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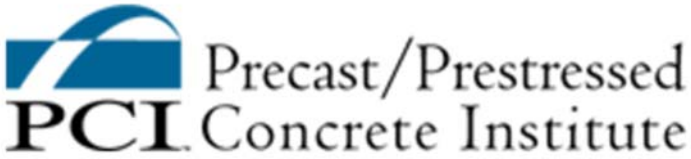
A Review of OSHA's Final Rule on Walking-Working Surfaces and Personal Fall Protection Systems

...and how it applies to the precast concrete industry

January 3, 2017

Prepared for the members of:



IMPORTANT INFORMATION – READ THIS FIRST

The content of this white paper was prepared by Optimum Safety Management™ ("Optimum") and is being presented to the members of the Precast/Prestressed Concrete Institute (PCI). The preparation of this white paper is being sponsored by PCI, and its contents contain the work and opinions of Optimum.

The document is intended as a general discussion of the changes in the Walking-Working Surface Final Rule in comparison to the existing regulation. Direct application to an individual reader's organization or circumstances is not intended. The reader should take into consideration the Final Rule, their particular configuration or practices, and available technology and industry best practices in final determination of work practices and compliance measures.

Authored By:

Drew M. Page, CHST
Director of Operations

Stephen E. Yates, CHST
President

Contributions By:

PCI Walking-Working Surface Task Group

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Contents

Executive Summary 4
Background 6
Scope 8
Definitions 8
General Requirements 9
Ladders 10
Stairways 14
Scaffolding 16
Fall Protection 18
Falling Object Protection 22
Stacked Material 23
Rolling Stock 27
Dockboards 28
Training Requirements 30
Intentional Omissions 31
Conclusion 31

Executive Summary

On November 18, 2016, the Occupational Safety and Health Administration (OSHA) released its final rule[1] for Walking-Working Surfaces (Subpart D) and Personal Protective Equipment (Subpart I) as it relates to fall protection systems.

This final rule has revised and updated the general industry standards (29 CFR 1910), including requirements for ladders, stairs, dockboards, fall protection, and falling object protection. The final rule also adds new requirements for the design, performance, and use of personal fall protection systems (1910.140) along with training on fall hazards and fall protection systems.

A key benefit of this final rule is that it has increased the consistency and harmonization of the general industry and construction standards (29 CFR 1926, subparts L Scaffolding, M Fall Protection, and X Stairways & Ladders) as they relate to fall protection systems, personal fall protection systems, ladders, and scaffoldings. In some cases, the new general industry standards directly reference construction standards. This was done to benefit employers who conduct operations in both industries, which is the case with many Precast/Prestressed Concrete Institute (PCI) members.

Another benefit to the final rule is that it has been written in performance-based, plain language rather than outdated prescriptive specification requirements. This change makes the final rule easier to understand and follow. It also leaves the specifics of how the employer will comply with the standard up to each company, rather than OSHA listing the exact specified requirement. The benefit to employers is greater compliance flexibility. Below is an example of the differences in language:

Existing[2] Standard 1910.23(c)(1): "Every open-sided floor or platform 4 feet or more above the adjacent floor or ground level shall be guarded by a standard railing on all open sides…"

Final Standard 1910.28(b)(1)(i): ". . . the employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet or more above a lower level is protected from falling by one or more of the following: (A) Guardrail systems; (B) Safety net systems; or (C) Personal fall protection systems, such as personal fall arrest, travel restraint, or positioning systems."

The third major benefit to the final rule is that it reflects advances in technology to be consistent with more recent OSHA standards and national consensus standards.

Emboldened, OSHA has strengthened its stance about the feasibility of fall protection methods while accessing stacked materials…

Despite the benefits, there are significant changes to the standard that PCI has recognized will bring challenges to the precast concrete industry. The most significant challenge will be faced within the multitude of precast industry storage yards. Emboldened, OSHA has strengthened its stance about the feasibility of fall protection methods while accessing stacked materials: "OSHA does not agree that requiring fall protection on stacked materials is infeasible or could create a greater hazard." The agency has long held a case-by-case view of feasibility. This is no longer its view. OSHA is also not writing language into the standard that specifically relates to the precast concrete industry. Rather, the final rule will apply. As it is so important, significant discussion on this topic is found later in this document.

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[1] Final Rule was issued on November 18, 2016, and goes into effect on January 17, 2017. All references to "final rule" indicate the standards that take effect on January 17, 2017.

[2] All references to "existing standard," "existing rule," "existing subpart D," etc., refer to the rule that is in place prior to January 17, 2017.

Similarly, OSHA has made some changes to the way it views fall protection while work is being performed atop trailers, or what it refers to as "rolling stock." While these changes are not as significant as those in the area of stacked materials, they could have an impact on the industry. How OSHA will utilize these differences in its enforcement activities will be seen in the coming months or years. This is also a topic with significant discussion later in the document.

Understanding the changes and significant impacts, PCI commissioned this white paper to inform its members of the overall changes within the final rule and to assist its members with compliance. Herein, we will discuss challenges, training requirements, compliance dates, and best practices.

As for the organization of the sections of the final rule, OSHA has chosen to use the same numbering system as the existing standard. This can create some confusion for those who are familiar with the existing standard, as the content of the specific numbered sections has changed beneath what will appear to be a familiar standard number. Below is a summary of changes to the organization of 1910 Subpart D, Walking-Working Surfaces.

Final 1910 Subpart D	**Existing 1910 Subpart D**
1910.21 Scope and definitions	1910.21 Definitions
1910.22 General requirements	1910.22 General requirements
1910.23 Ladders	1910.23 Guarding floor and wall openings and holes
1910.24 Step bolts and manhole steps	1910.24 Fixed industrial stairs
1910.25 Stairways	1910.25 Portable wood ladders
1910.26 Dockboards	1910.26 Portable metal ladders
1910.27 Scaffolds and rope descent systems	1910.27 Fixed ladders
1910.28 Duty to have fall protection and falling object protection	1910.28 Safety requirements for scaffolding
1910.29 Fall protection systems and falling object protection—criteria and practices	1910.29 Manually propelled mobile ladder stands and scaffolds (towers)
1910.30 Training requirements	1910.30 Other working surfaces

The new standard 1910.140 under Subpart I Personal Protective Equipment for personal fall protection systems is organized as follows: (a) *Scope*, (b) *Definitions*, (c) *General requirements*, and (d) *Personal fall arrest systems*.

Summary of Important Dates

- November 18, 2016 – Final Rule published
- January 17, 2017 – Final Rule effective
- January 17, 2017 – Grandfathered existing regulations and conditions
    - Stairway platform depth
    - Stair rail height
    - Stairway riser height and tread depth
    - Dockboard runoff protection
- May 17, 2017 – Training requirements
- November 19, 2018 – Grandfathered existing regulations
    - Fixed ladder cages or wells
- November 19, 2018 – All new fixed ladders must have ladder safety or personal fall arrest systems
- November 18, 2036 – All fixed ladders must have ladder safety or personal fall arrest systems

Background

In 1971, OSHA adopted the existing general industry standards on Walking-Working Surfaces (29 CFR part 1910, subpart D) and Personal Protective Equipment (PPE) (29 CFR part 1910, subpart I) from national consensus standards in existence at the time. OSHA had two years following the effective date of the Occupational Safety and Health Act of 1970 to establish federal standards, and saw this adoption as the best and quickest means. In 1973, OSHA published a proposed rule to revise the subpart D standards, but withdrew the proposal in 1976 because it thought the proposal was outdated. From 1976 through the 1980s, OSHA gathered a vast amount of scientific and technical data, research, and information related to walking-working surfaces.

OSHA developed two proposals in 1990 to revise and update the walking-working surfaces standards in subpart D and add personal fall protection system requirements to subpart I. In 1994, OSHA published a final rule revising subpart I, which added new general provisions requiring that employers conduct hazard assessments; select proper PPE; remove defective or damaged PPE from service; and provide worker training in the proper use, care, and disposal of PPE. This final rule in 1994 did not apply to the new general provisions to personal fall protection systems nor did it include specific requirements addressing such systems.

In 2003, OSHA published a notice to refresh subpart D and subpart I because these sections had grown stale from the 1990 proposal. On May 24, 2010 OSHA published a consolidated proposed rule on subparts D and I, which ignited the final rulemaking process, and on November 18, 2016, the final rule was released.

"OSHA does not agree that requiring fall protection on stacked materials is infeasible or could create a greater hazard"

On January 3, 2000, PCI issued a letter to OSHA requesting an interpretation and exception for riggers loading/unloading precast concrete products on trucks and for riggers stacking, storing, loading, or unloading precast concrete products in the plant relative to fall protection (1910.23[C]). PCI's stance at that time was that the use of conventional fall protection systems creates a greater hazard and in most cases is infeasible. PCI recommended an operating procedure in lieu of conventional fall protection systems.

On June 28, 2000, OSHA responded, "because an employer's obligation will often depend on specific facts, a comprehensive 'interpretation' of what a precast concrete employer must do cannot be given." OSHA went on to say that it would most likely not apply the guardrail standard requirements of 1910.23(c) to the transport vehicle deck or concrete products but, in some circumstances, the use of personal fall protection may be necessary. If personal fall protection could be used, but was not, then 1910.132(a) would apply. If personal fall protection could not be used, but there was another feasible way to eliminate or reduce the hazard, then the general duty clause might apply.

In May 2005, OSHA reached out to PCI regarding the January 3, 2000, interpretation and exception request letter, as it had received a similar letter from the American Iron and Steel Institute (AISI) regarding rigging steel in the plant. OSHA suggested a plant visit, which was conducted on June 29, 2005.

On August 17, 2010, PCI submitted a request to the OSHA Docket Office regarding the 2010 proposed rule on subparts D and I to exclude motor vehicles (trailers) and material stockpiles in the proposed regulation. PCI referenced its January 3, 2000, interpretation and exception request letter and June 29, 2005, OSHA plant visit to support its case that the use of conventional fall protection systems creates a greater hazard and in most cases is infeasible during these activities.

The preamble to the November 18, 2016, final rule discussed stacked materials, specifically, "when employees work and climb four feet or more above a lower level on stacked materials, such as stacks of steel and precast concrete products that are being stored or loaded onto motor vehicles and rail cars for transport." The preamble discusses PCI's and AISI's stance on greater hazard and infeasibility. The preamble goes on to conclude, "After reviewing the rulemaking record, OSHA does not agree that requiring fall protection on stacked materials is infeasible or could create a greater hazard."

The 2010 proposed rule on subparts D and I did not include specific requirements for rolling stock and motor vehicles. However, the preamble did indicate that OSHA would continue gathering information and evidence to determine whether there is a need to propose specific requirements for rolling stock and motor vehicles. If OSHA receives sufficient comments and evidence to warrant additional rulemaking on rolling stock and motor vehicles, the agency has stated that it will issue ''a separate proposed rule.''

Further discussion regarding rolling stock and motor vehicles, as well as stacked materials, is included in the following sections of this document.

Scope

Final Rule 1910 Subpart D Walking-Working Surfaces

Under the existing rule there is not a scope defined at the start of subpart D. Rather, it is listed in three different locations throughout: 1) the subpart 1910.22 *General requirements,* 2) 1910.27 *Fixed ladders* paragraph (e) *Pitch*, and 3) at the end of 1910.28 *Safety requirements for scaffolding*.

The final rule lists the scope of the entire subpart as the very first standard under 1910.21(a) *Scope*, which states, "this subpart applies to all general industry workplaces. It covers all walking-working surfaces unless specifically excluded by an individual section of this subpart."

Additionally, final rule 1910.27(a) *Scaffolds* states, "Scaffolds used in general industry must meet the requirements in 29 CFR part 1926, subpart L (Scaffolds)." Part 1926 subpart L also lists the scope of the entire subpart as the very first standard, under 1926.450(a) *Scope and application*: "this subpart applies to all scaffolds used in workplaces covered by this part. It does not apply to crane or derrick suspended personnel platforms. The criteria for aerial lifts are set out exclusively in 1926.453."

Final Rule 1910.140 Personal Fall Protection Systems

The final rule for personal fall protection systems follows suit and starts the standard with paragraph (a) as the *Scope* stating, "this section establishes performance, care and use criteria for all personal fall protection systems. The employer must ensure that each personal fall protection system used to comply with this part must meet the requirements of this section."

Definitions

Final Rule 1910 Subpart D Walking-Working Surfaces

The final rule incorporates all 62 definitions for subpart D under 1910.21(b) *Definitions*. The existing rule contained 125 definitions in 1910.21(a) through (g) and each paragraph listed the definitions for each standard number (1910.22, 1910.23, etc.). This created many duplicated definitions.

Walking-Working Surface is "any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location."

Final rule 1910.21(b) defines a walking-working surface as "any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location." The preamble to the final rule states, "walking-working surfaces include, but are not limited to, floors, stairways, roofs, ladders, runways, walkways, dockboards, aisles and step bolts."

Final rule 1910.27(a) *Scaffolds* states, "Scaffolds used in general industry must meet the requirements in 29 CFR part 1926, subpart L (Scaffolds)." Subpart L consists of 80 definitions. While some are common to the existing rule, there are many definitions new to general industry. However, this should not present much of an issue, because these are fairly straightforward or construction specific and would not apply in a precast concrete plant setting.

Final Rule 1910.140 Personal Fall Protection Systems

This standard will include 29 new definitions under paragraph (b), which defines terms that are applicable to final rule 1910.140. OSHA drew most of these definitions from existing OSHA standards, including the Powered Platforms standard (1910.66[d] and appendix C), construction standards (1926.450[b], 1926.50[b], and 1926.1050[b]), and the shipyard employment PPE standard (1915.151), and national consensus standards on fall protection.

General Requirements

The general requirements to 1910 subpart D are located under standard 1910.22 in both the existing and final rules. Both standards have four paragraphs (a) through (d).

Paragraph (a) is similar in both the existing and final rules; however, the titles are different in *Housekeeping* and *Surface Conditions*, respectively. Both contain three standards, which are almost identical word for word. In 1910.22(a)(3), corrosion, leaks, spills, snow, and ice have been added to the list of hazards that must be maintained free from walking-working surfaces. Sharp or protruding objects and loose boards complete this list of hazards.

In the final rule paragraph (b) is *Loads*, which correlates with the existing rules paragraph (d) *Floor loading protection*. The existing rule uses wordy and demanding language related to requirements for loads to be approved by building officials, and for load limits to be securely affixed on plates; it also states that it is unlawful to overload floors or a roof. The final rule simplifies this language and states, "The employer must ensure that each walking-working surface can support the maximum intended load for that surface." This is a great example of the new plain performance-based language: not giving the means, methods, and specifics. However, load-capacity plates are highly recommended in areas where materials are being stored, such as mezzanines, to ensure that employees understand the load limits and do not overload.

Existing paragraph (b), *Aisles and passageways*, which contains requirements on mechanical handling equipment and permanent aisles and passageways to be appropriately marked, has been deleted from the final rule as these requirements are addressed in 1910 subpart N, *Materials Handling and Storage*, 1910.176(a).

Final paragraph (c), *Access and egress*, of the final rule states, "The employer must provide, and ensure each employee uses, a safe means of access and egress to and from walking-working surfaces".

Covers and guardrails from existing 1910.22(c) are now included in final rules 1910.28 and 1910.29.

The last paragraph of final rule 1910.22 places expectations on employers to have procedures or programs in place to maintain walking-working surfaces so workers are not exposed to hazards that may cause injuries, such as slips, trips, and falls. Paragraph (d), *Inspection, maintenance and repair*, requires the employer to ensure that

> "(1) Walking-working surfaces are inspected, regularly and as necessary, and maintained in a safe condition."

OSHA would expect that each employer determines a schedule for inspecting walking-working surfaces, which will adequately identify hazards and address them in a timely manner. Once that frequency is determined, then the employer must ensure that these regular inspections are conducted according to that frequency.

Additional inspections are required as necessary when certain workplace conditions, circumstances, or events occur that warrant an additional check of walking-working surfaces to ensure that they are safe for workers to use. The final rule gives the example of completing an inspection after a significant leak or spill to ensure that it did not create a slip, trip, or fall hazard on walking-working surfaces. OSHA would also expect an inspection of outdoor workplaces after a major storm to ensure that walking-working surfaces are free from storm debris, downed power lines, and other related hazards.

> "(2) Hazardous conditions on walking-working surfaces are corrected or repaired before an employee uses the walking-working surface again. If the correction or repair cannot be made immediately, the hazard must be guarded to prevent employees from using the walking-working surface until the hazard is corrected or repaired."

The employer is responsible for selecting an effective guarding method to preventing workers from accessing or using the walking-working surface when a hazardous condition is identified and the correction or repair cannot be made immediately. Some examples of guarding methods include erecting barricades and demarcating no-entry zones.

OSHA also requires that structural integrity and strength are verified.

> "(3) When any correction or repair involves the structural integrity of the walking-working surface, a qualified person performs or supervises the correction or repair."

OSHA defines a qualified person as ''a person who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work or the project.''

Ladders

Overview

Section 1910.23 of the final rule covers all portable ladders (wood, metal, and fiberglass/composite), fixed ladders, and mobile ladder stands and platforms. Conversely, the existing rule contains four separate sections for ladder requirements. Many of the ladder requirements are the same as the existing rule but the final rule does update requirements to make them more consistent with OSHA's construction ladder standard (29 CFR 1926.1053) and current national consensus standards.

Also, the final rule is easier for employers and workers to understand and follow, as OSHA has consolidated all the general requirements that are common to, and apply to, all types of ladders into a single paragraph, which eliminates repetition. The final rule explains that "because most of those national consensus standards have been in place for years, OSHA believes that virtually all ladders this section covers that are manufactured today meet the requirements in those standards."

As stated previously, all ladders are covered in the final rule 1910.23 except for

1. Ladders used in emergency operations, such as firefighting, rescue, and tactical law enforcement operations or training for these operations; or
2. Ladders designed into or an integral part of machines or equipment (which applies to, but is not limited to, vehicles that the Department of Transportation (DOT) regulates).

General Requirements

OSHA has some general requirements regarding ladder design. Ladders must have rungs, steps, and cleats that are parallel, level, and uniformly spaced, 10 to 14 in. apart. They must also have a clear width of at least 11.5 in. on portable ladders and 16 in. on fixed ladders. Steps on stepstools must also be uniformly spaced, 8 to 12 in. apart, and have a clear width of 10.5 in. Wooden ladders cannot be coated with any material that may obscure structural defects and metal ladders must be made with corrosion-resistant material or protected against corrosion. Ladder surfaces are to be free of puncture and laceration hazards and used only for the purposes for which they were designed.

Any time a ladder is used, it is important that the proper ladder is selected for the task. Once selected, OSHA requires that all ladders are inspected before initial use in each work shift, and more frequently as necessary, to identify any visible defects that could cause employee injury. OSHA would expect that the inspection before initial use in each work shift be completed as part of the worker's regular procedures at the start of the work shift. Additional inspections would be required if a situation occurs during the work shift that could compromise the ladder's integrity. Examples in the preamble to the final rule include if a ladder tips over, falls off a structure (such as a roof) or vehicle, is struck by an object (such as a vehicle or machine), or is used in a corrosive environment. Unlike the existing rule, OSHA does not call out specific inspection criteria, as it felt that a list of inspection procedures may be either overinclusive or underinclusive. OSHA expects the employer to determine the scope of the inspection that is necessary.

Through the inspection process, if any ladder is found with structural or other defects, then it must be removed from service and immediately tagged "**Dangerous: Do Not Use**" or similar. The ladder must then be replaced or repaired under the supervision of a qualified person. OSHA does not spell out specific ladder defects that necessitate removing the ladder from service, as it had in the existing standard under 1910.25(d)(2)(viii) and 1910.26(c)(2)(vii), as this may not be a complete list of defects. OSHA does, however, believe that the defects listed in the existing rules in 1910.25(d)(2)(viii) and 1910.26(c)(2)(vii) continue to warrant removal of the ladder from service.

After proper selection and inspection of the ladder, OSHA expects the employer to ensure that employees are properly using the ladder. The new rule calls out three specific requirements under 1910.23(b) for safe work practices when climbing ladders:

> (11) Each employee faces the ladder when climbing up or down it;
> (12) Each employee uses at least one hand to grasp the ladder when climbing up and down it; and
> (13) No employee carries any object or load that could cause the employee to lose balance and fall while climbing up or down the ladder.

At locations where ladders provide access through a floor hole or a hole in a platform, the employer must ensure the hole is protected on all sides with a guardrail system and toeboards. At the entrance to the ladderway, OSHA will allow a self-closing gate that slides or swings away from the hole. This gate must have a top rail and midrail meeting the requirements for a guardrail system. OSHA will also allow an offset to the ladderway that prevents employees from walking or falling into the hole.

Portable Ladders

In addition to the requirements set forth in final rule 1910.23(b), portable ladders must also comply with final rule 1910.23(c). A portable ladder is defined under the final rule as a ladder that can be readily moved or carried, and usually consists of side rails joined at intervals by steps, rungs, or cleats. OSHA has combined the existing requirements for portable wood (existing rule 1910.25) and portable metal ladders (existing rule 1910.26) in order to eliminate unnecessary repetition.

Under portable ladders, there is one additional requirement for portable metal ladders: "(1) Rungs and steps of portable *metal ladders* are corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping." The remainder of the paragraph lists 12 common safe work practices when using portable ladders.

Fixed Ladders

Final rule 1910.23(d) sets forth the requirements for fixed ladders, in addition to the requirements of final rule 1910.23(b). Requirements for fixed ladders are also covered under final rule 1910.28(b)(9) as it relates to fixed ladders that extend more than 24 ft above a lower level. Final rule 1910.29(g) and 1910.29(i) addresses the requirements for cages, wells, and platforms used with fixed ladders and ladder safety systems on fixed ladders, respectively.

The final rule defines ''fixed ladder'' as a ladder, with side rails or individual rungs, that is permanently attached to a structure, building, or equipment (§ 1910.21[b]). Fixed ladders do not include ship stairs, step bolts, or manhole steps.

Fixed ladders can be found within the precast concrete manufacturing industry located in buildings or on the side of buildings to access roofs, on the sides of aggregate bins, within pits or machine wells, and on mobile gantry cranes.

OSHA's final rule requires that all fixed ladders are capable of supporting their maximum intended load, rather than calling out a specific load rating as it did in the past.

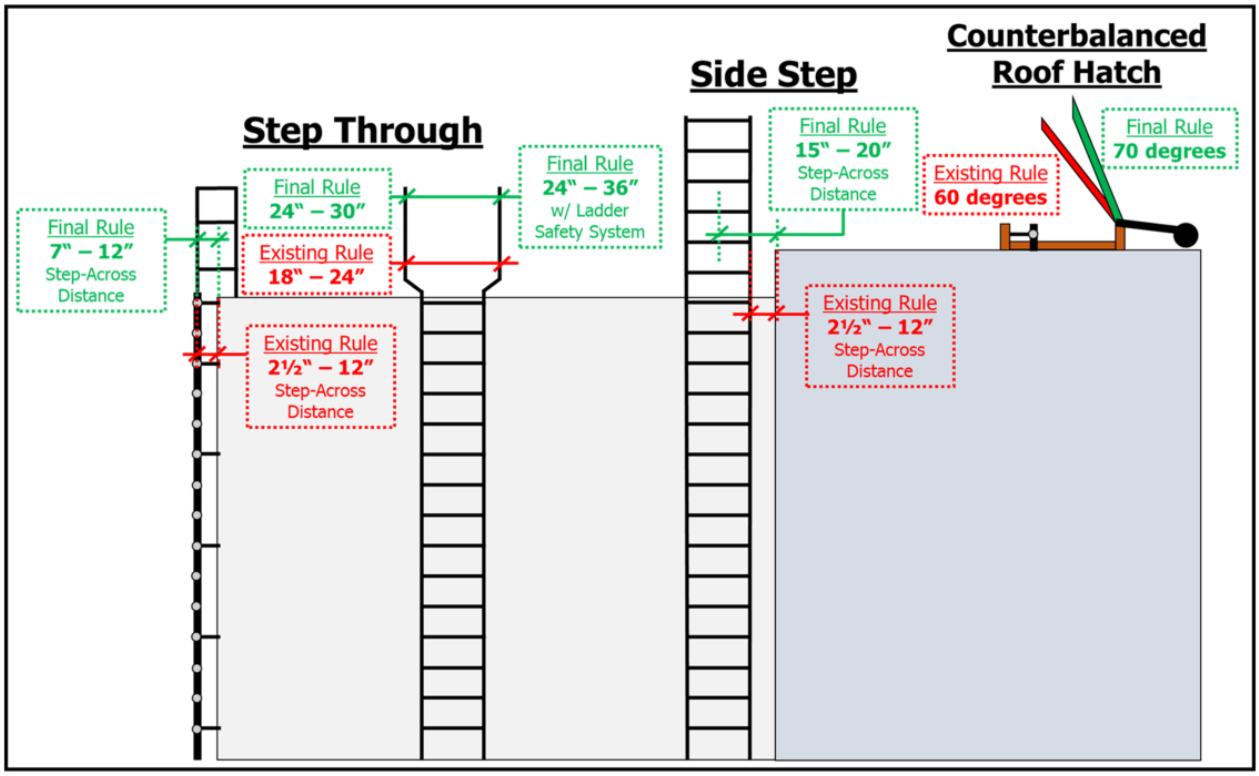
The final rule will phase out cages and wells, on fixed ladders that extend more than 24 ft above a lower level, over the next 20 years

The final rule keeps the 7 in. minimum perpendicular distance from the centerline of the steps or rungs to any obstruction or wall and replaces the existing 4 in. minimum perpendicular distance for grab bars with a 7 in. minimum clearance. The final rule removes the ''unavoidable obstructions'' requirement, solidifying the 7 in. minimum. The final rule does, however, add an exception for elevator pits to allow a 4.5 in. minimum.

For step-through ladders, the final rule increases the existing clearance width of the flared extensions on the side rails above the access level. The existing standard required from 18 to 24 in. while the final rule increases this to a range of 24 to 30 in. between the side rails. If a ladder safety system is installed on the ladder, then OSHA will allow up to 36 in. between side rails. For side-step ladders, the side rails, rungs, and steps must be continuous in the extension. For both step-through ladders and side-step ladders, the grab bars must extend 42 in. above the access level or landing platform.

When fixed ladders terminate at hatch covers, the hatch must open with sufficient clearance to provide easy access to or from the ladder. Also, OSHA requires counterbalanced hatches to open at least 70 degrees from horizontal, which is increased from 60 degrees.

OSHA has updated the step-across distance, which is measured from the centerline of the rung to the nearest edge of the structure, building, equipment, or platform edge. The existing rule required that the step-across distance was not less than 2.5 in. and not more than 12 in. The final rule differentiates this requirement for step-through ladders and side-step ladders. Step-through ladders must not be less than 7 in. and not more than 12 in., while side-step ladders must be between 15 and 20 in.



Note: " = in.

For fixed ladders that do not have cages or wells, OSHA still maintains a 15 in. clear width on each side of the ladder from centerline to the nearest permanent object. OSHA does, however, change the minimum perpendicular distance from the centerline of the steps or rungs to the nearest object on the climbing side. This requirement changes from 36 in. for a 75 degree pitch ladder and 30 in. for a 90 degree pitch ladder to a single minimum clearance of 30 in., regardless of the pitch. The final rule adds an exception to this requirement when "unavoidable obstructions are encountered." OSHA will now allow the clearance to be reduced to 24 in. if deflector plates are installed.

The final rule notes that there is wide recognition in the general industry that cages and wells neither prevent workers from falling off ladders nor protect them from injury when a fall occurs. For this reason, the final rule (1910.28[b][9][i]) will phase out cages and wells, on fixed ladders that extend more than 24 ft above a lower level, over the next 20 years as follows:

- For existing fixed ladders, installed before November 19, 2018, the ladder must be equipped with a ladder safety system, personal fall arrest system, cage, or well. These ladders must have a ladder safety system or personal fall arrest system installed by November 18, 2036.
- For new fixed ladders, installed on and after November 19, 2018, the ladder must be equipped with a ladder safety system or personal fall arrest system.
- When any portion of a fixed ladder is replaced (cage, well, or any portion of a section), a ladder safety system or personal fall arrest system must be installed in at least that replacement section.
- The final deadline for all fixed ladders to be equipped with a ladder safety system or personal fall arrest system is on November 18, 2036.

The existing rule requires that employers have cages or wells on fixed ladders more than 20 ft above a lower level; however, OSHA believes that the record indicates that some do not. Therefore, OSHA is giving employers two years to be compliant with the existing rule to order and install safety devices (ladder safety

system, personal fall arrest system, cage, or well) on fixed ladders that extend more than 24 ft above a lower level.

A ladder safety system is defined by the new rule as "a system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems." OSHA has also included design requirements, which will be used by the equipment manufacturers in 1910.29(i).

Additionally, OSHA is changing the requirements for when landing platforms are required on fixed ladders. The existing rule requires landing platforms for fixed ladders with a cage or well at 30 ft intervals, and at 20 ft intervals when there is not a cage or well.

The final rule will allow landing platforms at intervals of at most every 150 ft when there is a personal fall arrest system or ladder safety system in place. Additionally, during the phase-out period of cages and wells, the final rule requires that ladder sections with cages or wells be offset from adjacent sections and have landing platforms provided at maximum intervals of 50 ft.

Mobile Ladder Stands and Mobile Ladder Stand Platforms

Final rule 1910.23(e) replaces requirements of the existing standards 1910.29(e) and (f) for mobile ladder stands and mobile ladder stand platforms. A mobile ladder stand is defined under the final rule as a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand may also have handrails and is designed for use by one employee at a time. A mobile ladder stand platform is defined as a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress.

Paragraph (1) includes general requirements, (2) includes design requirements for mobile ladder stands, and (3) includes design requirements for mobile ladder stand platforms.

One noteworthy requirement in the final rules is that mobile ladder stands and platforms must be capable of supporting at least four times their maximum intended load.

Stairways

Final rule 1910.25 covers all stairways, which are defined as "risers and treads that connect one level with another, and includes any landings and platforms in-between those levels. Stairways include standard, spiral, alternating tread-type, and ship stairs." The final rule also defines standard stairs as "a fixed or permanently installed stairway. Ship, spiral, and alternating tread-type stairs are not considered standard stairs." Final rule 1910.25 is organized as follows: (a) *Application*, (b) *General requirements*, (c) *Standard stairs*, (d) *Spiral stairs*, (e) *Ship stairs*, and (f) *Alternating tread-type stairs*. Final rule 1910.25 does not cover stairs serving floating roof tanks, stairs on scaffolds (this is covered under final rule 1910.27(a) *Scaffolds*), stairs designed into machines or equipment, and stairs on self-propelled motorized equipment (such as motor vehicles or powered industrial trucks). Stairways are also covered under final rule 1910.28(b)(11) *Stairways* and 1910.29(f) *Handrails and stair rail systems*.

General Requirements

In the final rule, the general requirements for all stairways starts by requiring employers to ensure that handrails, stair rail systems, and guardrail systems are provided in accordance to 1910.28(b)(11). This section requires that (i) stairway landings 4 ft or more above a lower level be protected with a guardrail or stair rail system, (ii) stairs with three or more treads and four or more risers have stair rail systems and handrails as defined in Table D-2, and (iii) ship stairs and alternating tread-type stairs have handrails on both sides.

Table D-2 gives the requirements for the type and number of handrails or stair rails based on the width and configuration of the stairs. These requirements in (i) and (ii) are consistent with the existing rule. The requirement for ship stairs and alternating tread-type stairs is new, as the existing standard did not cover these types of stairs.

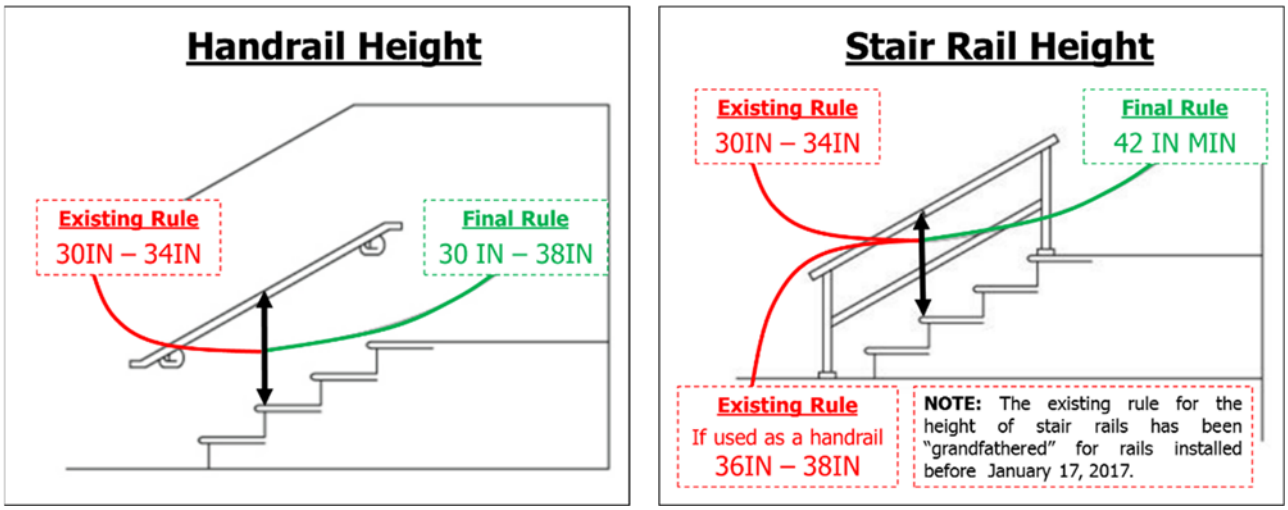
Part 1910.29(f) of the final rule then goes on to detail the specific criteria and practice requirements that handrails and stair rail systems must meet to include (1) height, (2) finger clearance, (3) surfaces, (4) stair rail openings, (5) handholds, (6) projection hazards, and (7) strength. The major changes are requirements for height, finger clearance, and stair rail openings.

The final rule defines a stair rail or stair rail system as "a barrier erected along the exposed or open side of stairways to prevent employees from falling to a lower level" and handrail as "a rail used to provide employees with a handhold for support."

The existing rule allowed an intermediate rail (midrail) halfway between the top rail and the floor, platform, runway, or ramp on stair rail systems.

The final rule requires openings in the stair rail system to not exceed 19 in. This allows the use of verticals, spaced no more than 19 in. apart, in place of a midrail. This aligns this standard with the similar construction standard. The final rule also adds the requirement for finger clearance, which must be at least 2¼ in. between handrails and any other object.

The major change here is with the height requirements of handrails and stair rail systems. The changes are outlined in the below diagrams. Note that OSHA is "grandfathering" all stair rail systems installed before January 17, 2017, that meet the existing rule. All stair rail systems installed or repaired after January 17, 2017, must comply with the height requirements of the new rule.



Note: IN = in.

The overhead clearance in stairwells has been reduced from 7 ft to 6 ft 8 in. OSHA's only exception is for spiral stairs, which is 6 ft 6 in.

OSHA has made another change that will have a grandfathered requirement. For platforms into which doors or gates open directly, the swing of the door/gate may not reduce the usable depth to less than 22 in. for platforms installed after January 17, 2017. The existing 20 in. rule will be acceptable for all platforms installed prior to January 17, 2017.

At locations where stairways provide access through a floor hole, the employer must ensure that the hole is protected on all sides with a guardrail system, except at the stairway entrance. In situations where the stairway is used less than once a day and a guardrail system is infeasible due to pedestrian traffic (for example, stairway holes in aisleways), then a hinged cover is allowed. In this situation, a removable guardrail system must protect all sides, except the stairway entrance, when the hinged cover is open.

Standard Stairs

In addition to the general requirements for stairways, the final rule continues to require that standard stairs are installed at angles between 30 and 50 degrees from horizontal. Additionally, the final rule now requires that stairways installed after January 17, 2017, have a maximum riser height and a minimum tread depth of 9½ in. For all stairways installed prior to January 17, 2017, OSHA has provided Table D-1, which lists the rise and tread run for angles between 30 to 50 degrees from horizontal to which the stairway must comply. Lastly, OSHA maintains a minimum width requirement of 22 in. but now informs employers that this is measured between vertical barriers (such as stair rails, guardrails, and walls).

Ship, Spiral, and Alternating Tread-Type Stairs

The existing rule only touches on spiral stairs, stating that they will "not be permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway."

The final rule now includes ship and alternating tread-type stairs into the standards. Ship, spiral, and alternating tread-type stairs may only be used when it is infeasible to provide standard stairs, in which case they must be installed, used, and maintained in accordance with the manufacturer's instructions. The specific requirements for width, riser height, tread depth, slope, etc., can be found in paragraphs (d), (e), and (f) of final rule 1910.25.

Scaffolding

OSHA has greatly simplified Scaffold Compliance as it effectively replaced the existing General Industry Scaffold Standards as it incorporates the Construction Industry Scaffold Standard by reference.

Under the final rule, the existing section 1910.28 *Safety requirements for scaffolding* and section 1910.29 *Manually propelled mobile ladder stands and scaffolds (towers)* have been deleted and replaced with section 1910.27(a), which states, "Scaffolds used in general industry must meet the requirements in 29 CFR part 1926, subpart L (Scaffolds)." The final rule also defines a scaffold as "any temporary elevated or suspended platform and its supporting structure, including anchorage points, used to support employees, equipment, materials, and other items. For purposes of [1910, subpart D], a scaffold does not include a crane-suspended or derrick-suspended personnel platform or a rope descent system."

Under final subpart D, scaffolds are addressed in two other locations, 1910.28(b)(12)(i) and the note to 1910.29(b). These requirements refer to 29 CFR part 1926, subpart L, to protect employees from falling when working on scaffolds and for the criteria and practices of guardrail systems on scaffolds.

29 CFR part 1926, subpart L, includes the following standards:

> 1926.450 – *Scope, application and definitions applicable to this subpart.* The scope and application of this subpart "applies to all scaffolds used in workplaces covered by this part. It does not apply to crane or derrick suspended personnel platforms. The criteria for aerial lifts are set out exclusively in

1926.453." Paragraph (b) consists of 80 definitions. This standard includes all 21 types of scaffolds that are included in the existing 1910 subpart D.

1926.451 – *General requirements*. This standard is broken down into the following paragraphs: (a) *capacity*, (b) *scaffold platform construction*, (c) *criteria for supported scaffolds*, (d) *criteria for suspension scaffolds*, (e) *access*, (f) *use*, (g) *fall protection*, and (h) *falling object protection*.

1926.452 – *Additional requirements applicable to specific types of scaffolds*. Under this standard are 25 types of scaffolds listed with specific requirements for each. In the precast concrete manufacturing industry, fabricated frame scaffolding, horse scaffolding, and mobile scaffolding (such as baker scaffold) are commonly seen. The additional requirements for these scaffolds are covered in 1926.452(c), 1926.452(f), and 1926.452(w), respectively.

1926.453 – *Aerial lifts*. This standard does not apply to general industry as extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and a combination thereof are covered under 1910.67 *Vehicle-mounted elevating and rotating work platforms*.

1926.454 – *Training requirements*. The requirements here focus on the specific training topics that must be included for employees who work on scaffolds (scaffold user) and employees who erect, disassemble, move, operate, repair, maintain, or inspect scaffolds (scaffold erector). This standard also provides specific situations where the employer must retrain an employee.

In summary, OSHA believes that the final rule will provide greater worker protection and simplify compliance because "many general industry employers who use scaffolds also perform construction work on scaffolds." To ensure compliance and worker protection it is imperative that proper training is conducted for those who supervise work on scaffolds and those who erect and use scaffolding.

Fall Protection

In efforts to ensure that the final rule of Walking-Working Surfaces (Subpart D) reduces a significant amount of fall-related injuries and deaths, provides employers with flexibility when choosing a fall protection system, and provide employers and employees with a better understanding of fall hazards and fall protection systems, OSHA has patterned a comprehensive approach to fall protection to be consistent with the Construction Fall Protection Standard (29 CFR 1926, subpart M). Where the existing general industry rule mandates guardrail systems as the primary means for fall protection, the final rule allows flexibility for the employer to select from a range of options, including engineering controls, administrative controls, and personal fall protection systems to protect workers from fall hazards.

Engineering Controls – for example, guardrails and safety net systems
Administrative Controls – for example, designated areas
Personal Fall Protection Systems – for example, personal fall arrest systems, travel restraint systems, and positioning devices

Another benefit to the final rule, according to OSHA, is that it allows employers to take advantage of advances in fall protection technology and accepted conventional fall protection systems. The flexibility allows the employer to determine what method will work best for its operations along with providing a selection of the most cost-effective protective measure. Most important, it will provide employers an easier way to comply while decreasing injuries.

OSHA has patterned a comprehensive approach to fall protection to be consistent with the Construction Fall Protection Standard

In some situations, the final rule has required that guardrails are the only means for providing fall protection. This includes dockboards, runways, and similar walkways and stair platforms.

Final rule 1910.28 provides employers with their duties to provide fall protection by specifying the areas where fall protection is required and what types of fall protection systems are allowed at those areas. Final rule 1910.29 then provides the criteria for the fall protection systems required under the duties. Additionally, final rule 1910.140 contains the specific criteria for personal fall protection systems. Lastly, final rule 1910.30 outlines the mandatory training requirements that employees must receive when using fall protection systems.

Duty to Have Fall Protection

Generally, OSHA has called out requirements for protecting employees from falling 4 ft or more above a lower level. However, the final rule does provide exceptions to section 1910.28, which includes portable ladders; exposed perimeters of entertainment stages and rail-station platforms; powered platforms (covered by 1910.66[j]); aerial lifts (covered by 1910.67[c][2][v]); telecommunications work (covered by 1910.268[n][7] and [8]); and electric power generation, transmission, and distribution work (covered by §1910.269[g][2][i]).

Additionally, section 1910.28 does not apply to employers who are inspecting, investigating, or assessing workplace conditions prior to the start of work or after all work is complete. Workers who are performing these inspections must, however, use fall protection systems or equipment if they are available during prework and postwork inspections and always when work is taking place.

The final rule has requirements for falls into dangerous equipment, and for protection from tripping into or stepping into or through holes, even when less than 4 ft. Final rule 1910.28(b)(6) requires a guardrail system or travel restraint system to keep employees from falling into or onto dangerous equipment, unless

the equipment is covered or guarded to eliminate the hazard. Final rule 1910.28(b)(3) requires covers or guardrail systems to prevent employees from tripping into or stepping into or through any hole that is less than 4 ft.

On a walking-working surface with an unprotected side or edge (1910.28[b][1]) and all walking-working surfaces not otherwise addressed in 29 CFR 1910 (1910.28[b][15]), where an employee is exposed to a fall hazard of 4 ft or more above a lower level, the final rule will allow guardrail systems, safety net systems, travel restraint systems, personal fall arrest systems, or positioning systems.

At hoist areas (1910.28[b][2]), above dangerous equipment (1910.28[b][6]), and at openings (including those with a chute attached) where the inside bottom edge is less than 39 in. above the walking-working surface (1910.28(b)(7)), where an employee is exposed to a fall hazard of 4 ft or more above a lower level, the final rule will allow guardrail systems, travel restraint systems, or personal fall arrest systems.

Additionally, if any portion of a guardrail system, gate, or chain is removed at hoist areas during hoisting operations, OSHA would expect personal fall arrest systems to be in place.

For holes (including skylights) (1910.28[b][3]) where an employee is exposed to a fall hazard of 4 ft or more above a lower level, the final rule will allow covers, guardrail systems, travel restraint systems, or personal fall arrest systems. The final rule has defined a hole as "a gap or open space in a floor, roof, horizontal walking-working surface, or similar surface that is at least 2 inches in its least dimension."

Hatchways and chute-floor holes require a fixed guardrail system with a hinged floor-hole cover, a fixed guardrail system with a removable guardrail system and toe boards on one or two sides, or the option of a guardrail system or travel restraint system when passing material though. When the hatchway or chute-floor hole is not in use, the hinged floor-hole cover is closed or removable guardrail is in place.

On runways and similar walkways (1910.28[b][5]) where an employee is exposed to a fall hazard of 4 ft or more above a lower level, the final rule will ONLY allow guardrail systems. The guardrail on one side of the runway may be removed when the employer demonstrates infeasibility of having guardrails on both sides, ensures the runway is at least 18 in. wide, and provides and ensures that each employee is protected with a travel restraint system or personal fall arrest system.

Final subpart D does not require a fall protection system for repair pits, service pits, and assembly pits less than 10 ft in depth (1910.28[b][8]) if the following alternative protection is in place. Floor markings (in colors that contrast with the surrounding area) or warning lines (that meet specific strength requirements) are placed around the pit at least 6 feet from the edge, visible signage is posted that states "Caution – Open Pit," and access within 6 ft is limited to authorize employees who have received proper training (in accordance with final 1910.30).

Where an employee is exposed to a fall hazard of 4 ft or more above a lower level, the final rule will allow guardrail systems, safety net systems, travel restraint systems, personal fall arrest systems, or positioning systems.

Also, final subpart D will allow work to be conducted without fall protection systems in place when the employer can demonstrate that the use of these systems is not feasible on the working side of a platform used at a loading rack, loading dock, or teeming platform. This is only allowed, however, during the work task that the employer has demonstrated is infeasible with fall protection in place. Additionally, access to the platform must be limited to authorized employees who have received proper training (in accordance with final rule 1910.30).

Lastly, the final rule has made special provisions for fall protection requirements when working on low-sloped roofs (1910.28[b][13]). The final rule defines a low-sloped roof as "a roof having a slope less than or equal to 4 in 12 (vertical to horizontal)." OSHA will require the use of conventional fall protection systems, specifically guardrail systems, safety net systems, travel restraint systems, or personal fall arrest systems, when an employee is working within 6 ft of the roof edge.

The special provisions are applied when work on low-sloped roofs is performed at least 6 ft but less than 15 ft from the roof edge that is both *temporary* and *infrequent*. In this circumstance, the employer may select to use a designated area in lieu of using a guardrail system, safety net system, travel restraint system, or personal fall arrest system.

In the preamble to the final rule, OSHA defines "temporary" as taking less than 1 to 2 hours to complete and not requiring significant equipment, personnel, and other resources. OSHA would expect temporary tasks to be ''short-term scheduled maintenance or minor repair activities,'' such as changing a filter in a rooftop HVAC system or replacing a part on a satellite dish.

OSHA also explains that "a task may be considered *infrequent* when it is performed once a month, once a year, or when needed. Infrequent tasks include work activities such as annual maintenance or servicing of equipment, monthly or quarterly replacement of batteries or HVAC filters, and responding to equipment outage or breakdown."

The final rule defines a designated area as "a distinct portion of a walking-working surface delineated by a warning line in which employees may perform work without additional fall protection."

A warning line is also defined as "a barrier erected to warn employees that they are approaching an unprotected side or edge, and which designates an area in which work may take place without the use of other means of fall protection."

More provisions are made in the final rule when work on low-sloped roofs is performed 15 ft or more from the edge. During this situation, a designated area in lieu of conventional fall protection is allowed even when work is not temporary or infrequent. However, if work is both temporary and infrequent, then employers do not have to provide any fall protection only when they implement and enforce a work rule prohibiting employees from going within 15 ft of the roof edge without using fall protection as required above.

Note: Requirements for residential roofs have been left out, as they do not apply to the precast concrete manufacturing industry. For requirements when working on residential roofs, see final rule 1910.28(b)(1)(ii).

Fall Protection Systems – Criteria and Practices

As mentioned earlier, final rule 1910.29 provides the criteria for the fall protection systems that are required under the duty to have fall protection.

A guardrail system consists of a top rail, 42 in. ± 3 in. above the walking-working surface and a midrail, screen, mesh, intermediate vertical members, solid panels, or equivalent intermediate members installed between the walking-working surface and the top edge of the guardrail system. The top rail and midrail must be at least ¼ in. in diameter or in thickness and may not be composed of steel or plastic banding. Manila or synthetic rope may be used for top rails or midrails, but employers must inspect them as necessary to ensure that the rope meets the 200 lb and 150 lb force test described in the following. The practice of using manila or synthetic rope is not recommended.

The top rail is required to withstand a force of at least 200 lb applied in a downward or outward direction within 2 in. of the top edge. When this 200 lb force is applied, the top rail must not fail or deflect to a height less than 39 in. above the walking-working surface.

Midrails, screens, mesh, intermediate vertical members, solid panels, and other equivalent intermediate members must be able to withstand at least 150 lb applied in any downward or outward direction. When using midrails, they must be installed halfway between the top edge of the guardrail system and the walking-working surface. If using screens or mesh, it must extend from the walking-working surface to the top rail along the entire opening. If choosing intermediate vertical members, they must be no more than 19 in. apart. Lastly, if using other equivalent intermediate members (such as additional midrails and architectural panels), they must be installed so that the openings are not greater than 19 in. wide.

At hoist areas, the final rule will allow a removable guardrail section (top and midrail) across the access opening between guardrail sections. Chains or gates may be used as a removable guardrail section at hoist areas if the employer demonstrates that the chains or gates provide a level of safety equivalent to guardrails. Note that this is the only area in the final rule where OSHA identifies an acceptable use of chains as a guardrail.

The criteria and practices for guardrail systems on scaffolds are specified in the construction scaffold standard 29 CFR part 1926, subpart L.

When safety net systems are chosen as the fall protection system, they must meet the requirements of the construction standard under 29 CFR part 1926, subpart M.

When using covers to protect holes, the employer must ensure that each cover is capable of supporting at least twice the maximum intended load, without failure. The cover must also be adequately secured down to prevent accidental displacement.

If grab handles are installed at hoist areas (these are not required) they must be at least 12 in. long, have a 3 in. clearance between the framing or opening, and be capable of withstanding a maximum horizontal pull-out force equal to two times the maximum intended load or 200 lb, whichever is greater.

On low-sloped roofs, the perimeter of the designated areas must be marked with a warning line consisting of a rope, wire, tape, or chain. The employer must ensure that the warning line is in place no less than 6 ft from the roof edge for work that is both temporary and infrequent or 15 ft for other work and as close to the work area as possible. This warning line must be installed at a height between 34 and 39 in. and supported so pulling on the line will not cause the other section(s) to fall outside of the height requirement. The warning line must have a minimum breaking strength of 200 lb, and be clearly visible both within the designated area and from 25 ft away.

Personal Fall Protection Systems

Harnesses, lanyards, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of final rule 1910.140 (*Personal Protective Equipment – Personal Fall Protection Systems*). This new section provides requirements for design, performance, use, and inspection of personal fall protection systems and system components.

The final rule 1910.140 is broken down into (a) *Scope and application*, (b) *Definitions*, (c) *General requirements*, (d) *Personal fall arrest systems*, and (e) *Positioning systems*.

There are 22 general requirements for personal fall protection systems. Such a system is defined as "a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems."

Many of the general requirements relate to the design specifications for anchors, connectors, lifelines, D-rings, snaphooks, and carabiners. The other requirements consist of the care and use of these systems. The most noteworthy requirements include the following:

- The employer must provide for prompt rescue of each employee in the event of a fall.
- Personal fall protection systems
    - must be inspected before initial use during each work shift for mildew, wear, damage, and other deterioration, and defective components must be removed from service.
    - must be worn with the attachment point of the body harness located in the center of the employee's back near shoulder level.
    - and their components must be used exclusively for employee fall protection and not for any other purpose, such as hoisting equipment or materials.
    - or their components subjected to impact loading must be removed from service immediately and not used again until a competent person inspects the system or components and determines that it is not damaged and safe for use for employee personal fall protection.

OSHA defines a travel restraint system in the final rule as "a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface." In addition to the general requirements discussed above, OSHA specifies that travel restraint lines must be capable of sustaining a minimum tensile load of 5000 lb.

Paragraph (d) of final rule 1910.140 then goes on to give the performance and use criteria specifically for personal fall arrest systems. Such a system is defined as a "system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these."

These requirements include, but are not limited to, being able to bring the employee to a complete stop and limit the maximum deceleration distance the employee travels to 3.5 ft; being rigged in such a manner that the employee cannot free fall more than 6 ft or contact a lower level; and limiting the maximum arresting force on the employee to 1800 lb. Most importantly, OSHA prohibits the use of body belts as part of a personal fall arrest system.

A positioning system or work-positioning system is defined as a "system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or window sill, and work with both hands free." The final rule has established specific requirements for performance and use of positioning systems.

To ensure proper performance, care, and use for personal fall protection systems, OSHA requires that all employees who use personal fall protection systems be properly trained by a qualified person to the requirements set forth under final 1910.30.

Falling Object Protection

Protection from Falling Objects

The employer also has a duty to provide falling object protection to employees as required under final rule 1910.28(c). This duty includes that each employee wears proper head protection meeting the requirements of 1910.135 *Head protection* when they are exposed to falling objects.

Additionally, the employer is responsible to protect employees from falling objects by

(1) erecting toeboards, screens, or guardrail systems to prevent objects from falling to a lower level,
(2) erecting canopy structures and keeping potential falling objects far enough from an edge, hole, or opening to prevent them from falling to a lower level, or
(3) barricading the area into which objects could fall, prohibiting employees from entering the barricaded area, and keeping objects far enough from an edge or opening to prevent them from falling to a lower level.

Falling Object Protection Criteria and Practices

Final rule 1910.29(k) specifies the criteria and practices for protection from falling objects, including the requirements for toeboards.

Employers must ensure that toeboards "(i) are erected along the exposed edge of the overhead walking-working surface for a length that is sufficient to protect employees below." The design requirements are as follows:

(ii) Have a minimum vertical height of 3.5 in. as measured from the top edge of the toeboard to the level of the walking-working surface.
(iii) Do not have more than a ¼ in. clearance or opening above the walking-working surface.
(iv) Are solid or do not have any opening that exceeds 1 in. at its greatest dimension.
(v) Have a minimum height of 2.5 in. when used around vehicle repair, service, or assembly pits. Toeboards may be omitted around vehicle repair, service, or assembly pits when the employer can demonstrate that a toeboard would prevent access to a vehicle that is over the pit.
(vi) Are capable of withstanding, without failure, a force of at least 50 lb applied in any downward or outward direction at any point along the toeboard.

Also, the employer must ensure that paneling or screening is installed from the toeboard to the midrail or top rail when tools, equipment, or materials are piled over the toeboard height. This paneling or screening must be sufficient enough in length to protect employees below. Additionally, the employer is required to ensure that all openings in a guardrail system are small enough to prevent objects from falling through the opening.

Lastly, the final rule states, "the employer must ensure canopies used for falling object protection are strong enough to prevent collapse and to prevent penetration by falling objects."

Stacked Material

The topic of fall protection atop stacked material is likely to be the biggest single area of change for the precast concrete industry. In the existing standard, under 1910.23(c)1, OSHA states, "Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing (or the equivalent as specified in paragraph (e)(3) of this section) on all open sides . . ." OSHA has attempted to apply this standard to the process that most every PCI member undertakes in its yards as precast concrete elements are moved, stacked, unstacked, and shuffled.

In a stunning turn of events, OSHA has recently reversed its stance on infeasibility as it relates to the stacked materials.

Through the work of PCI, as outlined in the Background section of this document, OSHA engaged conversations with the industry and went as far as to visit a facility to observe the operations. Through this

engagement, OSHA made the determination that it would not be able to grant an industrywide variance, due to the variation in circumstances at each plant. However, it did acknowledge infeasibility in some cases. OSHA took the position that if personal fall arrest could be used, the agency would expect it be used. If it could not, OSHA would expect other methods to be utilized to eliminate or reduce the hazard.

Conventional personal fall protection devices have traditionally proved to be infeasible for a variety of reasons: no overhead anchorage point; swing fall issues; time to set up system outweighing exposure time, which creates more exposure; entanglement with crane rigging; and other issues. Working on top of stacked materials, such as double tees or wall panels, most precasting operations have taken to using an administrative control, such as a plan or procedure.

We are aware of cases where OSHA has issued citations under the existing Walking-Working Surfaces standard 1910.23(c)1. The member has been able to effectively defeat the citation by showing infeasible the methods available to the industry. OSHA, when tasked with providing examples of systems it finds in use to mitigate the hazard, has been unable to produce an effective solution.

In a stunning turn of events, OSHA has recently reversed its stance on infeasibility as it relates to stacked materials. In the preamble to the final rule, there is discussion relative to stacked materials that references several comments from various entities.

OSHA received letters from PCI, AISI, and the International Sign Association (ISA) requesting that OSHA specifically address stacked materials to allow alternative fall protection measures, such as safe work practices and training, instead of conventional fall protection systems. All three organizations believe that using conventional fall protection systems (guardrails and personal fall arrest systems) on stacked materials is infeasible and that it creates a greater hazard.

On the other hand, OSHA received letters from the American Society of Safety Engineers, Society of Professional Rope Access Technicians (SPRAT), Capital Safety Group (CSG), International Safety Equipment Association (ISEA), and Ellis Fall Safety Solutions (Ellis), all stating that they felt conventional fall protection systems on stacked materials were feasible and practical. CSG, ISEA, and Ellis even submitted product solutions that they felt would be feasible and practical.

Through a Freedom of Information Act request, PCI has gained copies of these submissions. Reviewing the documents, here is what we find:

- SPRAT states in its letter that "the prevalence of incidents that have occurred in these situations" warrants a requirement to use "fall protection of some sort" on stacked materials. SPRAT goes on to recommend industrial rope access systems.

  There are a number of issues with its statements that cause issues for the industry. The first of these is its statement regarding the prevalence of incidents. It is unclear where it is gaining this data. A review of PCI data from member OSHA 300 logs simply does not bear evidence to support this statement. In fact, quite the opposite is the case.

  The second statement of concern is that it believes rope access techniques are feasible and will provide a greater level of safety. There is no evidence to substantiate this claim, nor is there, to the industry's knowledge, any member who has implemented this system.

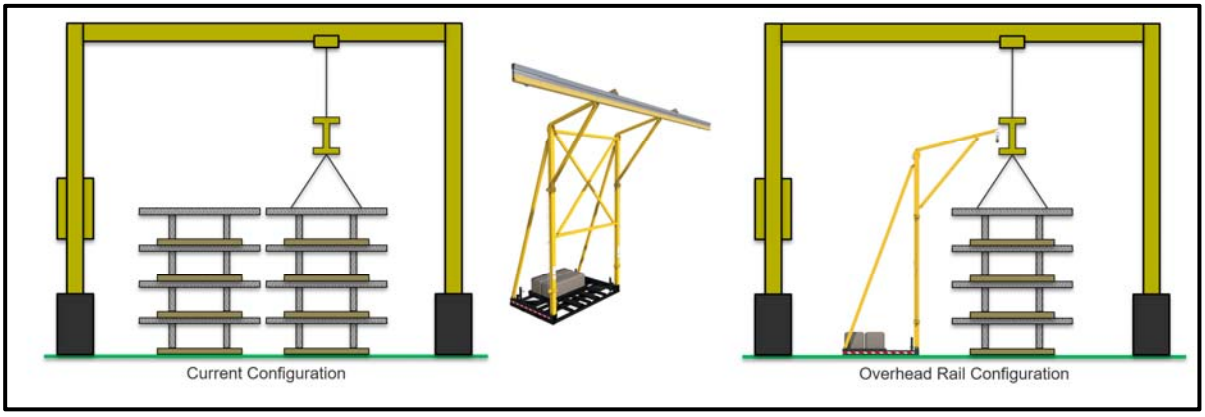
  While OSHA has included SPRAT's statements in the final rule, it has also stated that "OSHA is not adopting SPRAT's recommendations."

- Both ISEA and CSG issued an identical letter, simply changing the letterhead. In their letter, they discuss solutions in general and mention systems including "trailer-mounted systems, A-frames, rope grab systems, and ropes at tie-off points." The pictures and diagrams included with their letter to OSHA include very large rigs that must be driven up to the side or end of the product in the stacks. Each of these systems is depicted in an open area with no obstructions and no overhead or travel lift crane use.

  It has been reported to Optimum that PCI has had conversation with the author of the CSG letter. During the discussion, the author admitted never having been in a precast concrete producer's yard to witness the operation prior to or since writing the letter.

Typical stacking arrangements for double-tee product in storage yard

Proposed infeasible alterations to stacking arrangements for double-tee product



The use of these rigs is infeasible in most every yard across the industry for the following reasons and many others for the following reasons:

- They will become entangled in the crane rigging during travel, lifting, placing, and the like. This will create further safety issues, including constant damage to the rig and potential damage to the travel lifts or other mobile cranes in use.
- They occupy the same runway used by the travel lift cranes lifting the product. There is not adequate space to straddle the product stacks and the rig.

  - They require more area than is available between product stacks. To increase aisles to accommodate them would reduce panel storage by up to 50%. This creates many problems for precast concrete producers, including crowded yards, higher stacks, lack of available land for additional storage, and need to produce much of the project and store it for phased installation during building erection.

- The Ellis letter provides for a similar application of these "wheeled or fork-lifted devices." Again, all of the photographs and applications depict wide-open areas with both mobile vehicles and trailers with no overhead or straddling obstructions. They are simply not usable in PCI producer applications.

It is our opinion that these entities have solutions that work for certain industries, in certain applications. However, they have attempted to apply them to the precast concrete industry in ways that are not feasible because of the unique circumstances the industry faces. Yet OSHA has latched onto their application and taken it as basis for its final opinion stated in the preamble. OSHA has stated the following:

> After reviewing the rulemaking record, **OSHA does not agree that requiring fall protection on stacked materials is infeasible or could create a greater hazard.** OSHA finds there is substantial evidence showing that a number of fall protection systems for stacked materials are available and already are in use in general industry. For example, commenters said wheeled, trailer-mounted and fork-lifted overhead anchor and retractable line systems are available and in use to protect employees working on stacked materials. These stand-alone systems can be used for stacking, storing, and loading/unloading stacked materials in open yards and plants as well as for loading/unloading stacked materials on rolling stock and motor vehicles. In addition, the record shows that other fall protection systems employers use for loading/unloading stacked cargo on rolling stock and motor vehicles also work for materials that are stacked or stored in yards or plants. These systems include mobile work platforms, scissor lifts and stairs equipped with railings/guardrails that allow workers to access stacked materials without standing on them.

They have gone on to say OSHA has concluded that "the final rule does not need to include specific or separate requirements addressing stacked materials," as OSHA believes that "final 1910.28(b)(1) (Unprotected sides and edges) and (b)(15) (Walking-working surfaces not otherwise addressed) adequately address fall protection on stacked materials."

We strongly disagree with this position. It is our recommendation that PCI continue to work through, with its Walking-Working-Surface Task Group, the process of applying for an industry variance or letter of interpretation. While this may be a long and protracted process, it is the only way to provide a level of understanding between PCI producer members and OSHA. Without a successful effort in this direction, each individual member company would be subject to citation and the subsequent cost of defense.

It is our recommendation that PCI continue to work through, with its Walking-Working-Surface Task Group, the process of applying for an industry variance or letter of interpretation.

The goal of this process should be to educate OSHA as to the reasons why these solutions are infeasible and gain its consensus. This would then pave the way to the use of an administrative control in the form of a fall protection plan or procedure as the best available method.

Rolling Stock

Traditionally, OSHA has not taken a hard stance with regard to fall protection atop trailers, particularly tanker trailers, due to infeasibility arguments. Many industries have relied on what is commonly referred to as a "rolling stock exemption." The letter of interpretation that refers to this discusses sampling of materials from tankers in agricultural settings. This letter also identifies that fall protection should be considered and utilized when these activities occur within or alongside buildings where systems could be provided. It finally asserts the employer's responsibility to provide a safe and healthful workplace—the general duty clause.

In recent years, we have observed the agency attempting to exert itself regarding citations for fall protection systems while working on and accessing trailers where fall hazards exist in excess of 4 ft. This has happened in several industries, including the precast concrete industry. Typically, this has been the result of some sort of injury. Alternatively, it has been in cases where the employer was operating under a roof with the means available to provide fall protection during operations such as tarping loads. Due to technology and innovations now available, in some cases, OSHA has been able to demonstrate that what was once infeasible is now feasible. In most cases, OSHA has issued citations under the general duty clause, avoiding the walking-working surface standards.

Only time will tell what the agency will do to specifically apply or not apply these definitions to the bed of a flatbed trailer.

In the preamble to the final rule, there is much discussion about rolling stock. Here are some highlights to note.

- The current **construction standard** defines a walking-working surface with language that excludes trailers:

  > "Walking/working surface means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel ***but not including ladders, vehicles, or trailers***, on which employees must be located in order to perform their job duties."

- The **final rule** has a definition that **does not** have the exclusions found in the construction standard:

  > "Walking-working surface means any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location."

- The proposed rule included a list of example surfaces that meet the definition. However, in the preamble to the final rule, OSHA notes that "the final rule deletes the list of examples of walking-working surfaces from the proposal. Accordingly, **the regulated community is to broadly construe the final definition of "walking-working surface"** to cover any surface on or through which employees walk, work, or gain access to a work area or workplace location.
- OSHA concludes its section on rolling stock in the preamble with this statement:

  > "Since the Agency did not propose any specific fall protection requirements for rolling stock or motor vehicles, OSHA has not included any in this final rule. However, it will continue to consider the comments it has received, and in the future the Agency may determine whether it is appropriate to pursue any action on this issue."

Some have taken OSHA's final comments to indicate that there is no need to concern themselves with providing fall protection for workers when they are atop trailers. It is our opinion that this is a dangerous position to take, both for the worker and for the employer's OSHA record. The change in definitions appears to give OSHA latitude that it did not previously have. Only time will tell what the agency will do to specifically apply or not apply these definitions to the bed of a flatbed trailer. It may take some time before citations are

issued and contested or letters of interpretation are issued. In addition, there are numerous areas within the preamble where OSHA discusses feasible solutions. One such area is quite direct.

> "OSHA believes the evidence employers and industry associations submitted shows **it is technologically feasible in many cases** for employers to provide fall protection for rolling stock and motor vehicles regardless of their location."

Much of the infeasibility discussion regarding stacked materials in the prior section also applies to rolling stock fall protection with regard to trailer loading of precast concrete elements in the yard. This is the case as much of this operation is done beneath the footprint of a straddle crane or with mobile crane load lines, hooks, and rigging occupying the air space over the trailer. In addition, the elements are often wider than the trailer, preventing the use of clip-on devices, such as guard rails or nets. However, the precasting operation should be diligent to pursue all potential options for ensuring that workers are protected.

In all cases, where feasible, fall protection systems should be used. Alternatively, re-engineered processes that will prevent drivers and workers from needing to access the trailer are preferred. Examples include workers utilizing non-self-supporting ladders to reach the top or side lifters of panels on A-frames rather than straddling the tops of panels or unhooking wall panels from ladders if reach permits.

In the case of performing manufacturing operations on product that is stored or staged on a trailer, OSHA has been quite clear. There have been citations issued. It is recommended that precast concrete elements that need to be ground, patched, or otherwise repaired be staged on racks or in a safe area where the worker can perform the duties on the ground. Alternatively, workers should be provided work platforms that either eliminate their fall hazards or reduce such hazards to less than 4 ft.

Finally, when workers are required to access the trailer, best practices suggest that truck access ladders are utilized to prevent workers climbing up the tires or ICC bar (DOT bumper) at the rear of the trailer. Jumping down from the trailer is also a practice that should be eliminated.

Dockboards

Under the final rule, dockboards are covered under 1910.26 and 1910.28(b)(4). Similar requirements are included in the final rule as are in the existing rule, which include the following:

- Dockboards must be capable of supporting their maximum intended load
- Portable dockboards must be equipped with handholds or other means to permit safe handling
- Portable dockboards must be secured by anchoring them in place or using equipment or devices that prevent the dockboard from moving out of a safe position.

OSHA has included a new exception to this last point in the final rule that states, "When the employer demonstrates that securing the dockboard is not feasible, the employer must ensure there is sufficient contact between the dockboard and the surface to prevent the dockboard from moving out of a safe position."

Also, under the final rule, OSHA is now requiring dockboards to be designed, constructed, and maintained to prevent transfer vehicles (such as forklifts) from running off the dockboard edge (run-off protection). This requirement is mandatory for all dockboards put into initial service on or after January 17, 2017, unless the employer can demonstrate that there is no hazard of transfer vehicles running off the dockboard edge.

Additionally, the final rule has added requirements for measures, such as wheel chocks or sand shoes, to be used to prevent the transport vehicle (such as a truck, semitrailer, trailer, or rail car) on which a dockboard is placed from moving while employees are on the dockboard.

Lastly, OSHA will now require that employees working on dockboards are protected from falling 4 ft or more to a lower level by a guardrail system or handrails. OSHA has included an exception to this rule if dockboards are being used solely for materials-handling operations using motorized equipment and employees engaged in these operations are not exposed to fall hazards greater than 10 ft. Under these circumstances, OSHA requires that the employees involved in this operation are properly trained in accordance with final rule 1910.30.

Training Requirements

The final rule has specified training requirements in 1910.30 and calls out other training requirements throughout subpart D. In general, all employees must be properly trained by a *qualified person* before they are exposed to a fall hazard. This includes when employees use personal fall protection systems, work on ladders, work on scaffolds, work within floor markings or warning lines around the pits, work at loading docks where the employer has determined that fall protection systems are infeasible, and work in designated areas on low-sloped roofs. **The final rule requires that this training is conducted on or before May 17, 2017.**

The final rule defines a qualified employee as "a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project."

This training must be presented in a manner that the employee understands and consist of the following:

- The nature of the fall hazards in the work area and how to recognize them
- The procedures to be followed to minimize the hazards
- The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the employee uses
- The correct use of personal fall protection systems and equipment including, but not limited to, proper hook-up, anchoring, and tie-off techniques, and methods of equipment inspection and storage, as specified by the manufacturer
- Proper care, inspection, storage, and use of equipment before an employee uses the equipment
- How to properly place and secure dockboards to prevent unintentional movement for those who use dockboards
- The proper setup and use of designated areas for those working within designated areas
- The training requirements of 29 CFR 1926.454 for employees who erect or use scaffolding

Retraining is required when the employer has reason to believe the employee does not have the understanding and skill required. Situations requiring retraining include, but are not limited to the following:

- When changes in the workplace render previous training obsolete or inadequate
- When changes in the types of fall protection systems or equipment to be used render previous training obsolete or inadequate
- When inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee no longer has the requisite understanding or skill necessary to use equipment or perform the job safely

The final rule also calls out what employees must do when using ladders. OSHA would expect that employers train employees who use ladders on the following items:

- Each employee faces the ladder when climbing up or down it.
- Each employee uses at least one hand to grasp the ladder when climbing up and down it.
- No employee carries any object or load that could cause the employee to lose balance and fall while climbing up or down the ladder.
- No portable single rail ladders are used.
- No ladder is moved, shifted, or extended while an employee is on it.
- Portable ladders used on slippery surfaces are secured and stabilized.

- The top of a non-self-supporting ladder is placed so that both side rails are supported, unless the ladder is equipped with a single support attachment.
- Portable ladders used to gain access to an upper landing surface have side rails that extend at least 3 ft above the upper landing surface.
- No mobile ladder stand or platform moves when an employee is on it.

Intentional Omissions

The Walking-Working Surfaces Final Rule is wide ranging. For brevity, we have omitted discussion on the following topics, as they likely do not apply to PCI members. In the event that these do apply to your organization, please review the detailed final rule for each topic.

- *Step Bolts* 1910.24(a)
- *Manhole Steps* 1910.24(b)
- *Rope Descent Systems* 1910.27(b) and 1910.28(b)(12)(ii)
- *Fall Protection on Residential Roofs* 1910.28(b)(1)(ii)
- *Outdoor Advertising (Billboards)* 1910.28(b)(10) and 1910.29(h)
- *Slaughtering Facility Platforms* 1910.28(b)(14)

Conclusion

We sincerely hope that the readers of this white paper have found its contents useful in understanding the differences between the existing and final rules. While this is our hope, it is also our understanding that the final rule is extensive and likely to open many issues for the reader, the industry, and workers. Please feel free to take advantage of our free SafetyHelpline™ if there are any questions we can help to answer. The SafetyHelpline™ is available from 9:00 am to 5:00 pm, Monday through Friday, at the number below.

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