erection, initial connecting and grouting. The Precast Concrete Institute (PCI) thinks that fall protection should not be required for precast concrete erection activities occurring at heights below fifteen (15) feet and thirty (30) feet, the same fall protection thresholds as those in the recently proposed rule for steel erection (volume 63 of the **Federal Register** at pages 43452-43513) (Ex. 1–7).

On August 13, 1998, OSHA issued a proposed rule for fall protection in steel erection. This proposal is a product of negotiated rulemaking, conducted under the Negotiated Rulemaking Act (printed in volume 5 of the Unites States Code at section 561). The proposed rule would require fall protection for most steel erection workers above 15 feet. In that rule, however, there are exceptions for steel erection employees engaged in connecting activity and for deckers. Employees engaged in connecting work would be allowed to work at heights up to 30 feet without fall protection (but they must wear fall protection equipment and the employer must provide an attachment point). Deckers would also be allowed to work without fall protection up to 30 feet as long as they work in a Controlled Decking Zone. Conventional fall protection, such as safety nets, guardrail systems, or personal fall arrest systems would be required for all steel erection workers at heights over 30 feet.

PCI believes that the 15 foot threshold used in the proposed steel erection rule should also apply to the precast erection industry. They state that overhead attachment points (anchorages) are not always available when performing precast concrete work and that workers tied off at foot level need at least 12–19 feet of clearance below, depending on the type of system chosen.

PCI believes that the steel erection industry will have an unfair economic advantage over their industry if the threshold heights for fall protection differ in each industry. In support of this assertion, PCI has submitted data which it claims show that the use of fall protection equipment causes a 25 percent reduction in productivity. (Ex. 1–8)

PCI also argues that there are structures where both precast concrete and steel is erected and the same workers on such sites may be required to operate under two different rules. In such situations, under the steel erection proposal, workers doing the steel erection would be under the 15/30 foot thresholds. When the precast concrete is erected, with concrete members placed directly on the structural steel, the 6 foot threshold of subpart M would apply. This precast work is sometimes done by the same crews that erected the steel. PCI believes there should be one rule for these operations.

OSHA specifically requests comment on the extent to which the technical limitations of fall protection systems, and the limitations on the ways those systems can be used, forecloses the option of using conventional fall protection in precast erection. For example, the 15 foot minimum clearance limitation alluded to by PCI relates to assertions that have been made on the limitations of three types of fall protection systems: fixed lanyards anchored at floor level, some retractable lanyards, and nets. However, no minimum clearance is needed for temporary guardrails. The strap system described above is designed to work when anchored at floor level. The adjustable strap lanyard permits a worker to be tied-off at a fixed point and to move to various distances by extending and shortening the strap as needed. We believe that other lanyard systems connected to a lifeline can be installed so that a worker can work at and along a leading edge and be prevented from stepping past the edge, or to limit a leading edge worker's fall to six feet. We seek information on whether there are specific instances where these types of systems would not work in precast erection.

Questions on Precast Concrete Erection

In what specific situations are guardrails not useable in precast erection? Are there situations where lanyards connected to lifelines are not useable in precast concrete erection? Are there situations where the strap system would not be feasible? How do these limitations compare to those used in steel erection? Are there other fall protection devices that are useable in precast erection at 6 feet? In what specific way does the current rule for precast concrete erection, which gives alternatives when employers can show infeasibility or greater hazard, have insufficient flexibility to account for the technical limitations of fall protection systems?

Issue 3. Whether There Is A Need for Alternative Procedures for Post-Frame Construction

Post-frame construction employers believe there are many similarities between their work and residential construction, and that they too should be allowed to protect employees by using alternatives to conventional fall protection systems without showing on a site-specific basis that conventional fall protection is infeasible or creates a greater hazard.

The National Frame Builders Association (NFBA) suggested (in a letter to OSHA dated August 16, 1995, Ex. 1–9) that their work was similar to steel erection and that OSHA should exempt them from any fall protection rules up to a height of 25 feet. They assert that OSHA's requirements for residential construction, along with Appendix E of the rule and STD 3.1, are reasonable and appropriate for post frame construction operations.

Questions on Post-frame Construction

OSHA seeks comments and/or data on the following: under what specific circumstances are there problems with using conventional fall protection when building a post-frame structure? In what particular phases and parts of the operation do those problems arise? What factors limit the usability of fall protection systems in post-frame construction? Are there reasons why ladders, work platforms, scaffolds, restraint systems or fall protection systems cannot be used in post-frame construction? Are workers in post-frame construction exposed to unique fall hazards? We are particularly interested in hearing from safety product manufacturers or dealers, familiar with post-frame construction, who know of fall protection systems that can be used during post-frame construction and the limitations of those systems. We are also interested in hearing from builders and employees engaged in post-frame construction. What experiences do you have with fall protection systems in these operations? What accidents and/or near misses have occurred in your post-frame construction operations?

Issue 4. Whether There Is A Need For Alternative Procedures For Vendors Delivering Construction Materials

Employees of vendors delivering materials to a construction site can be exposed to the same fall hazards that construction workers face every day. However, some vendors have stated that fall protection for their workers is often infeasible, for several reasons. One is that the strength of a roof under construction is limited; if the weight of the materials being delivered collapses the structure, being tied-off to the structure will obviously not provide protection. Second, they assert that in the limited work area provided by the roof under construction, the use of fall protection systems creates a greater hazard because workers may trip over each other's lanyards. Finally, they point out that ''rope grab'' systems are infeasible for their workers. Those systems require the user to pull the lanyard with one hand in order to move across a work surface. Workers delivering materials would need to hold the rope grab with one hand and, at the same time, carry the materials, which are often large and/or heavy, with the other.

In February 1995 OSHA addressed fall protection issues related to vendors delivering materials by issuing two interpretations, designated Interpretation M–1 and Interpretation M–2 (Ex. 1–10). In Interpretation M–1, OSHA clarified when vendor employees are engaged in construction. They are defined as being so engaged ''when they deliver products or materials to the construction site that are used during the construction activity or when they are engaged in an activity that completes the construction work, such as final cleaning of buildings and structures.'' The Interpretation also made clear that if a construction contractor picks up materials at the vendor's store or outlet (rather than having the vendor deliver the materials), the vendor is not engaged in construction. Therefore, vendor employees delivering materials to a construction site and exposed to fall hazards of 6 feet (l.8 m) or more are covered by subpart M (Interpretation M–1).

Interpretation M–2 explained how OSHA would apply the fall protection requirements to vendor employees:

Gaining Access to the Roof: A handhold (rope, chain, or other railing) must be attached to the conveyer belt so that the employee has something to steady himself with as he gains access to the roof or a ladder must be used to gain access to the roof.

Distributing the Roofing Materials: Once on the roof the vendor's employee will receive the roofing products from a conveyor belt (lift truck or similar equipment) and then distribute the products onto the roof at various locations. During this distribution process, OSHA will not require the vendor's employees to install an anchorage point for fall protection equipment regardless of the slope of the roof or the fall distance.

However, if an anchorage point is already available on the roof, the employees must use fall protection equipment.

Questions on Fall Protection for Vendor Employees

Is there a reason why conventional fall protection for vendors is infeasible? Although the use of lanyards may pose a tripping hazard, that hazard—falling while protected by a fall protection system—must be compared with falling six or more feet to a lower level or to the ground. Why would tripping and being in an arrested fall be a greater hazard than the risk of falling, unprotected, to the ground?

We believe that there are fall protection devices available for this work other than rope grabs. For example, retractable lanyards and lanyards attached to lifelines permit workers to move across a surface while still being protected from falls. We believe that, when using these systems, a worker can use both hands and not have to hold onto the fall protection equipment. Are there reasons why these types of systems cannot be used to protect vendor employees?

There are now commercially available fall protection anchors that are designed to be placed on top of roof sheathing (Ex. 1–2). Is there a reason why vendors delivering supplies to a roof could not install this type of anchor and use it for fall protection for their employees? Also, the strap anchor can be installed to the trusses and be left available for the roofing work. Is there a reason why these systems are infeasible or would pose a greater hazard? We are particularly interested in hearing from safety product manufacturers or dealers, familiar with these operations, who are aware of fall protection systems (and their limitations) that can be used when delivering materials to roofs. We would also like to hear from vendors and vendor employees who have knowledge of industry practice and the use of fall protection for workers delivering construction materials.

Issue 5. Whether There Are Alternative Methods of Fall Protection While Climbing Reinforcing Steel (Rebar Walls and Cages)

Paragraph (b)(5) of § 1926.501, titled ''Formwork and reinforcing steel,'' requires employers to protect employees from falls by a safety net system, personal fall arrest system, or a positioning device system. These requirements are essentially the same ones that applied before we revised the rule. The issue concerning climbing rebar (steel rods used to reinforce concrete) is whether fall protection is infeasible for employees while climbing rebar walls and assemblies. In late December 1994, the National Association of Reinforcing Steel Contractors (NARSC) and the International Association of Bridge, Structural, and Ornamental Iron Workers (IWI) asked OSHA to clarify the requirements for workers climbing built-in-place rebar walls. They felt that employees were safer if allowed to climb the rebar without fall protection; only upon reaching their work location should they have to attach their personal fall arrest system or positioning device system (such as a rebar chain assembly).

Usually when placing and tying built-in-place rebar walls (as opposed to preassembled units, which are built on the ground and lifted into position), workers carry lengths of rebar cradled in their arms as they climb. Because of this, and the need to constantly connect and disconnect the lanyard while climbing, the NARSC and IWI felt their workers would encounter a greater risk of falling if required to comply with the rule. Also, the chain length in a rebar chain assembly, or the length of the lanyard in a positioning device system, ranges from 18 to 24 inches. This restricts the worker's movement and increases the frequency of disconnecting and reconnecting, according to these commenters.

In December 1994 and January 1995 (Ex. 1–11), OSHA issued interpretation letters that responded to these concerns by allowing employees to climb vertically and/or horizontally on the face of reinforcing steel walls and cages, up to a height of 24 feet, without being protected from falls. Over 24 feet, employees could not free climb.

Subsequently, on July 18 and August 5, 1996, the NARSC and the IWI submitted another interpretation request, which focused on preassembled reinforcing steel units. NARSC and IWI wanted us to expand our earlier interpretation for built-in-place units to cover preassembled units. Several interested parties supported NARSC's and IWI's request.

In a letter of interpretation dated May 19, 1997 (Ex. 1–12), we stated that, pending future rulemaking, employees could climb or move on both built-in-place and preassembled rebar units without fall protection until they reached their work location or until they reached a fall distance of 24 feet. Over 24 feet, continuous fall protection would be required.

Questions on Climbing Rebar

Are there ways of transporting lengths of rebar, other than having workers carry them in their arms? How far do workers typically have to move on the rebar in order to get to their initial work station, and to get to subsequent work stations? What portion is typically vertical, how much is horizontal, and for what part of the work? How many cycles of connecting disconnecting/reconnecting a fall protection device would be required in these point-to-point moves? To what extent is moving vertically on the rebar similar to climbing a fixed ladder? What problems are involved with providing fall protection for horizontal climbing? How are they different from those in vertical climbing? When employees climb without carrying rebar, are there any problems using positioning devices or personal fall arrest systems? Are there reasons why employees engaged in work other than rebar assembly work cannot use fall protection while climbing rebar? We are particularly interested in hearing from employers and employees engaged in placing and tying rebar walls and assemblies, and the type of fall protection methods they currently use. We would also like to receive information, including accident experience or data, as well as comments, comparing the risk of falling while moving horizontally and the risk while moving vertically.

Issue 6. What Criteria Should Be Used for Restraint Systems?

Subpart M does not mention ''restraint systems.'' Employers have asked for criteria for restraint systems and have questioned whether they can use a body belt with a restraint system instead of a full body harness to comply with the rule (Ex. 1–13). They have questioned whether the anchorage requirements for a restraint system need to be as strong as those for a personal fall arrest system, since a restraint system prevents a fall. Since restraint systems prevent falls, they can be used

to meet the requirements of the rule, according to some employers.

Is there is a need for a definition clarifying how restraint systems differ from other types of fall protection? In recent interpretation letters (Exs. 1–14 and 1–15), OSHA defined a restraint system as a means of preventing an employee from reaching a fall hazard. In other words, there will be no fall distance because the fall is prevented. For example, a restraint system would prevent an employee from stepping past the edge of a floor or roof. In contrast, a positioning device permits a fall, but the fall is arrested after no more than two feet. A personal fall arrest system arrests a fall after no more than six feet.

There are several reasons to consider adopting a definition and criteria for restraint systems. When using a restraint system, there is no fall to arrest—which means that no load is imposed on the body from an arrested fall. That may obviate the need for a body harness. Also, restraint system components may not need to be as strong as those for fall arrest systems; they need only be strong enough to hold an employee back from the edge.

One drawback to having diminished strength requirements for restraint systems may be that restraint system components may get mixed up with fall arrest system components and fail when used in a personal fall arrest system. This may be a particular problem with anchors—fall arrest systems may be inadvertently anchored to a restraint system anchor, which would not be adequate in an arrested fall.

Questions About Restraint System Criteria

OSHA requests comments on whether it should adopt separate requirements in § 1926.502 for restraint systems. Specifically, what are the maximum loads expected to be imposed on a system designed to restrain an employee from stepping past an edge? What are the appropriate strength requirements for restraint system anchors and other components? Is there a need for the requirements in subpart M for snap hooks and other connecting hardware also to apply to restraint systems? Alternatively, should components of a restraint system meet the same strength and other criteria as those for personal fall arrest systems? Is there a significant likelihood that restraint system components would get mixed up with personal fall arrest system components?

Issue 7. Whether the Strength Requirements for Anchorage Points for Personal Fall Arrest Systems, Positioning Device Systems, and Restraint Systems Should Be Changed

This issue addresses whether the anchorage requirement for positioning device systems should be changed. Commenters point out that, in some circumstances, the strength requirements for positioning device anchors are greater than those for personal fall arrest system anchors (Ex. 1–16). They assert that this does not make sense because positioning devices do not have to withstand as much force as fall arrest systems.

The rule requires fall arrest system anchorages to be capable of supporting at least 5,000 pounds (22.2 Kn) per employee or that the system maintain a safety factor of two. These commenters have calculated that, in some circumstances, a safety factor of two can be achieved in a 6 foot fall using an anchor strength of 2,000 pounds.

In contrast, positioning device anchors must always have a strength of at least 3,000 pounds. (Under § 1926.502(e)(2), positioning device anchors must be capable of supporting at least twice the potential impact load of an employee's fall, or 3,000 pounds, whichever is greater.) Since a positioning device limits a fall to only two feet, while a personal fall arrest system must sustain the much higher loads imposed by a six foot fall, these commenters suggest that the positioning device anchor requirements in § 1926.502(e)(2) be changed to require a support capability of 3,000 pounds, or two times the potential impact, whichever is less, rather than the current rule's requirement of whichever is greater.

Questions on Strength Requirements for Positioning Device Anchors

We request comments on whether the strength requirement for positioning device anchors should be changed to permit a capability based on the calculated potential impact. Are there circumstances when a positioning device anchor would have to be stronger than a fall arrest system anchor, as suggested by these commenters? What are the factors that a strength calculation should be based on? Should it be similar to the approach taken for fall arrest system anchors?

Issue 8. Whether the Standard's Prompt Rescue Requirements Should Be Changed

The rule requires employers to ensure that workers in an arrested fall either be promptly rescued from the fall arrest system or be able to rescue themselves, § 1926.502(d)(20). Some employers state that they cannot comply with this requirement when an employee is working alone in a remote location. Commenters say that self-rescue is rarely possible, since the worker is hanging in a harness in mid-air, often at least six feet down from the anchor point. Providing a mobile telephone or two-way radio will not always work, because these devices may be out of range in remote areas. Even in less remote areas, there are ''dead spots'' where these communication devices will not work. They also claim that it is often impossible to determine in advance if a construction crew will be working in a dead spot. A further complication is that in some remote areas, even if rescue personnel can be reached by telephone or radio, it may take a long time for help to arrive.

In some cases, providing an additional worker would ensure a prompt rescue. Some commenters have asserted that in many situations this second person would have no work to do other than to ''stand by'' in the event of an arrested fall. Others have questioned the need for this provision, pointing out that rescue is not required when employees are protected from falls by a positioning device or while tethered or restrained. They assert that rescue is only required when employees are performing construction work and using a personal fall arrest system—that there is no comparable rescue requirement while employees are performing maintenance work.

Most of the general industry standards do not explicitly require prompt rescue, although OSHA interprets the general industry standard for electric power generation, transmission and distribution (volume 29 of the Code of Federal Regulations at section 1910.269) as incorporating the rescue provision of 1926 subpart M. For other work, an employee who must be protected by the rescue requirement while doing construction work would not have to be protected in this way when engaged in maintenance work.

Questions on Prompt Rescue

OSHA seeks comments and information on the rule's prompt rescue requirement. We specifically seek information on the extent to which there have been instances where rescue has been necessary from arrested falls, or where workers have fallen unprotected by a fall arrest system, but would have needed to be rescued had they been protected. Is there a need to define ''prompt'? How long can an employee

be suspended in a harness without being harmed?

Issue 9. Whether There Is a Need for Alternative Procedures for Drilling Shafts

The rule (§ 1926.501(b)(7)(ii)) requires employees at the edge of a well, pit, shaft, or similar excavation, 6 feet or more in depth, to be protected from falling by the use of a guardrail system, fences, barricades, or covers. OSHA's policy is that where these options are infeasible, this requirement can be met by the use of a personal fall arrest system.

The International Association of Foundation Drilling and others are concerned that excavating shafts using drilling rigs presents unique fall protection problems and that requiring conventional fall protection while performing certain tasks creates a greater hazard to workers. They assert that lanyards and lifelines can get entangled with equipment and that self-retracting lanyards may be rendered inoperable by mud and/or wet concrete. They do not consider guardrails, fences, barricades, or covers as viable fall protection options around an active shaft because these would prevent the drilling workers from doing their work.

When addressing the fall hazards associated with holes, OSHA stated in the preamble to the rule (located at volume 59 of the **Federal Register** at page 40686) that it did not intend a guardrail to be erected around holes while employees were working at the hole and that, if a hole cover was removed while work was in progress, guardrails would not be required because they would interfere with the performance of work. The drilling industry commenters believe that this statement should apply to shafts that are actively being drilled and that only after the shaft has been completed should fall protection be required.

These commenters also suggest that the diameter of a shaft should be considered in determining when fall protection is required. They assert that small diameter shafts do not pose the same hazards as larger diameter shafts—that workers around shafts with a diameter of 18–30″ do not necessarily need fall protection.

Questions on Fall Protection While Drilling Shafts

OSHA requests comments with supporting information on any difficulties or hazards associated with providing fall protection during the drilling of shafts. With respect to the entanglement issue, what equipment at a drilling or shaft excavation site can entangle a fall protection system, and under what specific circumstances can that occur? Where is the fall protection equipment anchored when the entanglement potential exists? What movement of which equipment could catch the safety lines? What work activities are being performed near the excavation? Is there a reason why the entanglement problem could not be avoided by using different safety equipment, coordinating work or modifying work practices? Are there retractable lanyards that are not adversely affected by mud and wet concrete? Are there ways of covering the lanyards to protect them from mud and concrete? Is there a reason why catenary lifeline systems could not be used? Under what circumstances are guardrails infeasible? Does the diameter of the shaft have a bearing on the extent to which fall protection is infeasible or on the degree of hazard present? Under what circumstances is the installation of a collar on top of a caisson, or simply allowing the caisson to extend above grade, infeasible?

Issue 10. Whether Body Belts Incorporated Into Full Body Harnesses Provide Appropriate Employee Protection in a Fall

Interested parties have raised a concern about full body harnesses that incorporate body belts into the harness system. Their concern is that, during a fall, these types of body harnesses impose loads on the user that are similar to those imposed by a body belt, since the belt portion of the harness transmits the arresting forces directly to the abdomen. They claim that workers may attach their lanyards to the belt portion of the harness, thus defeating the advantages of using a harness instead of a body belt. Under § 1926.502(d), body belts are not permitted as part of a personal fall arrest system because of their potential to cause injury to a worker who falls.

The rule currently defines a body harness as ''straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.'' OSHA solicits comments on full body harnesses that incorporate body belts. OSHA encourages individuals familiar with these types of harness systems to comment on the possible benefits or detriments of their use.

Questions on Body Harnesses

Should OSHA revise its definition of a body harness to prohibit harnesses that, in effect, incorporate body belts? Does this type of harness transmit excessive forces to the waist/abdomen area in an arrested fall when the harness is properly attached?

IV. Authority and Signature

This document was prepared under the direction of Charles N. Jeffress, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW, Washington, D.C. 20210. It is issued pursuant to section 6(b) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655).

Signed at Washington, D.C. this 1st day of July, 1999.

Charles N. Jeffress,

Assistant Secretary.

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