

# SCAFFOLD SAFETY IN THE CONSTRUCTION INDUSTRY

AN OVERVIEW OF THE OCCUPATIONAL  
HEALTH AND SAFETY ADMINISTRATION  
(OSHA) STANDARD

**New England Laborers'**



**Health & Safety Fund**

410 South Main Street  
Providence, RI 02903  
Phone: (401) 621-5355  
Fax: (401) 621-5603  
[www.nelhsf.com](http://www.nelhsf.com)

## What are the highlights of the scaffolding standard?

OSHA's scaffolding standard has several key provisions:

- Fall protection or fall arrest systems -- Each employee more than 10 feet above a lower level shall be protected from falls by guardrails or a fall arrest system, except those on single-point and two-point adjustable suspension scaffolds. Each employee on a single-point and two-point adjustable suspended scaffold shall be protected by both a personal fall arrest system and a guardrail. **1926.451(g)(1)**
- Guardrail height -- The height of the toprail for scaffolds manufactured and placed in service after January 1, 2000 must be between 38 inches (0.9 meters) and 45 inches (1.2 meters). The height of the toprail for scaffolds manufactured and placed in service before January 1, 2000 can be between 36 inches (0.9 meters) and 45 inches (1.2 meters). **1926.451(g)(4)(ii)**
- Crossbracing -- When the crosspoint of crossbracing is used as a toprail, it must be between 38 inches (0.97 m) and 48 inches (1.3 meters) above the work platform. **1926.451(g)(4)(xv)**
- Midrails -- Midrails must be installed approximately halfway between the toprail and the platform surface. When a crosspoint of crossbracing is used as a midrail, it must be between 20 inches (0.5 meters) and 30 inches (0.8 m) above the work platform. **1926.451(g)(4)**
- Footings -- Support scaffold footings shall be level and capable of supporting the loaded scaffold. The legs, poles, frames, and uprights shall bear on base plates and mud sills. **1926.451(c)(2)**
- Platforms -- Supported scaffold platforms shall be fully planked or decked. **1926.451(b)**
- Guying, ties, and braces -- Supported scaffolds with a height-to-base of more than 4:1 shall be restrained from tipping by guying, tying, bracing, or the equivalent. **1926.451(c)(1)**
- Capacity -- Scaffolds and scaffold components must support at least 4 times the maximum intended load. Suspension scaffold rigging must at least 6 times the intended load. **1926.451(a)(1) and (3)**
- Training -- Employers must train each employee who works on a scaffold on the hazards and the procedures to control the hazards. **1926.454**
- Inspections -- Before each work shift and after any occurrence that could affect the structural integrity, a competent person must inspect the scaffold and scaffold components for visible defects. **1926.451(f)(3)**
- Erecting and Dismantling -- When erecting and dismantling supported scaffolds, a competent person must determine the feasibility of providing a safe means of access and fall protection for these operations. **1926.451(e)(9) & (g)(2)**

## General Requirements for Scaffolds §1926.451

### *Capacity*

#### **What are the capacity requirements for all scaffolds?**

Each scaffold and scaffold component must support without failure its own weight and at least four times the maximum intended load applied or transmitted to it. **1926.451(a)(1)**

A qualified person must design the scaffolds, which are loaded in accordance with that design. **1926.451(a)(6)**

Scaffolds and scaffold components must not be loaded in excess of their maximum intended loads or rated capacities, whichever is less. **1926.451(f)(1)**

Load carrying timber members should be a minimum of 1,500 lb-f/in<sup>2</sup> construction grade lumber. **Appendix A (1)(a)**

### *Scaffold Platform Construction*

#### **What are scaffold platform construction requirements?**

Each platform must be planked and decked as fully as possible with the space between the platform and uprights not more than 1 inch (2.5 centimeters) wide. The space must not exceed 9 inches (24.1 centimeters) when side brackets or odd-shaped structures result in a wider opening between the platform and the uprights. **1926.451(b)(1)**

#### **What are the requirements for scaffold planking?**

Scaffold planking must be able to support, without failure, its own weight and at least four times the intended load. **1926.451(a)(1)**

Solid sawn wood, fabricated planks, and fabricated platforms may be used as scaffold planks following the recommendations by the manufacturer or a lumber grading association or inspection agency. **Appendix A (1)(b) and (c)**

Tables showing maximum permissible spans, rated load capacity, and nominal thickness are in **Appendix A (1)(b) & (c)** of the standard.

#### **What is the maximum deflection of a platform?**

The platform must not deflect more than 1/60 of the span when loaded. **1926.451(f)(16)**

#### **Are there requirements for work on platforms cluttered with debris?**

The standard prohibits work on platforms cluttered with debris. **1926.451(f)(13)**

#### **How wide does the work area need to be on scaffolding?**

Each scaffold platform and walkway must be at least 18 inches (46 centimeters) wide. When the work area is less than 18 inches (46 centimeters) wide, guardrails and/or personal fall arrest systems must be used. **1926.451(b)(2)**

### **Are guardrails required on all open sides of scaffolding?**

The standard requires employers to protect each employee on a scaffold more than 10 feet (3.1 m) above a lower level from falling to that lower level. **1926.451(g)(1)**

To ensure adequate protection, install guardrails along all open sides and ends before releasing the scaffold for use by employees, other than the erection and dismantling crews.

1926.451(g)(4) Guardrails are not required, however,

- When the front end of all platforms are less than 14 inches (36 centimeters) from the face of the work; **1926.451(b)(3)**
- When outrigger scaffolds are 3 inches (8 centimeters) or less from the front edge; **1926.451(b)(3)(I)**
- When employees are plastering and lathing 18 inches (46 centimeters) or less from the front edge. **1926.451(b)(3)(ii)**

### **What materials are unacceptable for guardrails?**

Steel or plastic banding must not be used as a toprail or a midrail. **1926.451(g)(4)(xiii)**

### ***Criteria for Supported Scaffolds***

#### **What are supported scaffolds?**

Supported scaffolds are platforms supported by legs, outrigger beams, brackets, poles, uprights, posts, frames, or similar rigid support. **1926.451(b)**

The structural members, poles, legs, posts, frames, and uprights, must be plumb and braced to prevent swaying and displacement. **1926.451(c)(3)**

#### **Do employees working on supported scaffolds need to be trained?**

All employees must be trained by a qualified person to recognize the hazards associated with the type of scaffold being used and how to control or minimize those hazards. The training must include fall hazards, falling object hazards, electrical hazards, proper use of the scaffold, and handling of materials. **1926.454(a)**

#### **When do supported scaffolds need to be restrained from tipping?**

Supported scaffolds with a height to base width ratio of more than 4:1 must be restrained by guying, tying, bracing, or an equivalent means. **1926.451(c)(1)**

#### **How can one prevent supported scaffolding from tipping?**

Either the manufacturers' recommendation or the following placements must be used for guys, ties, and braces:

- Install guys, ties, or braces at the closest horizontal member to the 4:1 height and repeat vertically with the top restraint no further than the 4:1 height from the top.
- Vertically -- every 20 feet (6.1 meters) or less for scaffolds less than three feet (0.91 meters) wide; every 26 feet (7.9 meters) or less for scaffolds more than three feet (0.91 meters) wide.
- Horizontally -- at each end; at intervals not to exceed 30 feet (9.1 meters) from one end. **1926.451(c)(1)**

### **What are the footing and foundation requirements for supported scaffolds?**

Supported scaffolds' poles, legs, posts, frames, and uprights must bear on base plates and mud sills, or other adequate firm foundation. **1926.451(c)(2)(i) and (ii)**

### **May forklifts, front-end loaders, or similar equipment support platforms?**

Forklifts can support platforms only when the entire platform is attached to the fork and the forklift does not move horizontally when workers are on the platform. **1926.451(c)(2)(v)**

Front-end loaders and similar equipment can support scaffold platforms only when they have been specifically designed by the manufacturer for such use. **1926.451(c)(2)(iv)**

### **What materials can be used to increase the working level height of employees on supported scaffolds?**

Stilts may be used on a large area scaffold. When a guardrail system is used, the guardrail height must be increased in height equal to the height of the stilts. The manufacturer must approve any alterations to the stilts. **1926.452(v)**

**Note:** A large area scaffold consists of a pole, tube and coupler systems, or a fabricated frame scaffold erected over substantially the entire work area. **1926.451(b)**

### ***Criteria for Suspended Scaffolds***

#### **What are suspension scaffolds?**

A suspension scaffold contains one or more platforms suspended by ropes or other non-rigid means from an overhead structure, **1926.450(b)**, such as the following scaffolds: single-point, multipoint, multi-level, two-point, adjustable, boatswains' chair, catenary, chimney hoist, continuous run, elevator false car, go-devils, interior hung, masons', and stone setters'.

#### **Are there requirements for suspension scaffolds?**

Some of the requirements for all types of suspension scaffolds include:

- Employers must ensure that all employees are trained to recognize the hazards associated with the type of scaffold being used. **1926.451(d)(1)**
- All support devices must rest on surfaces capable of supporting at least four times the load imposed on them by the scaffold when operating at the rated load of the hoist, or at least one-and-a-half times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater. **1926.451(d)(1)**
- A competent person must evaluate all direct connections prior to use to confirm that the supporting surfaces are able to support the imposed load, **1926.451(d)(1)**
- All suspension scaffolds must be tied or otherwise secured to prevent them from swaying, as determined by a competent person. **1926.451(d)**
- Guardrails, a personal fall arrest system, or both must protect each employee more than 10 feet (3.1 meters) above a lower level from falling. **1926.451(g)**
- A competent person must inspect ropes for defects prior to each workshift and after every occurrence that could affect a rope's integrity. **1926.451(d)(10)**
- When scaffold platforms are more than 24 inches (61 centimeters) above or below a point of access, ladders, ramps, walkways, or similar surfaces must be used. **1926.451(e)(1)**
- When using direct access, the surface must not be more than 24 inches (61 centimeters) above or 14 inches (36 cm) horizontally from the surface. **1926.451(e)(8)**

- When lanyards are connected to horizontal lifelines or structural members on single-point or two-point adjustable scaffolds, the scaffold must have additional independent support lines equal in number and strength to the suspension lines and have automatic locking devices. **1926.451(g)(3)(iii)**
- Emergency escape and rescue devices must not be used as working platforms, unless designed to function as suspension scaffolds and emergency systems. **1926.451(d)(19)**

### **Are there specific requirements for counterweights?**

Counterweights used to balance adjustable suspension scaffolds must be able to resist at least four times the tipping moment imposed by the scaffold operating at either the rated load of the hoist, or one-and-a-half (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater. **1926.451(a)(2)**

Only those items specifically designed as counterweights must be used. **1926.451(d)(3)(iii)**

Counterweights used for suspended scaffolds must be made of materials that can not be easily dislocated. Flowable material, such as sand or water, cannot be used. **1926.451(d)(3)(ii)**

Counterweights must be secured by mechanical means to the outrigger beams. **1926.451(d)(3)(iv)**

Vertical lifelines must not be fastened to counterweights. **1926.451(g)(3)(i)**

### **Can sand, masonry units, or rolls of roofing felt be used for counterweights?**

No. Such materials cannot be used as counterweights. **1926.451(d)(3)(ii) and (iii)**

### **What are the specific requirements for outrigger beams?**

Outrigger beams (thrustouts) are the structural members of a suspension or outrigger scaffold that provide support. **1926.450(b)** They must be placed perpendicular to their bearing support. **1926.451(d)(3)(viii)**

### **Where do tiebacks for outrigger beams, cornice hooks, roof hooks, roof irons, parapet clamps, or similar devices need to be secured?**

Tiebacks must be secured to a structurally sound anchorage on the building or structure. Sound anchorages do not include standpipes, vents, other piping systems, or electrical conduit. **1926.451(d)(3)(ix) and (d)(5)**

### **How do tiebacks need to be installed?**

A single tieback must be installed perpendicular to the face of the building or structure. Two tiebacks installed at opposing angles are required when a perpendicular tieback cannot be installed. **1926.451(d)(3)(x)**

### **What are the requirements for suspension ropes?**

The suspension ropes must be long enough to allow the scaffold to be lowered to the level below without the rope passing through the hoist, or the end of the rope configured to prevent the end from passing through the hoist. **1926.451(d)(6)**

The standard prohibits using repaired wire. **1926.451(d)(7)**

Drum hoists must contain no less than four wraps of the rope at the lowest point.

**1926.451(d)(6)**

Employers must replace wire rope when the following conditions exist: kinks; six randomly broken wires in one rope lay or three broken wires in one strand in one lay; one third of the original diameter of the outside wires is lost; heat damage; evidence that the secondary brake has engaged the rope; and any other physical damage that impairs the function and strength of the rope. **1926.451(d)(10)**

Suspension ropes supporting adjustable suspension scaffolds must be a diameter large enough to provide sufficient surface area for the functioning of brake and hoist mechanisms.

**1926.451(f)(10)**

Suspension ropes must be shielded from heat-producing processes. **1926.451(f)(11)**

### **What are some of the requirements for power-operated suspension scaffold hoists?**

Power-operated hoists used to raise or lower a suspended scaffold must be tested and listed by a qualified testing laboratory. **1926.451(d)(13)**

The stall load of any scaffold hoist must not exceed three times its rated load. **1926.451(a)(5)**

The stall load is the load at which the prime-mover (motor or engine) of a power-operated hoist stalls or the power to the prime-mover is automatically disconnected. **1926.451(b)**

Gasoline power-operated hoists or equipment are not permitted. **1926.451(d)(14)**

Drum hoists must contain no less than four wraps of suspension rope at the lowest point of scaffold travel. **1926.451(d)(6)**

Gears and brakes must be enclosed. **1926.451(d)(15)**

An automatic braking and locking device, in addition to the operating brake, must engage when a hoist makes an instantaneous change in momentum or an accelerated overspeed.

**1926.451(d)(16)**

### **What are some of the requirements for manually operated suspension scaffold hoists?**

Manually operated hoists used to raise or lower a suspended scaffold must be tested and listed by a qualified testing laboratory. **1926.451(d)(13)**

These hoists require a positive crank force to descend. **1926.451(d)(17)**

### **When can welding be done from a suspension scaffold?**

Welding can be done from suspended scaffolds when

- A grounding conductor is connected from the scaffold to the structure and is at least the size of the welding lead;
- The grounding conductor is not attached in series with the welding process or the work piece;
- An insulating material covers the suspension wire rope and extends at least four feet (1.2 meters) above the hoist;
- Insulated protective covers cover the hoist;
- The tail line is guided, retained, or both, so that it does not become grounded;

- Each suspension rope is attached to an insulated thimble; and
- Each suspension rope and any other independent lines are insulated from grounding. **1926.451(f)(17)**

**What materials can be used to increase the working level height of employees on suspended scaffolds?**

No materials or devices may be used to increase the working height on a suspension scaffold. This includes ladders, boxes, and barrels. **1926.451(f)(14) and (15)**

***Access Requirements***

**What are the requirements for access to scaffolds?**

Employers must provide access when the scaffold platforms are more than 2 feet (0.6 meters) above or below a point of access. **1926.451(e)(1)**

Direct access is acceptable when the scaffold is not more than 14 inches (36 centimeters) horizontally and not more than 24 inches (61 centimeters) vertically from the other surfaces. **1926.451(e)(8)**

The standard prohibits the use of crossbraces as a means of access. **1926.451(e)(1)**

**What types of access can be used?**

Several types of access are permitted:

- Ladders, such as portable, hook-on, attachable, and stairway **1926.451(e)(2)**,
- Stair towers **1926.451(e)(4)**,
- Ramps and walkways **1926.451(e)(5)**, and
- Integral prefabricated frames (**1926.451(e)(6)**).

**What are the access requirements for employees erecting and dismantling supported scaffolds?**

Employees erecting and dismantling supported scaffolding must have a safe means of access provided when a competent person has determined the feasibility and analyzed the site conditions. **1926.451(e)**

***Use Requirements***

**Does the standard prohibit any types of scaffolds?**

Shore and lean-to scaffolds are strictly prohibited. **1926.451(f)(2)**

Also, employees are prohibited from working on scaffolds covered with snow, ice, or other slippery materials, except to remove these substances. **1926.451(f)(8)**

**What are the clearance distances between scaffolds and power lines?**

The standard requires specific clearance distances. See page 42 of this publication and **1926.451(f)(6)** for a table listing those distances.

## ***Fall Protection Requirements***

### **What is fall protection?**

Fall protection includes guardrail systems and personal fall arrest systems. Guardrail systems are explained below in another question. Personal fall arrest systems include harnesses, components of the harness/belt such as Dee-rings, and snap hooks, lifelines, and anchorage point.

#### **1926.451(g)(3)**

Vertical or horizontal lifelines may be used. **1926.451(g)(3)(ii) through (iv)**

Lifelines must be independent of support lines and suspension ropes and not attached to the same anchorage point as the support or suspension ropes. **1926.451(g)(3)(iii) and (iv)**

When working from an aerial lift, attach the fall arrest system to the boom or basket.

#### **1926.453(b)(2)(v)**

### **What are the fall protection requirements for all scaffolds?**

Employers must provide fall protection for each employee on a scaffold more than 10 feet (3.1 meters) above a lower level. **1926.451(g)(1)**

A competent person must determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. **1926.451(g)(2)**

### **How will I know what kind of fall protection to provide for a specific-type of scaffold?**

The chart on the next page illustrates the type of fall protection required for specific scaffolds.

<b><i>Type of Scaffold</i></b>	<b><i>Fall Protection Required</i></b>
Aerial lifts	Personal fall arrest system
Boatswains' chair	Personal fall arrest system
Catenary scaffold	Personal fall arrest system
Crawling board (chicken ladder)	Personal fall arrest system, or a guardrail system, or by a 3/4 inch (1.9 cm) diameter grab line or equivalent handhold securely fastened beside each crawling board
Float scaffold	Personal fall arrest system
Ladder jack scaffold	Personal fall arrest system
Needle beam scaffold	Personal fall arrest system
Self-contained scaffold	<b>Both</b> a personal adjustable scaffold arrest system <b>and</b> a guardrail system
Single-point and two-point suspension scaffolds	Both a personal fall arrest system <b>and</b> a guardrail system
Supported scaffold	Personal fall arrest system <b>or</b> guardrail system
All other scaffolds not specified above	Personal fall arrest system <b>or</b> guardrail systems that meet the required criteria

**When can personal fall arrest systems be used when working on scaffolding and aerial lifts?**

Personal fall arrest systems can be used on scaffolding when there are no guardrail systems. **1926.451(g)(1)(vii)**

Use fall arrest systems when working from the following types of scaffolding: boatswains' chair, catenary, float, needle beam, ladder, and pump jack. **1926.451(g)(1)**

Use fall arrest systems also when working from the boom/basket of an aerial lift. **1926.453(b)(2)(v)**

**When are both fall arrest and guardrail systems required?**

Fall arrest and guardrail systems must be used when working on single- and two-point adjustable suspension scaffolds and self-contained adjustable scaffolds that are supported by ropes. **1926.451(g)(1)**

***Falling Object Protection***

**What protections from overhead falling objects do the standards require?**

To protect employees from falling hand tools, debris, and other small objects, install toeboards, screens, guardrail systems, debris nets, catch platforms, canopy structures, or barricades. In addition, employees must wear hard hats. **1926.451(h)(1) & (2) and (3)**

**Specific Scaffold (§1926.452) and Aerial Lift (§1926.453) Requirements**

***Specific Scaffold Requirements §1926.452***

**Are there additional requirements for specific types of scaffolds?**

The standard addresses other requirements for specific types of scaffolds such as mobile, ladder, and pump jack, fabricated frame, and tube and coupler scaffolds. These are found in **1926.452**, "Additional Requirements Applicable to Specific Types of Scaffolds."

***Aerial Lift Requirements §1926.453***

**What are aerial lifts?**

Vehicle-mounted aerial devices used to elevate employees -- such as extensible boom platforms, aerial lifts, articulating boom platforms, and vertical towers -- are considered "aerial lifts." **1926.453(a)(1)**

**Do aerial lifts and mobile scaffolds have the same requirements?**

The **1926.453** and **1926.454** standards apply to aerial lifts. The **1926.451**, **1926.452**, and **1926.454** standards apply to mobile scaffolds.

### **What are some of the specific requirements for aerial lifts?**

Some specific requirements include the following:

- Only authorized personnel can operate aerial lifts.
- The manufacturer or equivalent must certify any modification.
- The insulated portion must not be altered to reduce its insulating value.
- Lift controls must be tested daily.
- Controls must be clearly marked.
- Brakes must be set and outriggers used.
- Boom and basket load limits must not be exceeded.
- Employees must wear personal fall arrest systems, with the lanyard attached to the boom or basket.
- No devices to raise the employee above the basket floor can be used. **1926.453(b)**

### ***Training Requirements §1926.454***

#### **What are the training standards for employees who work on scaffolds?**

All employees who work on a scaffold must be trained by a person qualified to recognize the hazards associated with the type of scaffold used and to understand the procedures to control and minimize those hazards. **1926.454(a)**

#### **What are the training standards for employees who work, erect, dismantle, move, operate, repair, maintain, or inspect scaffolds?**

A competent person must train all employees who erect, disassemble, move, operate, repair, maintain, or inspect scaffolds. Training must cover the nature of the hazards, the correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in use. **1926.454(b)**

Other recommended training topics include erection and dismantling, planning, personal protective equipment, access, guys and braces, and parts inspection. **Appendix D**

#### **What are the retraining requirements for employees working on scaffolds?**

The standard requires retraining when (1) no employee training has taken place for the worksite changes, scaffold changes, or falling object protection changes; or (2) where the employer believes the employee lacks the necessary skill, understanding, or proficiency to work safely. **1926.454(c)**

## When is a competent person required for scaffolding?

OSHA's scaffolding standard defines a competent person as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous to employees, and who has authorization to take prompt corrective measures to eliminate them."

The standard requires a competent person to perform the following duties under these circumstances:

- *In General:*
  - To select and direct employees who erect, dismantle, move, or alter scaffolds. **1926.451(f)(7)**
  - To determine if it is safe for employees to work on or from a scaffold during storms or high winds and to ensure that a personal fall arrest system or wind screens protect these employees. (Note: Windscreens should not be used unless the scaffold is secured against the anticipated wind forces imposed.) **1926.451(f)(12)**
- *For Training:*
  - To train employees involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting scaffolds to recognize associated work hazards. **1926.454(b)**
- *For Inspections:*
  - To inspect scaffolds and scaffold components for visible defects before each work shift and after any occurrence which could affect the structural integrity and to authorize prompt corrective actions. **1926.451(f)(3)**
  - To inspect ropes on suspended scaffolds prior to each workshift and after every occurrence which could affect the structural integrity and to authorize prompt corrective actions. **1926.451(d)(10)**
  - To inspect manila or plastic (or other synthetic) rope being used for top rails or mid rails. **1926.451(g)(4)(xiv)**
- *For Suspension Scaffolds:*
  - To evaluate direct connections to support the load. 1926.451 (d)(3)(i)
  - To evaluate the need to secure two-point and multi-point scaffolds to prevent swaying. **1926.451(d)(18)**
- *For Erectors and Dismantlers:*
  - To determine the feasibility and safety of providing fall protection and access. **1926.451(e)(9) and 1926.451(g)(2)**
  - To train erectors and dismantlers (effective September 2, 1997) to recognize associated work hazards. **1926.454(b)**
- *For Scaffold Components:*
  - To determine if a scaffold will be structurally sound when intermixing components from different manufacturers. **1926.451(b)(10)**
  - To determine if galvanic action has affected the capacity when using components of dissimilar metals. **1926.451(b)(11)**

## When is a qualified person required for scaffolding?

The standard defines a qualified person as "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."

The qualified person must perform the following duties in these circumstances:

- *In General:*
  - To design and load scaffolds in accordance with that design. **1926.451(a)(6)**
- *For Training:*
  - To train employees working on the scaffolds to recognize the associated hazards and understand procedures to control or minimize those hazards. **1926.454(a)**
- *For Suspension Scaffolds:*
  - To design the rigging for single-point adjustable suspension scaffolds. 1926.452(o)(2)(i)
  - To design platforms on two-point adjustable suspension types that are less than 36 inches (0.9 m) wide to prevent instability. **1926.452(p)(1)**
  - To make swaged attachments or spliced eyes on wire suspension ropes. **1926.451(d)(11)**
- *For Components and Design:*
  - To design scaffold components construction in accordance with the design. **1926.451(a)(6)**

### **When is an engineer required?**

The standard requires a registered professional engineer to perform the following duties in these circumstances:

- *For Suspension Scaffolds:*
  - To design the direct connections of masons' multi-point adjustable suspension scaffolds.
- *For Design:*
  - To design scaffolds that are to be moved when employees are on them. **1926.451(f)(5)**
  - To design pole scaffolds over 60 feet (18.3 meters) in height. **1926.452(a)(10)**
  - To design tube and coupler scaffolds over 125 feet (38 meters) in height. **1926.452(b)(10)**
  - To design fabricated frame scaffolds over 125 feet (38 meters) in height above their base plates. **1926.452(c)(6)**
  - To design brackets on fabricated frame scaffolds used to support cantilevered loads in addition to workers. **1926.452(c)(5)**
  - To design outrigger scaffolds and scaffold components. **1926.452(i)(8)**

### **What other standards apply to scaffolds?**

29 CFR contains other standards that apply to construction work such as the responsibility to initiate and maintain programs (**1926.29(b)(1)**); exposures to dusts and chemicals (**1926.33, .55, .59, .62, and .1101**); hand and power tools (**1926.300 - .307**); electrical (**1926.300 - .449**); personal fall arrest systems (**1926.502**); and ladders (**1926.1050 - .1060**).