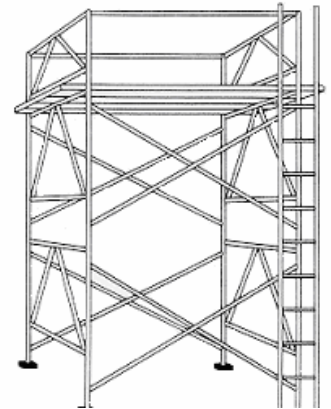


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## **A SUPERVISOR'S GUIDE TO SCAFFOLDING SAFETY IN CONSTRUCTION**

*By SeaBright Insurance Loss Control*

**A**ccording to OSHA, an estimated 2.3 million construction workers, or 65% of the construction industry, work on scaffolds frequently. Protecting these workers from scaffold-related accidents would prevent 4,500 injuries and 50 deaths every year, saving American employers \$90 million in lost workdays. In a recent BLS (Bureau of Labor Statistics) study, 72% of workers injured in scaffold accidents attributed the accident either to the planking or support giving way, or to the employee slipping or being struck by a falling object. All of these events can be controlled by compliance with OSHA standards and "best safety practices."



### **THE GOAL: FEWER SCAFFOLD ACCIDENTS AND INJURIES**

Scaffolds are used in construction for both interior and exterior work, and injuries associated with this equipment are common. Scaffold accidents account for about 9% of all fatalities in the construction industry. While falls are the most serious hazard of concern, additional hazards include falling objects, structural instability, overloading, and electrocution.

This *Supervisor's Safety Update* will list key safety factors to be remembered during the construction and use of scaffolding. These factors must be monitored and followed by all supervisors. We also list training needs, which are critical for all employees who perform work, erect, or disassemble scaffolds. References to the OSHA Scaffolding standard (29 CFR Part 1926 – Subpart L) will provide supervisors with a technical reference when needed, plus help them better understand what is required and how they can best safeguard the workers they supervise.

### **√ -PLATFORM WEIGHT CAPACITY: [1926.451(a)]**

Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms. In general, all scaffolds and scaffold components must be capable of supporting the weight of the structure *and* at least *four times* the maximum intended load (i.e., the total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time). Additional capacity requirements apply to suspension type scaffolds and their associated hardware. The stall load of any scaffold hoist

must not exceed *three* times the rated load. Specific criteria for scaffold capacity specifications are contained in an appendix to the OSHA standard.

If you design and construct your own scaffold, it must be designed by a “*qualified person*” and then must be constructed and loaded in accordance with the design.

***Qualified*** person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

### √ **PLATFORM CONSTRUCTION:** [1926.451(b)]

All working level platforms of scaffolds must be fully planked or decked between the front uprights and the guardrail supports. If the platform is composed of several individual plat-form units, such as scaffold grade planks, then the maximum space allowed between units or between a unit and an upright is one inch.

However, if you can demonstrate that a wider space is absolutely necessary, then an open space of up to 9” is allowed. An example of this situation would be when a space of more than one inch is necessary to fit around the uprights when side brackets are used to extend the width of the entire platform.

The use of shore or lean-to scaffolds is not allowed.

### √ **PLATFORM WIDTH:** [1926.451 (b)(2)]

In most cases, a scaffold platform must be at least 18” wide. However, a minimum width requirement of 12” for ladder jack scaffolds, top plate bracket scaffolds, and pump jack scaffolds. The standard does not yet require roof brackets scaffolds to meet the 12” width requirement. Manufacturers’ have argued that most existing 8” or 10” wide roof bracket scaffolds function adequately.

### √ **THE GAP ON THE OPEN-SIDED EDGE:** [1926.451 (b)(3)]

The maximum allowable space between the working edge of a platform and the face of the work surface is 14”, unless a guardrail system or personal fall arrest system is utilized for fall protection on this edge. Exceptions are:

- A maximum space of only 3” applies to outrigger scaffolds;
- A maximum space of up to 18” from the face of the work surface is allowed for plastering and lathing operations.

Each platform end must extend over its support by at least 6” unless it is cleated or otherwise restrained from movement by hooks or equivalent means.

The end of each platform that is 10 feet or less in length must not extend over its support by more than 12”. The end of each platform that is more than 10 feet in length must not extend over its support by more than 18”. However, in both cases, the maximum extension distance over the support may be increased if the platform is designed and installed so that the cantilevered portion is able to support employees and materials without tipping, or if a guardrail system is installed to block employees from accessing the cantilevered end.

***Qualified Person:*** means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

## √ ACCESS TO SCAFFOLDS [1926.451(e)]

Whenever a scaffold platform is more than 2 feet above or below the point of access, a suitable ladder, stair tower, ramp, walkway, personnel hoist, or other suitable structure is required for access. Cross braces must not be used as a means of access.

- Safe means of access must be provided if feasible and if it does not create a greater hazard for employees. A “*competent person*” will make this determination, based upon site conditions and the type of scaffold being erected or dismantled;
- Hook-on or attachable ladders must be installed as soon as scaffold erection has progressed to a point that permits safe installation and usage;
- Integral or built-in access ladders can be used but must be specifically designed and constructed for use as ladder rungs. The rungs must be uniformly spaced and be at least 8” in length, with a maximum space between rungs of 16¾”. This distance can vary slightly at the transitions between frames. These rungs cannot be used as work platforms when the rungs are less than 11½” in length, unless each affected worker uses appropriate fall protection.
- Employers must have a “competent person” determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are also required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard.

**Competent Person** means “one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.”

- When erecting or dismantling tubular welded frame scaffolds, end frames with horizontal members that are parallel and not more than 22” apart vertically may be used as climbing devices for access if they are erected in a manner that creates a usable ladder and provides good hand hold and foot space.
- Cross-braces on tubular welded frame scaffolds shall not be used as a means of access.

## √ SAFETY INSPECTIONS: [1926.451(e)3-15]

Scaffolds and their components must be inspected for visual defects by a competent person before every work shift and after any incident that may have affected the structural integrity. Any part of a scaffold that is damaged or weakened below the applicable strength provisions is to be immediately repaired, replaced, or removed from service.

- Working on a scaffold is prohibited whenever covered by snow, ice, or other slippery material except as necessary to remove such materials.
- Accumulation of debris on platforms is not allowed.
- Makeshift devices or items, such as boxes or barrels, must not be used on scaffold platforms to increase the working height of an employee.
- Ladders must not be used on scaffolds. Ladders are allowed on large area scaffolds if special criteria for securing and stabilizing them are met.

## √ FALL PROTECTION: [1926.451 (g)]

Some type of fall protection is required for each employee who works on a scaffold more than 10 feet above a lower level.

- Each employee on a boatswains' chair, catenary scaffold, float scaffold, needle beam scaffold, or ladder jack scaffold must be protected from falling with a personal fall arrest system. "*Personal fall arrest system*" (PFAS) means a system used to arrest a worker's fall. It consists of an anchorage, connectors, a full-body harness, lanyard, and may include a deceleration device, lifeline, or combinations of these. See the OSHA Construction Fall Protection Standard (29 CFR Part 1926 - Subpart M).
- Each employee on a single-point or two-point adjustable suspension scaffold must be protected by *both* a personal fall arrest system and guardrail system.
- Each employee on a crawling board (chicken ladder) must be protected by a fall arrest system, guardrail system, *or* by a 3/4" diameter grabline or equivalent handhold securely fastened beside the crawling board.
- A "*competent person*" must determine the feasibility and safety of providing fall protection for employees who erect or dismantle supported scaffolds.



## √ ANCHORAGE POINTS & LANYARDS:

A lanyard may be attached to a scaffold structural member in a personal fall arrest system. However, the scaffold structural member must be capable of supporting at least 5000 pounds per employee attached and this requirement makes it difficult for most structural members to meet the requirement for an anchorage point.

- Vertical lifelines must be fastened to a fixed safe anchorage point that is independent from the scaffold
- Horizontal lifelines must be secured to two or more scaffold structural members, or they may be looped around both suspension and independent suspension lines above the hoist and brake attached to the end of the scaffold.
- Horizontal lifelines must not be attached only to the suspension ropes.

**Competent Person** means "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

## √ GUARDRAILS: [1926.451(g)(4)]

If a guardrail system is utilized for fall protection, it must be installed on all open sides and ends of platforms *before* the scaffold is released for use by employees other than erection and dismantling crews.

- The top edge height of top rails on *supported* scaffolds (manufactured or placed in service after January 1, 2000) must be between 38" and 45" above the platform surface.
- The top edge height of top rails on all *suspension* scaffolds where both guardrails and a personal fall arrest systems is required must be between 36" and 45" above the platform surface.
- Top rails must be strong enough to withstand a force of at least 200 pounds applied in any downward or horizontal dimension.

- Midrails, screens, and mesh must be strong enough to withstand a force of at least 150 pounds applied in any downward or horizontal dimension.
- When midrails are used, they must be installed at approximately half the height between the top edge of the toprail and the platform surface.
- When screens and mesh are used, they must extend along the entire opening between the supports and from the toprail to the scaffold platform.
- All guardrails are required to be surfaced in order to prevent punctures, lacerations, and snagging of clothing.
- Crossbracing is acceptable as a toprail when the crossing point is between 38” and 48” above the work platform, or is acceptable as a midrail when the crossing point of the two braces is between 20” and 30” above the work platform. The end points at each upright must be no more than 48” apart.
- Crossbraces may be used as a substitute for either a toprail or a midrail, but not for both at the same location.

### √ **PROTECTION FROM FALLING OBJECTS:** [1926.451(h)]

In addition to wearing a hard-hat, each employee on a scaffold must be provided with additional protection from falling hand tools, debris, and other small objects by the utilization of toe-boards, screens, guardrail systems, debris nets, catch platforms, or canopy structures that contain or deflect falling objects.

- Large potential falling objects must be placed away from the surface edge and secured to prevent falling.
- Toe-boards must: be at least 3½” high from the working surface; be securely fastened in place at the outer most edge of the platform; have not more than ¼” clearance above the working surface; and be capable of withstanding a force of at least 50 pounds applied in any downward or horizontal direction at any point.
- Toe-boards must be solid or with openings of no more than 1 inch wide in the greatest dimension.

### √ **AERIAL LIFTS:** [1926.453]

Aerial lifts are vehicle-mounted aerial devices, which elevate employees to work-sites above the ground. Aerial lifts include extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and a combination of any such devices. They may be powered or manually operated and may be capable of rotating about a substantially vertical axis.

- All extensible and articulating boom platforms must have the lift controls tested each day prior to use to determine that the controls are in safe working condition.
- Only an authorized person can be allowed to operate any aerial lift.
- Upper controls that are within easy reach of the operator in the platform and lower controls that provide for overriding of the upper controls are both required.
- Employees must stand firmly on the floor of the basket and wear a Personal Fall Arrest System (PFAS) that is attached to and approved anchorage point on the boom or in the basket.
- Tying-off to an adjacent pole, structure, or equipment is not permitted.

## √ TRAINING REQUIREMENTS FOR EMPLOYEE'S PERFORMING WORK FROM OR ON SCAFFOLDS: [1926.454]

Each employee who performs work while on a scaffold must be trained by a “*qualified person*” in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. Training must include:

- The nature of any electrical hazards, fall hazards, and falling object hazards in the work area;
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being utilized;
- The proper use of the scaffold and proper handling of materials on the scaffold;
- The maximum intended load and load-carrying capacities of the scaffold used;

Each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold must be trained by a “*competent person*” to recognize any hazards associated with the specific work and to understand any pertinent requirement. The training must also always include:

- The nature of scaffold hazards; correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold;
- The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold;

Retraining of an employee is required whenever there is reason to believe that the employee lacks the skill or understanding needed for safe use, erection, or dismantling of scaffolds.

Retraining is required if changes in the work site, type of scaffold, fall protection, falling object protection, or other equipment present a hazard that the employee has not been previously trained to recognize and control.

Retraining is also required where inadequacies in an affected employee's work indicate a lack of the requisite proficiency.

### FEDERAL OSHA STANDARDS:

29 CFR Part 1926 – Subpart L applies to all scaffolds used in construction, including exclusive criteria for aerial lifts. Crane or derrick suspended personnel platforms are covered under a separate existing standard. (Note: the shipyard industry scaffold standards are contained in 29 CFR Part 1915 - Subpart E.) There are 25 specific types of scaffold listed in the OSHA scaffolding standards. This SSU has not covered all of the specific requirements for these. We have reviewed the general highlights, however, and emphasize that all OSHA standards contain the minimum compliance requirements.

### STATE PLANS MAY BE STRICTER:

The 25 states and territories with their own OSHA-approved plans are required to adopt a comparable standard that is at least as stringent as the 1996 OSHA standards. States are also allowed to have *more* stringent requirements, so check your local standards carefully. For additional information or assistance, please contact your SeaBright Loss Control consultant.

### CONCLUSION:

Considering that an estimated 65% of construction crew members frequently work on scaffolds, this job requirement presents a significant hazard in need of constant attention. Supervisors must never assume that employees will be cautious—or that they have received adequate training on previous jobsites. Scaffolding safety should be reinforced during frequent crew safety meetings. One of the SeaBright's Safety Meeting Outlines, **SMO 96-0301**, “*Personal Fall Arrest and Fall Restraint Systems*”, could be used for part of that safety training.

## **INTERNET LINKS TO THE OSHA SCAFFOLDING STANDARD:**

Go to: [www.osha.gov](http://www.osha.gov)

- Select: Standards/Construction/General Requirements/Subpart L

Or Go to: [www.osha.gov](http://www.osha.gov)

- Select S in the site index (A – Z)
- Choose “Scaffolding” in the Index, then
- Click “Outreach Memo”, and then choose “Summary” for a user-friendly PDF of the Standard.

Remember that SeaBright’s website has many helpful and user-friendly articles, links and safety meetings for your use. Just go to [www.sbic.com](http://www.sbic.com)