# Scaffolding in Construction Subpart L

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# Scaffolding in Construction Topics

1. Statistics/Serious Hazards
2. Types of Scaffolds
3. Citations
4. Competent Person/Training
5. Foundations
6. Electrical Issues
7. Capacities
8. Access
9. Platforms
10. Fall Protection
11. Falling Object Protection
12. Tying/Guying

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# Key Provisions for Scaffold Safety

## Safe access for erectors and users includes:

**1926.451 (e) (1)**

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# Key Provisions for Scaffold Safety

## Safe access for erectors and users includes:

**1926.451 (e) (1)**

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# Scaffolding

- 2.3 million construction workers, or 65 percent of the construction industry, work on scaffolds frequently
- Approximately 4,500 injuries on scaffolds each year in the United States
- An average of 50 deaths each year from falls from scaffolds
- An estimated cost of $90 million in workdays lost each year as a result of scaffold injuries

Source: United States Department of Labor

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# Scaffolding

- 72% of workers injured in scaffold accidents attributed the accident either to
  - the planking or support giving way
  - the employee slipping
  - being struck by a falling object

Source: Bureau of Labor Statistics

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# The Five Most Serious Scaffold Hazards

- Falls
- Unsafe Access
- Falling Objects
- Electrocution
- Scaffold Collapse

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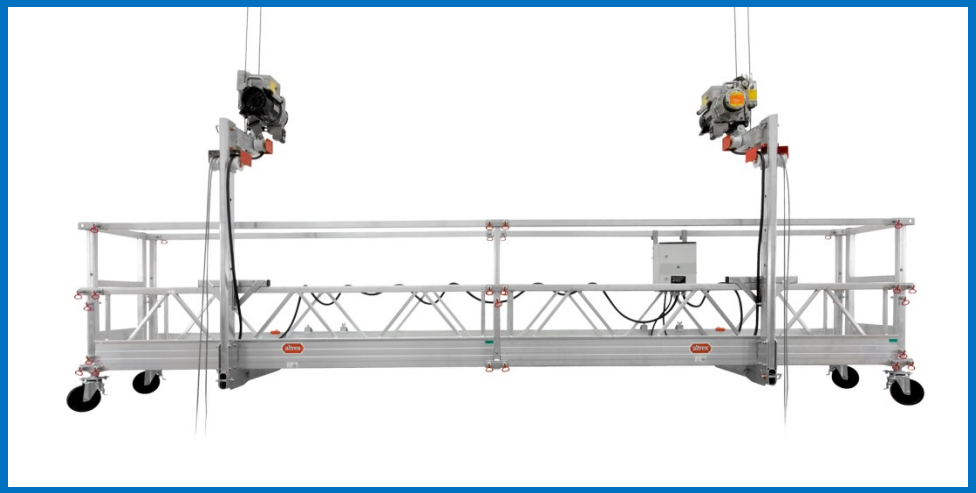
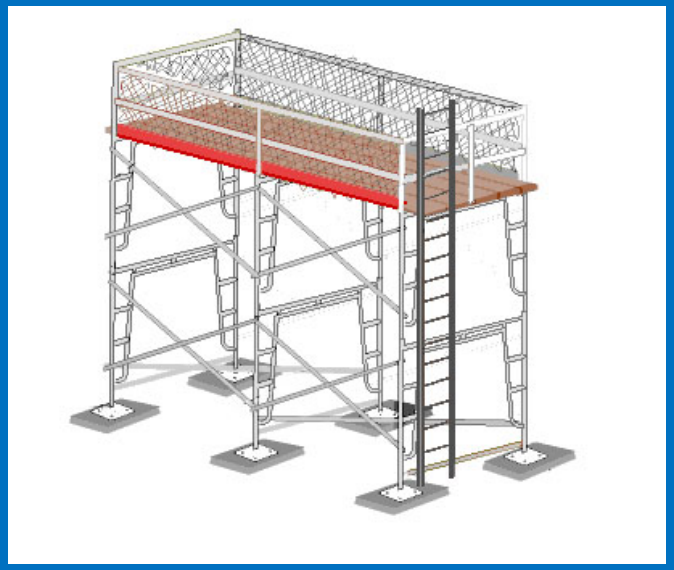
# Definition

**Scaffold means any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage), used for supporting employees or materials or both.**



Suspended



Supported

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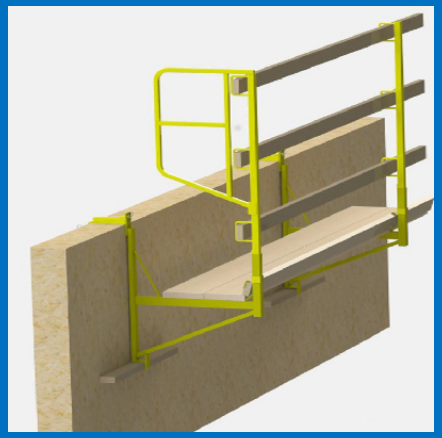
# Common Scaffolds

Fabricated Framed

Tube and Coupler



Top Plate

Ladder Jack

Mobile

Pump Jack

# Single and Two Point (Swing Stage) Adjustable Suspended Scaffolds

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# MNOSHA Supported Scaffold Citations in the Last 5 Years

- 33 Citations - 1926.451 (b) (1) Each platform on all working levels of scaffolds shall be fully planked or decked
- 11 Citations – 1926.451 (b) (5) Each end of a platform 10 feet or less in length shall not extend over its support more than 12 inches

Source: Minnesota OSHA

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Extending over support by more than 12 inches

Not fully decked and other concerns

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# MNOSHA Supported Scaffold Citations in the Last 5 Years

- 8 Citations – 1926.451 ( c ) (1) Supported scaffolds with a height to base width (including outrigger supports, if used) ratio of more than four to one (4:1) shall be restrained from tipping by guying, tying, bracing, or equivalent means

Source: Minnesota OSHA

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**Scaffolding properly tied to a building**

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# MNOSHA Supported Scaffold Citations in the Last 5 Years

- **33 Citations 1926.451 ( c ) (2) Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills or other adequate firm foundation.**

- **43 Citations 1926.451 ( e ) (1) Access requirements for employees erecting or dismantling supported scaffolds**

**Source: Minnesota OSHA**

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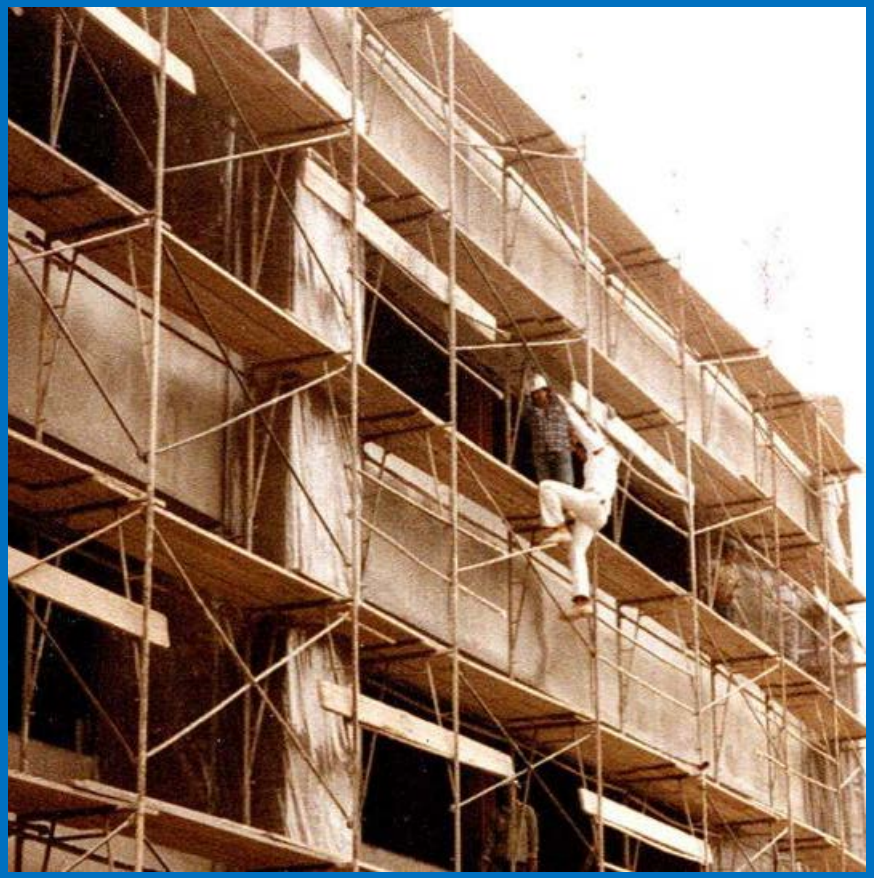

Crossbraces shall not be used as a means of access or egress

Inadequate base support

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# MNOSHA Supported Scaffold Citations in the Last 5 Years

- 22 Citations – 1926.451 (f) (7) Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling or alteration

- 175 Citations – 1926.451 (g) (1) Each employee on a scaffold more than 10 feet (3.1 m) above a lower level shall be protected from falling to that lower level

Source: Minnesota OSHA

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Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person

No fall protection for employees on this scaffold

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# MNOSHA Supported Scaffold Citations in the Last 5 Years

- **9 Citations – 1926.451 (h) (2) A danger of tools, materials, or equipment falling from a scaffold and striking employees below**

**Source: Minnesota OSHA**

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**Some type of protection is needed to protect employees from falling objects when they are working below a scaffold**

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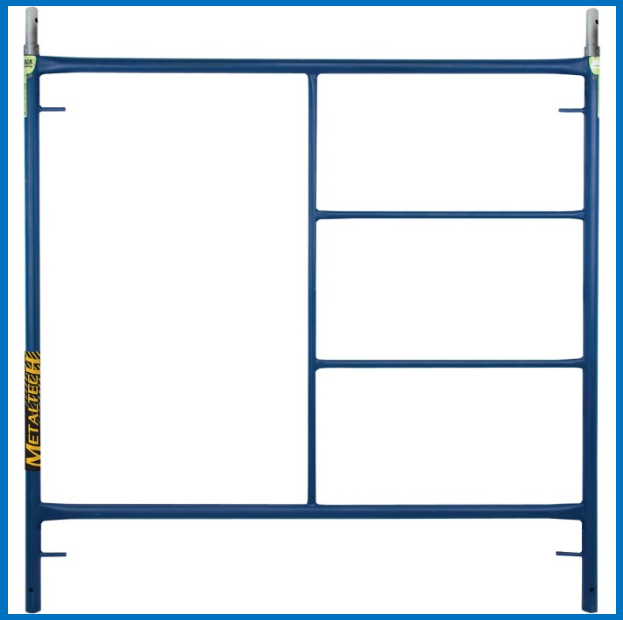
# The following slides will discuss MNOSHA Standards for Supported Fabricated Frame Scaffolds, (Tubular Welded Frame Scaffolds)

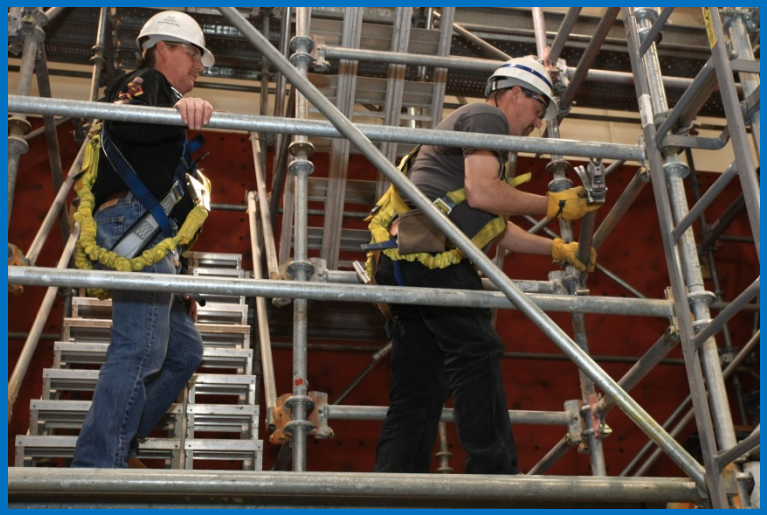


# Key Provisions for Scaffold Safety

**Training -**

- **Employers must train each employee who works on a scaffold on the hazards and the procedures to control the hazards**

**1926.454**



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# Key Provisions for Scaffold Training

- Employees working on a scaffold shall be trained by a Qualified person
- Employees erecting, or dismantling a scaffold shall be trained by a Competent person

1926.454 (a) and (b)

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# Key Provisions for Scaffold Safety

- A competent person shall determine the feasibility of providing 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.

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# Key Provisions for Scaffold Safety

**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)**

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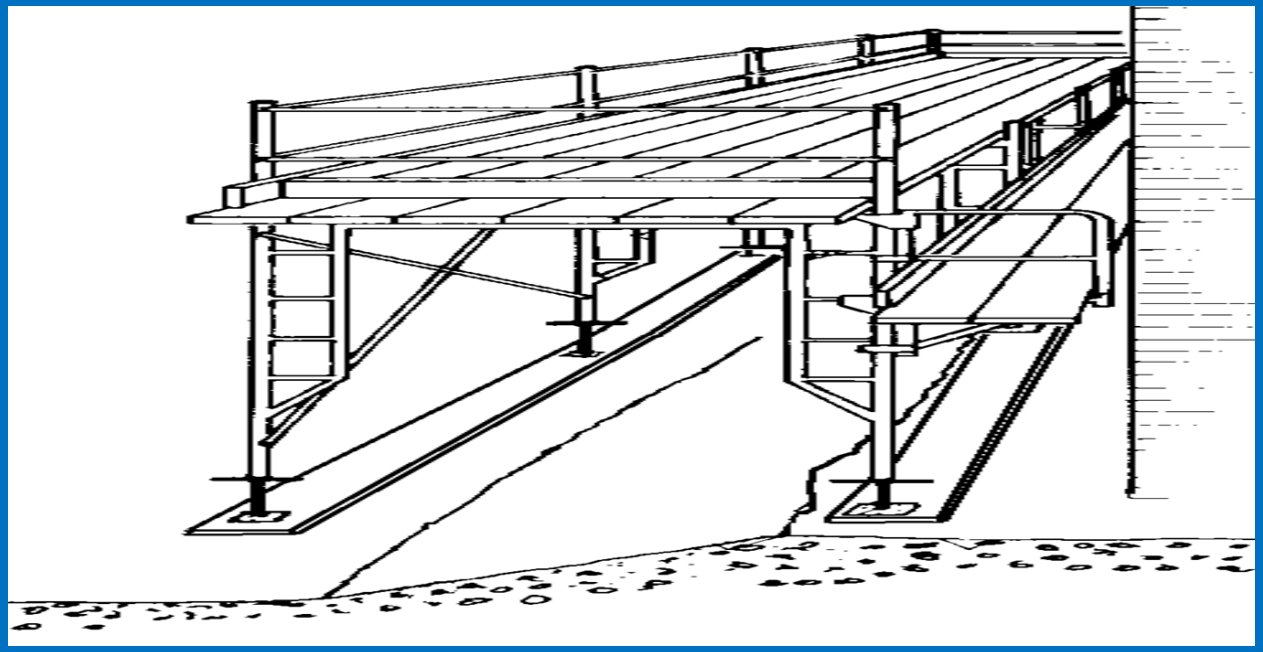
# Key Provisions for Scaffold Safety

**Footings-**

**Shall be level, sound, rigid and capable of supporting the loaded scaffold without settling or displacement.**

**1926.451 (c) (2)(i)**



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# Key Provisions for Scaffold Safety

**Footings -**

- **The legs, poles, frames, and uprights shall bear on base plates and mud sills**

**1926.451 (c) (2)**

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# Key Provisions for Scaffold Safety

**Scaffolds shall not be erected, used, dismantled, altered or moved such that they or any conductive material handled on them  might come closer to exposed and energized power lines than as follows 1926.451 (F)(6)**

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# Key Provisions for Scaffold Safety

## Power line clearance: 1926.451 (f) (6)

| Insulated line voltage | Minimum distance | Alternatives |
|---|---|---|
| Less than 300 volts | 3 feet (0.9m) | |
| 300 volts to 50 kv | 10 feet (3.1m) | |
| More than 50 kv | 10 feet plus .4 inches for each 1 kv over 50 kv | 2 times the length of the line insulator, never less than 10 feet. |

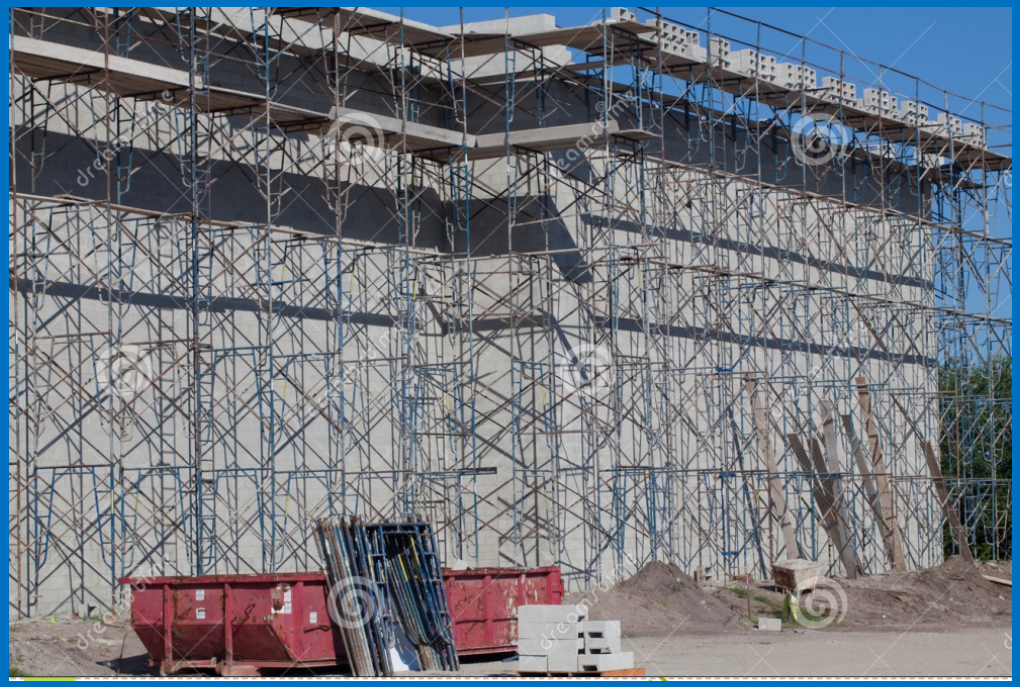
| Uninsulated line Voltage | Minimum distance | Alternatives |
|---|---|---|
| Less than 50 kv | 10 feet (3.1m) | |
| More than 50 kv | 10 feet plus .4 inches for each 1 kv over 50 kv | 2 times the length of the line Insulator, never less than 10 feet. |

# Key Provisions for Scaffold Safety

**Capacity -**

- **Scaffolds and scaffold components must support at least 4 times the maximum intended load**

**1926.451 (a) (1)**



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# Key Provisions for Scaffold Safety

**Safe access for erectors and users includes:**

- **Portable Ladders**
- **Stair Towers/Stairways**
- **Prefabricated Scaffold Frame Access**
- **Ramps**
- **Walkways**
- **Direct Access, etc.**

**1926.451 (e) (1)**

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# Key Provisions for Scaffold Safety

## Safe access for erectors and users includes:

1926.451 (e) (1)

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# Key Provisions for Scaffold Safety

**Platforms -**

- **Supported scaffold platforms shall be fully planked or decked**

**1926.451 (b)**

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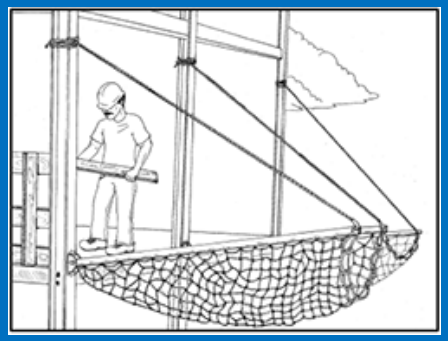
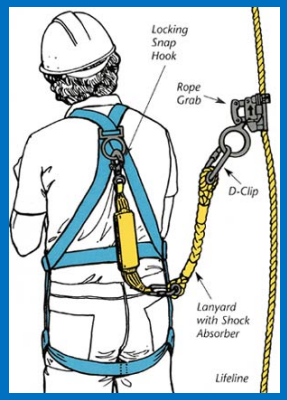
# Key Provisions for Scaffold Safety

**Fall Protection -**

**Each employee on a <u>supported scaffold</u> more than 10 feet above a lower level shall be protected from falls by:**

- **guardrails**
- **a fall arrest system**
- **safety net system**






**1926.451 (g) (1)**

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# Key Provisions for Scaffold Safety

**Guardrails -**

- **The height of the top-rail 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)**

**1926.451 (g) (4) (ii)**

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# Key Provisions for Scaffold Safety

**1926.451 (g) (4) and (vii) and (ix)**

**Guardrails -**

- **Must be Installed along all open sides before used by employees**
- **Top rail to support at least 200 lbs**
- **Midrails, screens, mesh, intermediate vertical members, solid panels, shall support at least 150 lbs.**

***When screens and mesh are used, they shall extend from the top edge of the guardrail system to the scaffold platform, and along the entire opening between the supports.**

**1926.451 (g) (v)**

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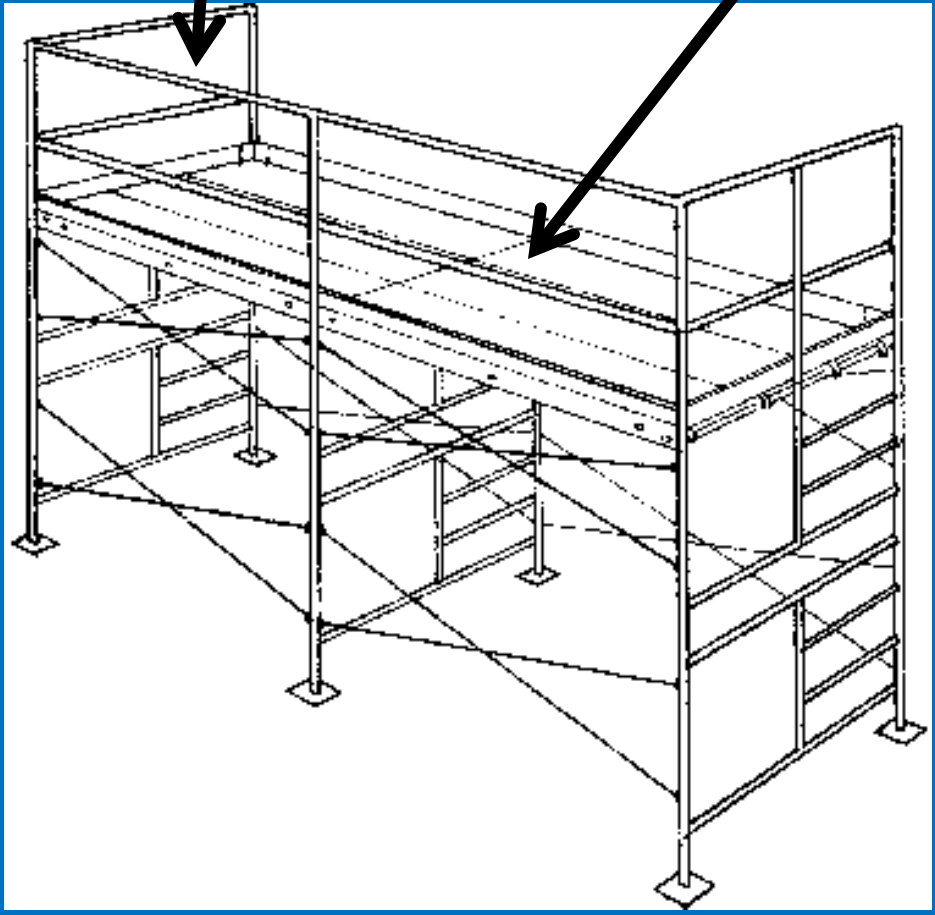
Toprail between 38 and 45 inches
Supports 200 lbs in any downward
or horizontal direction

Midrail midway between the toprail and the platform surface, supports 150 lbs.



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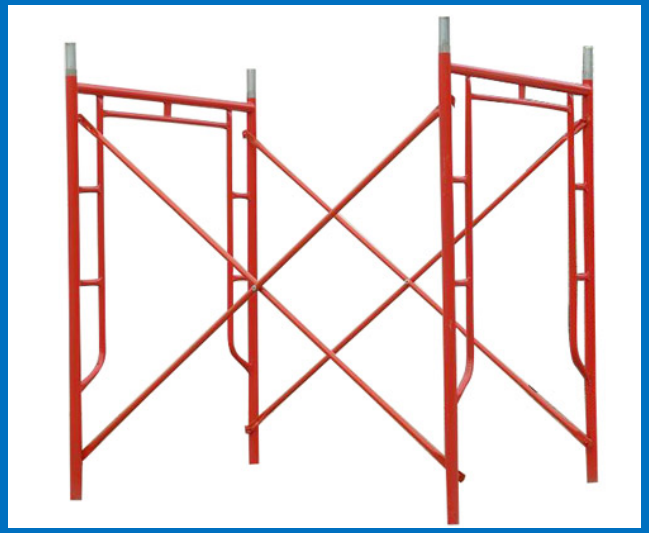
# Key Provisions for Scaffold Safety

**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)**



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Cross bracing used as a toprail. Between 38 and 48 inches above the platform

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# Key Provisions for Scaffold Safety

**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)**

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# Key Provisions for Scaffold Safety

**Falling object protection –**

**Protection is gained through the installation of:**

- Toeboards
- Screens
- Guardrail systems
- Debris nets
- Catch platforms
- Barricades

1926.451 (h)

Screens

Barricades

Toeboards

# Key Provisions for Scaffold Safety

**Guying, ties, and braces – shall be installed according to:**

- **the scaffold manufacturer's recommendations**
- **or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet (6.1 m) or less thereafter for scaffolds 3 feet (0.91 m) wide or less,**

- **and every 26 feet (7.9 m) or less thereafter for scaffolds greater than 3 feet (0.91 m) wide.**

**1926.451 (c) (1)**

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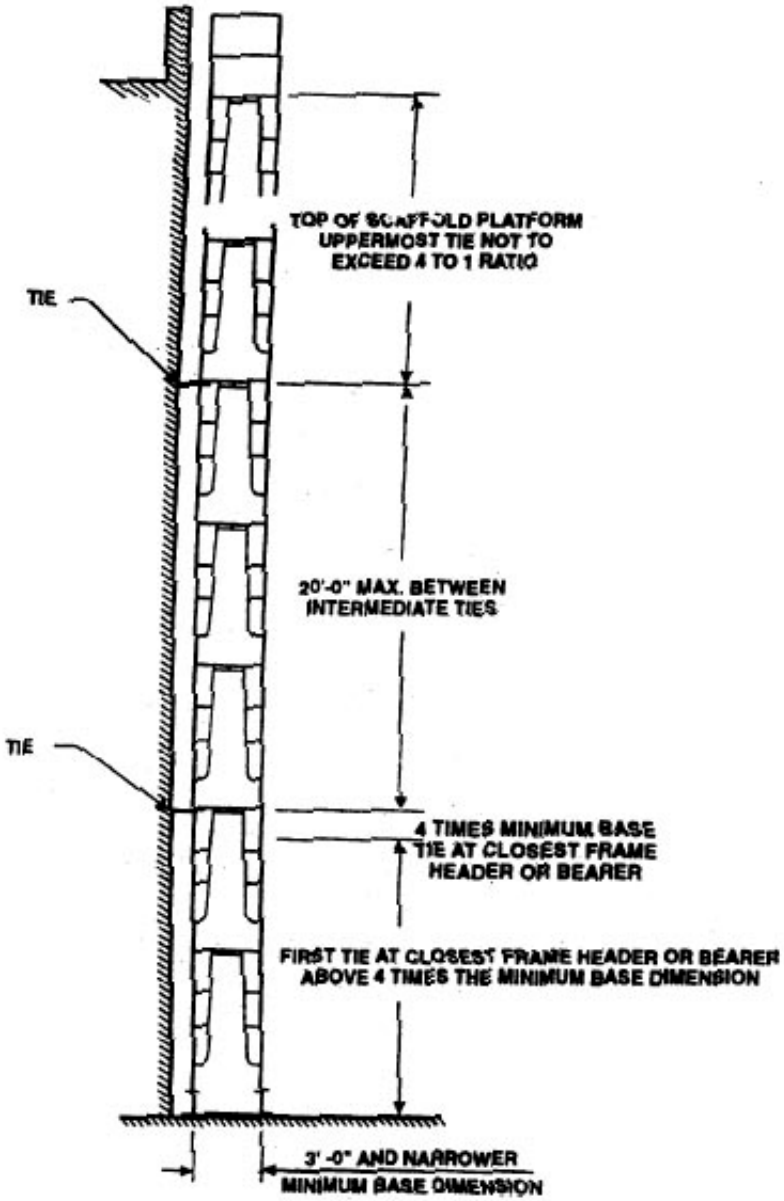
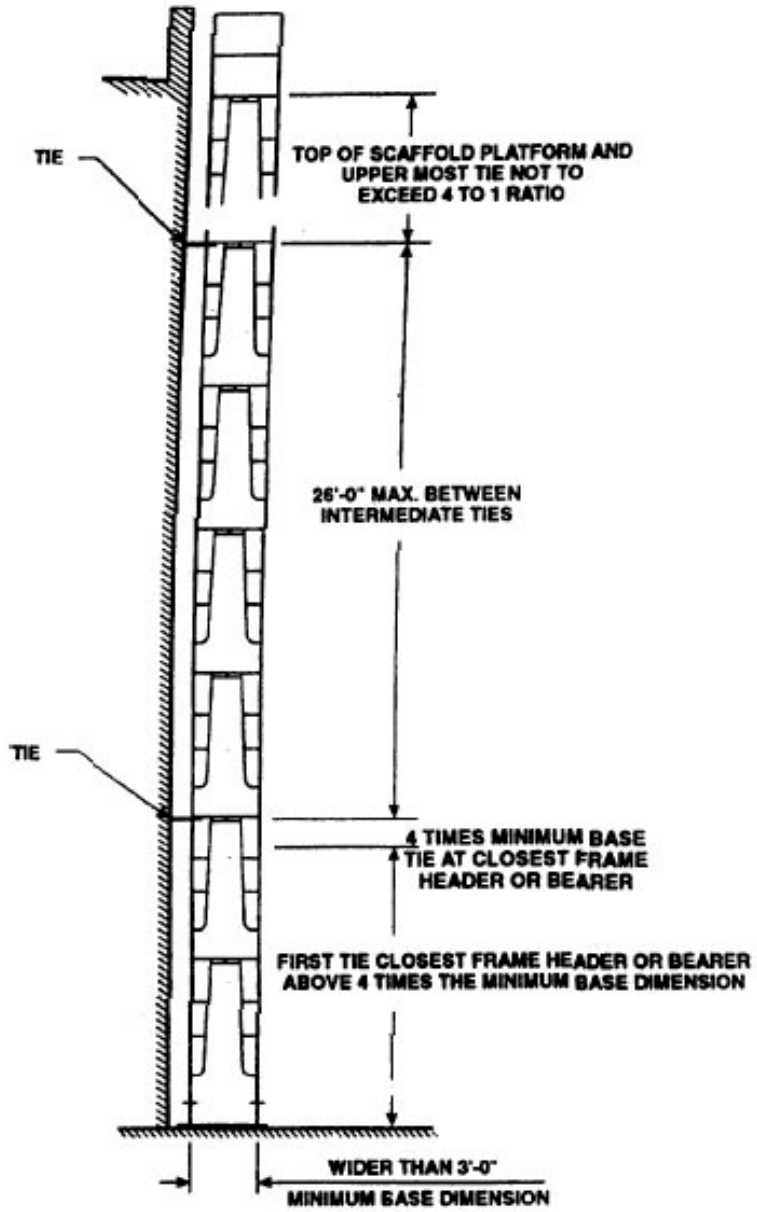
## MAXIMUM VERTICAL TIE SPACING

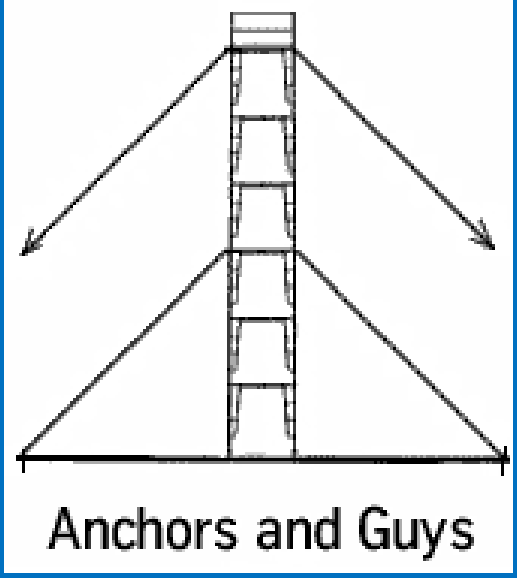
### 3'-0" AND NARROWER BASES




## MAXIMUM VERTICAL TIE SPACING

### WIDER THAN 3'-0" BASES





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# Hazard Identification

- **Putting up a plastic barrier is not scaffold erection**

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- Scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load
- Platforms shall not deflect more than 1/60 of the span when loaded

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Cross bracing by itself is not adequate fall protection
Where is the midrail?

12.20.2007

2006 4 11

DUPONT
Tyvek
HomeWrap

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E6.5! !!

19 1:49PM

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ELECTRIC
452-8441

Plummer
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